AFRICA
INNOVATION LEADERS

# COUNTRY OVERVIEW
# TUNISIA
## An Introduction to the Country Economy and the National Innovation System

## AID 11346
## Emerging African Innovation Leaders

G7 Exchange & Empowerment Program
for enabling Innovation
within the Next Production Revolution

Work Package 1

POLITECNICO MILANO 1863
POLITECNICO DI TORINO
AGENZIA ITALIANA PER LA COOPERAZIONE ALLO SVILUPPO
in collaboration with
POLITECNICO DI MILANO GRADUATE SCHOOL OF BUSINESS

**COUNTRY OVERVIEW: TUNISIA**
**An Introduction to the Country Economy and the National Innovation System**

This report describes Tunisia's National Innovation System (NIS) under the lens of the Next Production Revolution (NPR). After summarizing the main characteristics of the country's economy, it introduces the NIS players and institutions that are considered to sustain the diffusion of NPR technologies and business models across the main domestic industries. The report is primarily aimed at introducing all the members of the Emerging African Innovation Leaders project, including trainers and mentors, to the country's economy, its potential for the NPR technologies and the NIS components that can foster the embracement of the NPR in Tunisia. The report content may also be of interest to local and international policymakers, enterprises and civil sector organizations that are working toward the NPR adoption in the country.

*The document was produced by Leonardo Rosciarelli and Pierluigi Leone between April and August 2018 as a researcher and professor of Politecnico di Torino and the Energy Center Initiative. The report is part of a serie of six Country Overviews, which were designed and reviewed by the "Emerging African Innovation Leaders" research team composed by Pierluigi Leone and Leonardo Rosciarelli from Politecnico di Torino, and Emanuela Colombo, Paola Garrone, Andrea Gumina, Fabio Lamperti, Boris Mrkajic, Felipe Repetto, Nicolo' Stevanato and Stefano Pistolese from Politecnico di Milano.*

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# Executive Summary

This report aims at describing and analysing the National Innovation System (NIS) of Tunisia, inspecting the topic, the key institutions and the specific actors under the lens of the Next Production Revolution (NPR).

The first section of the report describes the country focusing on several important aspects (e.g. geography, politics, economy, industry structure, etc.) with the aim of providing an insight of the local situation and to critically understand the starting point for the spreading of the NPR. Tunisia is today a strongly service-based country with quite big urban conglomerates in the north, while arid southern regions remains quite underpopulated. It presents low competitiveness with respect of other Middle East and North African countries and most of the export relies on textile and agricultural products while imports consist in automobiles and refined petroleum products. The country also presents a great variety of natural resources and raw materials exploited for several years; in addition, the geographical location and the peculiar conformation of the territory could be suitable for the installation of renewable energy infrastructure like utility-scale solar systems or wind power parks. Differently from many others African countries, Tunisia presents a wide range of mobility infrastructures, with many kilometres of paved highways and a high number of airports that allows for transportation of high volumes of passengers and freights transported. In the viewpoint of business and entrepreneurship, Tunisia shows good features in international rankings and a large part of population sees good opportunities to start a firm in the area where they live. Great efforts have also been made in education and today an ever-increasing part of GDP is devoted into this field or in research.

The second section of the report provides an overview of the country's NIS, critically analysing the major categories of actors, their actions and readiness towards the embracement of the NPR, and the existing linkages and interactions between them. Many of the Tunisian activities, as mentioned above, are more focused on services such as vehicle repair and wholesale trade. Few are actually the industrial realities of the country, focused mainly on sectors such as agribusiness, textile, mining industry and the first processing of the extracted materials. Now the country's government is focused more on the better implementation of the digital infrastructure and the improvement of existing network for what concern transportation and energy. Indeed, thanks to the great amount of renewable

sources, Tunisia claims to achieve a high share of electricity production from renewables within 2030, while the challenge in logistic performance enhancement will be addressed even before 2022 according to governmental plans. However, particularly advanced technical skills are required to reach these goals. Indeed, many technical support centers have been created and universities are collaborating, despite they are facing a clear need to improve their international collaboration capabilities. Tunisia could rely also on many vocational training and employment program directly organized by its government.

In the third section we provide two different insights. On one hand, we analyze in more detail some of the most interesting actors of the Tunisian NIS, emphasizing more their peculiarities. On the other hand, we will try to provide a detail on the possibilities that the national system offers and the actions that can be carried out to increase the probability of spreading of the NPR. In this section, we analyse a technological cluster near Elgazala, near the capital Tunis, a university still in Tunis and two agencies. One is the Tunisian union of industry, commerce and crafts, while the second is the Agency for the promotion of industry and innovation that in 2017 organized the first nation's conference on Industry 4.0. Finally, related to the second and final part, after a critical assessment, four key sectors have been identified and cross-analysed with the three NPR-enabling transformation fields of Energy, Mobility and Digitalization.

# 1.

# Country overview

This first Section of the report presents a synthetic overview of the Tunisian framework in terms of socio-political and infrastructural aspects. This kind of analysis is necessary to proceed in further chapters to a critical assessment of the country innovation ecosystem and definition of its own peculiarities.

## 1.1 General description

Tunisia is located in **Northern Africa**, bordering the Mediterranean Sea, between Algeria and Libya. The prevalent ethnic group is Arab with official language being Arabic. French is also widely used in commerce. Muslims cover 99% of population with small minorities of Christian, Jewish and others. Tunisia is a **parliamentary republic** organized into administrative divisions including 24 governorates, with the capital city of Tunis. The executive branch includes the chief of state that appoints the head of government selected by the majority party or majority coalition. The legislative branch consists of a unicameral Assembly of the Representatives of the People.

With a **population** of around 11.4 billion people and a territory of more than 155 thousand km$^2$, Tunisia is the **smallest country of Northern Africa** exceeding only Libya in terms of population. **Agricultural land** accounts for around 65% of total territory with 18% arable land, 15% permanent crops and 31% permanent pasture. Forests are limited to around 6.5% of total area. Because of its geographical location, the climate is temperate in the northern part with mild, rainy winters and hot dry summers, while the south is deserted. The terrain in the north is comprised of mountains with hot and dry central plain; the southern part is instead semi-arid before merging into the Sahara. Most of the population is located in the northern half of the country, while the **south remains largely underpopulated**. Tunisia had a strong **urbanization** period starting from the seventies until the nineties during which period the urbanization rate was up to 5% per year. Today, the urbanization trend is around 1.5 % per year, one of the lowest of the whole MENA region. The largest city, Tunis, accounts for more than 26% of total urban population. Overall, urban population is around 67% of the total and the urban land area is around 10 thousand km$^2$ compared with around 144 thousand km$^2$ of rural land area. Despite the high urbanization and relatively small land area, the population density is only 73 people per km$^2$ because of the smallest population growth of the region, with only about 1.5% increase per year. However, 24% of total population ages 0-14, 68% ages 15-64 and 8% is above 65 accomplice a life expectancy at birth of around

75 years. Migrations are also affecting demographics having Tunisia a net migration rate of -1.7 migrant(s)/1,000 population.

Tunisia has a high **human development index** of 0.725 ranking at the 97th position globally. This results from of substantial expenditures in **education** that were 6.3% of GDP in 2012 bringing a high level of total literate population (81.8%) and school life expectancy of 15 years. Other positive parameters were **health** expenditures sharing 7% of GDP in 2014.

Tunisia is a key country in the Mediterranean area in terms of socio-economic relations with Italy and Europe contributing to migration flows (e.g., 5,763 out of 114,611 in Italy in 2017) and FDI (1,541 m$ stock out of 21.531 m$ in 2015 for Italy).

## 1.2 Economy

Tunisia is a **market-oriented economy** and has one of the most advanced economic systems among the Northern Africa countries. The economic strategy has been focused on **exports**, especially textiles, food products, oil, chemicals, and phosphates. Foreign investments have been also favoured by specific policies like the establishment of the Foreign Investment Promotion Agency «FIPA-Tunisia» in 1995 under the supervision of the Ministry of Development Investment and International Cooperation.

Overall, the **GDP** of Tunisia was slightly more than $US 48.5 billion (constant 2010 US$) in 2016, achieving the highest **GDP per capita** (4,265 constant 2010 US$) of Northern Africa countries only lower than the one of Algeria. The trend was equivalent when considering the GDP per capita in terms of purchase parity power having a value of 10,752 (constant 2011 international $) compared with 13,921 of Algeria.

After decades of 4-5% annual GDP growth and improved living standards, the economic growth has slowed down with an **annual growth rate** less than 1.2% per year. The decline can be mostly attributed to terroristic attacks that influenced the tourism sector as well as the strikes in the phosphate sector, which account for nearly 15% of GDP combined. The actual precarious health of the economy is also testified by the relatively high **inflation rate** of 3.7% in 2016 and the central bank **discount rate** of 5.75% (2010 est.).

The **employment** conditions are also critical with more than 15% of unemployed total labor force. **Youth employment** is particular worrisome, with more than 35% unemployed workforce aged 15-24, as estimated by the ILO in 2017. This condition, which has been emerging since 2011, ranks Tunisia as the second worst performing country in the

GDP
$US 48.5 billion
(constant 2010 US$)
in 2016
achieving the **GDP per capita (4,265 constant 2010 US$)** of Northern Africa countries

Annual growth
1.2% per year
The economic growth has slowed down

Unemployed
15%
**of total labor force**
35%
**unemployed workforce aged 15-24**, as estimated by the ILO in 2017

## Population
**11.4 billion**

Tunisia is the smallest country of Northern Africa

## Urban population
**67%**

of the total
and the urban land area
is around **10 thousand km²**
compared with around
**144 thousand km²**
of rural land area

## Population density
**73 people per km²**

Due to the **smallest population growth** of the region, with only about **1.5% increase per year**

## Life expectancy
**75 years**

24% of total population ages 0-14,
68% ages 15-64
8% is above 65

## Human Development Index
**0.725**

Ranking at the
**97th position globally**

Northern Africa (after Libya).

Tunisian economy is mostly based on **services** with a minor role of **industry** and **agriculture**. As a result, the net trading balance is negative showing a higher contribution of **imports** than **exports** ($US 19.5 billion of imports against $US 13.6 billion in 2016). Overall, the imports of goods and services are as high as 51 % of GDP, while the exports fair at 40 % of GDP.

Top 3 **exports partners** include France (around 32%), Italy (around 17.5%) and Germany (around 10.5%) with a similar proportion in terms of **import** (France 15.5%, Italy 14.5%, China 9.5% and Germany 7.72%). The other **G7 countries** have somewhat less trade interaction with Tunisia, both in terms of imports: United States (3.6%), United Kingdom (1.6%), Canada (0.8%), Japan (1.1%); and in terms of export: United States (1.8%), United Kingdom (1.8%), Canada (0.2%), Japan (0.2%). At large, Europe and Central Asia account for around 65% of all imports and 76% of all exports.

Most relevant **export products** include electronics, textiles, oil and agriculture products (i.e., olive oil); on the other hand, **top import products** include oil products, automobiles and diesel power truck.

**Value added** from services' sector accounts for around 2/3 of Tunisian GDP (64%), value added from industry for around one quarter (26%), while the remaining part is contributed by agriculture (10%). Net inflows of **foreign direct investment** were around 1.7% of GDP in 2016, in line with other Northern Africa countries and corresponding to around $US 695 million. Half of investments were in the **energy** sector, one third in **industry** and the remaining part in **services**. The largest part of investments came from the UK (around $US 158 million), Austria (around $US 155 million) and France (around $US 126 million); however, the highest number of projects came from France and Italy. Other G7 countries invested as follows (rounded values): $US 37 million (Italy), $US 30 million (Germany), $US 19 million (Canada), $US 7 million (United States) and $US 5 million (Japan). Net outflows of direct investment were less than 1% of GDP.

Overall, Tunisia has shown **weak competitiveness** among African countries and especially the Arab world. The Global Competitiveness Index 2017–2018 ranks Tunisia in the 95th position out of 137 countries, overcoming only Egypt among the Northern Africa countries. Despite showing good features in terms of healthcare, primary, secondary, higher education and training, as well as infrastructure, Tunisia still suffers from **poor labour and market efficiency**, **underperforming**

**macroeconomic environment, business sophistication** and **innovation output**.

Tunisia is a member country of the World Bank, the International Monetary Fund, the World Trade Organization, the African Union, and the League of Arab States. Tunisia is also member of the Comite Maghrebin de L'electricite (COMELEC) that is a regional power pool for energy infrastructure.

## 1.3 Industry structure

The economic structure of Tunisia has changed dramatically in the last 40 years with an increase of the share on GDP of the service sector and a reduction of industry and agriculture. **Service sector** shared 54% of GDP in 1965 and increased to 64% in 2016. As far as the services are concerned, the key sector in Tunisia is tourism.

Value added from **industry** decreased in the last 30 years having a share of 38% of GDP in 1984. Manufacturing is leading the industrial sector with 60% of its total value added. The main manufacturing subsectors are ***Textiles and clothing***, ***Food, beverages and tobacco***, ***Chemicals***, ***Machinery and transport equipment***, and they contribute to around 35% of the total manufacturing value added.

Finally, value added from **agriculture** was decreasing from around 25% of GDP in 1970 to 10% of GDP in 2016. Key agriculture sectors include olives, olive oil, grain, tomatoes, citrus fruit, sugar beets, dates, almonds, beef and dairy products.

The same relevance of the different sectors holds in the case of **employment**. Indeed, employment in services was around 59% of total employment, compared to 29% in industry and 12% in agriculture.

The **industrial production** growth rate of 0.5% has been estimated for 2017. Overall, the **productivity** of the country has increased steadily in the last 50 years and the GDP per person employed reached more than $US 35 thousand in 2017 (constant 2011 PPP $) comparable with Egypt but much lower than Algeria ($US 51 thousand in 2017, constant 2011 PPP $). Finally, the **agriculture value added per worker** was $US 5 thousand (constant 2010 US$) in 2015 one of the lowest of Northern Africa.

## 1.4 Natural resources

The contribution of natural resources to the economic output of Tunisia has been variable in the last 30 years, but has steadily declined in the last 10 years reaching around 3% of GDP. Key natural resources of Tunisia are **petroleum**, **phosphates**, **iron ore**, **lead**, **zinc** and **salt**.

In 2016, total proved **oil reserves** were around 100 million tons of oil equivalent (toe), while the yearly production was 2.4 million

### Import/Export

The **imports** of goods and services are as high as

51 % of GDP

while the **exports** fair at

40 % of GDP

### Exports partners

32%

**France**

17.5%

**Italy**

10.5%

**Germany**

with a similar proportion in **terms of import**

**France 15.5%, Italy 14.5%, China 9.5% and Germany 7.72%**

The other G7 countries have somewhat less trade interaction with Tunisia, both in terms of imports.

**Europe and Central Asia** account for around

65%

**of all imports**

76%

**of all exports**

### Foreign Direct Investment

1.7% of GDP

in 2016 corresponding to around $US 695 million

## Phosphate

Mining is a key sector of Tunisia. Today, the sector accounts for around

**2% of GDP**

and employs about

**27,000 people**

**90%**

**of the phosphate is used to produce fertilizers** and phosphate-based products for national uses

## Other natural resources production

**55 million tons**
**Iron ore**

**2 million tons**
**Plumb iron ore**

**2 million tons**
**Zinc iron ore**

## Renewable energy sources

Tunisia has a high-unexploited potential for renewable energy sources with annual irradiation rates of

**1800 to 2600 KWh**

per square metre, over **20% more than the most irradiated sites in Europe**

toe. Most of these resources were exported.

**Phosphate mining** is a key sector of Tunisia as the country's first mines opened in the late 19th century. Today, the sector accounts for around 2% of GDP and employs about 27 thousand people. Most of mines are located in the Gafsa's basin with estimates of phosphate at 2005 of 1.5 billion tons. The Compagnie des Phosphates de Gafsa (CPG) is the leading government-owned company that operates phosphate mines.

Phosphate production has decreased in the last years due to social tensions and strikes, falling from 8 million tons in 2010 to an average of 3 million tons during the 2011-2015 period. Around 90% of the phosphate production is used to produce fertilizers and phosphate-based products for national uses.

Data at 2005 reported the availability and exploitation of **other natural resources** being iron ore (55 million tons production), plumb iron ore (2 million tons production) and zinc iron ore (2 million tons production).

Like other Northern Africa countries, Tunisia has a **high-unexploited potential for renewable energy** sources with annual irradiation rates of approximately 1800 to 2600 KWh per square metre, over 20% more than the most irradiated sites in Europe. Wind potential is also high with the mean power density and wind speed for the 10% windiest areas of 426 W/m$^2$ and 7.14 m/s respectively at 50m height. Some of the potential sites for wind exploitation include Zaghouan, Kasserine, Kebili and Nabeul, that could provide up to 1 GW of power capacity. Despite this fact, around 97% of electricity is still generated through fossil fuels, as it will be shown later.

## 1.5 Smart and integrated infrastructure (Enabling quality infrastructures)

### *1.5.1 Energy*

Tunisia ranks 65$^{th}$ out of 127 countries in terms of the *energy architecture performance index* defined by the World Economic Forum. Although the **national energy system** shows some positive features, especially when compared to the other MENA countries, there are still several gaps in terms of linkages with **economic performance**, **environmental sustainability** and **energy security.**

A macroscopic analysis of the Tunisian national energy system shows a **high intensity of energy utilization**, with the energy intensity level of primary energy (MJ/$2011 PPP GDP) equal to 3.7. Moreover, a significant **dependence on energy import** (around 36% of total energy use) hinders economic growth and

warns for security of supplies. Finally, **electricity price** for industry is between 50 and 60 €/MWh, depending on the contracting levels. This value is relevant if compared with the country GDP and leads to a cost of 712% of income per capita. **Time to get electricity** of 65 days is instead competitive with industrialized countries,

Environmental sustainability is also low with **renewable energy contributing** to only around 13% of total final energy consumption (the remaining is provided by **fossil fuels** with oil and gas at 60% and 40% respectively). Because of the energy mix, total **greenhouse gas yearly emissions** are around 40 million tons of $CO_2$ equivalent and the per capita value is around 2.6 metric tons that is a high value if compared with the economic output. Indeed, **$CO_2$ intensity** is 0.6 kg per 2010 US$ of GDP. Notably, **access to electricity and clean fuels** is available to almost the total of population (>99.7%), both in urban and rural areas as both power, gas grids and clean gas logistics is available.

Concerning with infrastructure, the **installed power capacity** of Tunisia was around 5 GW in 2016, mostly coming from fossil sources (94%) and the remaining from hydropower (62 MW) and wind (240 MW). Crude oil and natural gas are prevalent primary resources for electricity production accounting for around 2.5 million toe and 2 million toe. Primary electricity from renewable energy sources is less than 0.05 million toe. The **share of renewable energy sources** in the country electricity production was around 3.5% in 2016. The total electricity consumption in 2016 was 15 TWh mainly consumed in Big Tunis distribution center (almost 29%). The **total electricity consumption per capita** was around 1320 kWh per year in 2016 which is low compared with European values. The value lost due to electrical outages was 2% in 2013.

*High shares of renewable energy integration should be pursued to decrease costs and mitigate GHGs emissions*

There is also a significant **use of natural gas** (4.7 million) especially for industry and residential/ commercial uses with more than 17 thousand km of pipeline and 772 thousand subscribers. **Oil refineries** is instead weak leading to net oil products imports.

Although the country has an adequate infrastructure to distribute power and gas in all the national territory, the fossil fuel dependence is still high as well

## Electricity

Price for industry between

50 - 60 €/MWh

## Energy architecture performance index

65th

out of 127 countries

## Access to electricity and clean fuels

>99.7%

It is available to almost the total of population

## Installed power capacity

5 GW

(2016)

It is mostly coming from **fossil sources (94%)** and the remaining from **hydropower (62 MW)** and **wind (240 MW)**

## Share of renewable energy sources

in the country electricity production was around

3.5%

in 2016

## Road System

20,000 km

**of paved roads**

500 km

**of highways**

## Railways system

2,000 km

**and 23 lines.**

There are a total number of 267 train stations with rail-road links that favour multimodal passenger transport

## Airports

29

but only
15 have paved runways

## Ports

8

They ensure
**96% of the foreign commercial trade.**
Most of **maritime trade** (**80%**) is processed through a single port - Radès Port

as the energy bill. **High shares of renewable energy integration** should be pursued to decrease costs and mitigate GHGs emissions, especially in the framework of the NPR, where electrification may be relevant and economic growth could rise even more energy demand.

### *1.5.2 Mobility*

**Roads** account for most of passengers and freight transport in Tunisia sharing around 80% of all goods transported. The road network includes around 20 thousand kilometres of paved roads and 500 kilometres of highways across the entire country territory. The highway network is planned to reach 1,000 kilometres by the end 2020, which should substantially improve the efficiency of transportation and logistics in Tunisia.

**Railways** cover a large part of the national territory with a network of more than 2,000 kilometres and 23 lines. Most of these lines (around 1,700 kilometres) are metre-gauge railways, out of which only 90 kilometres are electrified. There are a total number of 267 train stations with **rail-road links** that favour multimodal passenger transport. Passengers carried were more than 1.2 million passenger-km in 2016, while goods hauled were 664 million ton-km contributing to industrial logistics.

There are 29 **airports** in Tunisia but only 15 have paved runways. Registered carrier departures worldwide were 39 thousand in 2016 with 3.6 million passengers and airfreight of 39 million ton-km especially for the transport of perishable goods such as food export.

**Ports** ensure 96% of the foreign commercial trade. Most of maritime trade (80%) is processed through a single port - Radès Port. There are 8 ports in total in Tunisia with port container traffic of 490 thousand TEU (twenty-foot equivalent unit).

Overall, **logistics** is underdeveloped in Tunisia. In fact, Tunisia ranked 110$^{th}$ out of 160 countries in terms of logistics performance index (LPI). Poor performances were obtained across the six dimensions defining the LPI including efficiency of the clearance process including customs (1.96/5), quality of trade and transport related infrastructure (2.44/5), ease of arranging competitively priced shipments (2.33/5), competence and quality of logistics services (2.59/5), ability to track and trace consignments (2.67/5), timeliness of shipments (3/5). Deploying digital technologies in transport could **increase the country capability in logistics** that is fundamental to enable effectively NPR solutions.

### *1.5.3 Digitalization*

**Telecommunication network** in Tunisia has achieved relevant results in recent years (ICT sector represents more than 7% of the

GDP) and Tunisia aims to become an international **digital destination** under the National Strategic Plan "Digital Tunisia 2018". While **fixed telephone subscriptions** are low (9 subscriptions per 100 people), **mobile cellular subscriptions** are 126%. Individuals using internet were 51% of total population, however number of subscribers to the Internet for the 1000 inhabitants was only 159 in 2015. In particular, **fixed broadband Internet** subscriptions were 5.65 per 100 mostly for business applications. Capacity of the **international connectivity** for the Internet was 4,447 kBps in 2017 that is much lower than Kenya (12,160 kBps).

*Tunisia aims to become an international digital destination under the National Strategic Plan "Digital Tunisia 2018"*

Finally, around 30% of mobile connections are **2G**, 50% is **3G** and 20% is **4G/5G**. Other statistics report an overall 3G or better availability of more than 81%. Overall, the **existing infrastructure is a starting point** to implement digital infrastructure required for NPR with the main interventions needed on increasing capacity and establish a more articulated regulation.

## 1.6 Human capital

Human capital is an important contributor to the relatively high human development index of Tunisia. Tunisia allocated 6% to 7% of the yearly GDP to education in the last decade; in particular, education represented at least 20% of **total government expenditure**. Half of this expenditure was addressed to secondary education, while primary and tertiary education accounted each for about 25% of total education expenditure. As a result, the literacy rate of the adult population is higher than 80%, while this value rises up to 96% in the case of youth's literacy. **Gross enrolment** in primary school is 114%, this value declines to 88% for secondary school; finally, the enrolment in tertiary school decreases to 35%.

In 2016, around 60,000 students graduated in the tertiary education; 30% of total graduates were in **engineering and computer science and telecommunications**. Another 15% of graduates belonged to **business and administrative affairs**. **Agriculture** accounted for 6% of total graduates, while **arts and literature** added another 15% of total graduates. The high commitment in human capital of Tunisia is promising to set up **new**

Mobile cellular subscriptions
126%
Individuals using internet were **51% of total population**

Fixed broadband Internet
subscriptions
5.65 per 100
mostly for business applications

International connectivity
4,447 kBps
in 2017 it is much lower than Kenya **(12,160 kBps)**

Adult's literacy rate
higher than
80%

Youth's literacy rate
96%

**Ease of doing business**
**88th** position at the global level,
**7th** position among MENA countries and
**2nd** among Northern African countries

**Entrepreneurial behaviour**
**49%**
**of 18-64 population** who sees good opportunities tostart a firm in the area where they live

**Gross domestic expenditure on R&D**
(GERD) more **0.6% of GDP** in the period between 2005 and 2015

**cooperation capacity building programs** that may focus on technical and management aspects of NPR.

## 1.7 Entrepreneurship

Tunisia ranks at the 88th position at the global level for the **ease of doing business**, 7th position among MENA countries and 2nd among Northern African countries. This result includes the positive score in ease of getting electricity and timing to resolving insolvency, however there are some gaps in **trading across borders and dealing with construction permits**.

*Entrepreneurial behaviour and attitudes in Tunisia are positive towards business activities*

**Entrepreneurial behaviour** and attitudes in Tunisia are positive towards business activities with almost 49% of 18-64 population who sees good opportunities to start a firm in the area where they live. Furthermore, almost 60% of the population believe they have the required skills and knowledge to start a business. Entrepreneurial intentions are significant with the around 29% of population that intend to start a business within three years. The **total early stage entrepreneurial activity** (TEA) shows a more than 10 % of population who are either a nascent entrepreneur or owner-manager of a new business; however, the ratio between female/male TEA is only 0.36.

This positive attitude of the country towards entrepreneurship may be of high relevance for NPR given its potential for **physical and financial decentralization** and thus the empowerment of individuals.

## 1.8 Science, research and innovation

**Gross domestic expenditure on R&D** (GERD) was more 0.6% of GDP in the period between 2005 and 2015 that is comparable with other Northern African countries but lower than industrialized ones. Public funds were around 77% of total GERD, business enterprise contributed to 19%, while the funds from abroad were less than 4%.

**High technology exports** were $US 673 million in 2016, sharing 6.3% of manufactured exports. **Patent applications** were 589 in 2016, mostly (409) coming from non-residents. **Trademark applications** were instead almost 6.5 thousand. Finally, **industrial design applications** were more than 1.5 thousand; even in this case the vast majority came from non-residents.

**Scientific output** of Tunisia is

quite high, ranking the country at the 51st position at the global level and second among all African countries, with a total number of more than 67 thousand publications and 459 thousand citations. At sectorial level, there is a good level of research in the field of **business**, **management and accounting** (3th in the African rank) and **engineering** (4th in the African rank). However, the low connections between Universities and industries come out to **weak innovation linkages** that may stop further innovation in the country, especially in the field of NPR where the relevance of applied research and technology transfer is high.

*The low connections between Universities and industries come out to weak innovation linkages that may stop further innovation in the country*

# 2.

# Institutions of the national innovation system

The following section will exhaustively introduce the most important actors which constitutes the Tunisian ecosystem. We will shortly present their features and main activities, exploring the public and private institutions that could lead to enable the Next Production Revolution.

## 2.1 Firms

The economy of Tunisia, as shown before, presents some promising industrial sectors like agribusiness and manufacturing such as textile, leather and footwear, mechanical, electrical, and electronics. **Enterprises** in Tunisia were more than 740 thousand in 2016 showing an increase of almost 20% in the last five years. Most of enterprises were involved in wholesale and retail trade, repair of motor vehicles and motorcycles (more than 42%), while less than 12% was focused on industry. Especially, more than 20% of enterprises in the **industry sector** focused on **textiles and clothing**, around 17% in **food and beverage** industries, around 15% in **metallurgy**. Information and communication enterprises were only 2%. Moreover, around 10% of total enterprises were devoted to professional, technical, education, and human health and social work activities.

In the last five years, a main increase in the total number of enterprises was registered in the wholesale and retail trade (46 of yearly new entries) and industry (10%).

**Micro enterprises** (less than 6 employees) were around 97% of total, while **small and medium enterprises** (6-49 and 50-199 employees) were only 2.5%. Finally, there were 815 large enterprises (>200 employees). Almost the total of enterprises are Tunisian with a 98% of share almost constant in the last 5 years. There are some co-participations of foreign enterprises coming mainly from France, Italy, Germany and Belgium.

Almost 1 million people are **employed in enterprises**, with 42% of employees in large enterprises, 46% in small and medium enterprises and 12% in micro enterprises.

In the manufacturing sector, more than 75% of firms use **material inputs and/or supplies** of foreign origin that account for 55.3% of total inputs showing a high dynamism and good infrastructure for international trading although custom system could be improved. Time spent waiting for imports and exports to **clear customs** is recognized as a major barrier for international trades by around 10% of Tunisian firms.

Low dimensions of enterprises and traditional business sectors of the Tunisian economy lead to a low global competitiveness especially for the **lack of business sophistication, knowledge, technology and creative outputs**.

Although contribution of business to total GERD is relevant (19%) and firms offering formal training are almost 30%, knowledge-intensive employment only accounts for 21 % of total employees, university/ industry research collaborations are weak and intellectual property payments are still under the average value of upper-middle income countries. This situation should be improved to enable NPR uptake by introducing capacity building programs and innovation actions that may spur **clustering and networking**.

*Introducing capacity building programs and innovation actions may spur clustering and networking*

Finally, more than 150 thousand enterprises are grouped in **l'Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat** (UTICA) (www.utica.org.tn) that aims at supporting and spurring the activities of the private sector. Furthermore, the **Chamber de Commerce et D'Industrie** en Tunisie provides support to enterprises including international development, market analysis, and business opportunities.

## 2.2 Government

The Tunisian government has launched and is supporting several innovation policies and initiatives at the country level to modernize the national economy. Relevant innovation policies and initiatives, in the field of NPR, focus on **strategic infrastructural assets** including digitalization and energy. Tunisian authorities have recognized **ICTs as a national priority** given the interest in public and private investments in digital infrastructure. Many technological centres (e.g., El Ghazala in Tunis, Sfax) have been established and key infrastructure has been realized to connect to Europe. This has led, for instance, to the start of several offshoring activities in Tunisia with many available call centers. Furthermore, large multinationals like Alcatel, Ericsson, Sofrecom, etc. have established their regional and national offices in the country.

In this framework the **"Digital Tunisia 2020"** National Strategic Plan (https://www.afdb.org/en/documents/document/tunisia-support-project-for-the-implementation-of-the-digital-tunisia-2020-national-strategic-plan-98912/) aims to catalyse this positive momentum by establishing, among other initiatives, main ministerial information systems (e.g., e-finance, e-justice, e-local government) and all the platforms that guarantee e-government (e.g. interoperability, public cloud, Government intranet, etc.).

Micro enterprises
(less than 6 employees)
were around
97%
of total

Small and medium enterprises
(6-49 and 50-199 employees)
were only
2.5%

large enterprises
(>200 employees)
815

Enterprises
150 thousand
They are grouped
in l'Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat

Tunisian Renewable Energy
Action Plan 2030
aims at improving energy intensity by
3% per year
and saving energy by
17%
during the period 2016-2020.

Relevant actions have been also taken in the field of energy with Tunisia's INDC that aims at reducing greenhouse gas emissions across all economic sectors, and especially in the energy sector, of 41% by 2030 relative to 2010 emissions. Therefore, the **Tunisian Renewable Energy Action Plan 2030** aims at improving energy intensity by 3% per year and saving energy by 17% during the period 2016-2020. Furthermore, the plan aims at producing 30% of Tunisia's electricity from renewable energy sources in 2030 by installing 1GW of renewable capacity in the first phase (2017 – 2020) and 1.25 GW more in the second phase (2021 – 2030).

*Relevant innovation policies and initiatives, in the field of NPR, focus on strategic infrastructural assets including digitalization and energy*

Finally, a recent initiative, the **Smart Industrie 2017,** (http://www.tunisieindustrie.nat.tn/smartindustrie/home.asp) aims at promoting the Industry 4.0 among Tunisian enterprises and create new opportunities for innovation and business.

All these policies are very promising in the field of NPR and may be enforced by adopting a **smart and integrated infrastructure** approach as the one suggested by **the Infrastructure Consortium for Africa (ICA) 2017**.

There are key governmental actors in Tunisia that operate, directly or indirectly, in the field of NPR. The **Ministry of Development, Investment and International Cooperation** (http://www.mdici.gov.tn/en/) prepares policies and strategies for infrastructure and human development, at regional and sectoral level. Furthermore, the Ministry prepares economic and sectoral studies to support regional and international, as well as private and public investments.

The **Ministry of Industry** (http://www.tunisieindustrie.gov.tn/) aims at implementing policy in areas related to industry, agribusiness, services to industry, energy, mining, industrial cooperation and industrial safety. Under its umbrella there are key **agencies that promote innovation**, **foreign investments and industrial property**. The recently established Ministère de l'Energie, des Mines et des Energies renouvelables (http://www.energymines.gov.tn/) oversees activities related with natural resources of Tunisia including renewable energy sources. In the field of energy, it is worth mentioning the National Agency for Energy Conservation

and the Société Tunisienne de l'Electricité et du Gaz, a public owned company, that is responsible for transmission and distribution and retains control of almost the existing power generation facilities.

The **Ministry of the Environment and Sustainable Development** (http://www.environnement.gov.tn/index.php?id=3&L=1#.WtS2pZe-k2w), aims at establishing and spreading the concept of sustainable development and to incorporate it into general and sectoral socio-economic policies as well as into natural resource planning and management methodologies. Main sectors are sustainable development, risk prevention, climate change, biodiversity, etc. Notably, the Tunisian Observatory for Environment and Sustainable Development (OTEDD) under the authority of the Ministry of the Environment and Sustainable Development is considered the dashboard to monitor the activities of sustainable development in the country.

The **Ministère de l'Enseignement Supérieur et de la Recherche Scientifique** (http://www.mes.tn/) develops and implements the policy of higher education and scientific research. It oversees the activities of universities, higher education and research institutions.

The **Ministry of Vocational Training and Employment** (http://www.emploi.gov.tn/en/the-ministry/missions/), develops policy for the development of employment, integration and reintegration into the labor market and the promotion of self-employment. It is in charge to develop the legal framework governing vocational training and employment and to adapt it to economic and social changes while ensuring the application of the relevant legislative and regulatory texts.

The **Ministry of Communication Technologies and Digital Economy** (Ministère des Technologies de la Communication et de l'Economie Numérique, MINCOM) is the main public authority on all matters related to ICT. It establishes the national telecommunication strategy and ensures its proper implementation through the necessary regulation, infrastructure and cybersecurity policy. Under the umbrella of this Ministry, it is worth mentioning the National Telecommunications Agency (Instance Nationale des Télécommunications, INT), the market regulator that handles phone numbers, mobile networks, licences and pricing. Moreover, the Centre for Studies and Research of Telecommunications (Centre d'Etudes et des Recherches des Télécommunications, CERT) assists the regulating agency when it conducts quality-control studies by providing the INT with data related to the current quality of mobile phone networks.

## Students enrolled

240,000

in Tunisian Universities (2016)

## Graduated students

more than

57,000

with about

45%

of tertiary graduates in **science, technology, engineering and mathematics**

## Public Universities

14

The biggest universities are located in the biggest urban centres of the country

### 2.3 Universities

There were about 240,000 students enrolled in **Tunisian Universities** in 2016. More than 57,000 graduated in 2016 with about 45% of tertiary graduates in **science**, **technology**, **engineering** and **mathematics**.

Overall, there are 14 public universities (http://www.mes.tn/annuaire.php?code_menu=22):

1. Université Ez-Zitouna (www.uz.rnu.tn)
2. Université de Tunis (www.utunis.rnu.tn)
3. Université de Tunis El Manar (www.utm.rnu.tn)
4. Université de Carthage (www.ucar.rnu.tn)
5. Université de la Manouba (www.uma.rnu.tn)
6. Université de Jendouba (www.uj.rnu.tn)
7. Université de Sousse (www.uc.rnu.tn)
8. Université de Monastir (www.um.rnu.tn)
9. Université de Kairouan (www.univ-k.rnu.tn)
10. Université de Sfax (www.uss.rnu.tn)
11. Université de Gafsa (www.ugaf.rnu.tn)
12. Université de Gabès (www.univgb.rnu.tn)
13. Université virtuelle (www.uvt.rnu.tn)
14. Instituts Supérieurs des Etudes Technologiques ()

The biggest universities are located in the biggest urban centres of the country. Université de Tunis has around 28,000 students, while the students enrolled at the Université de Tunis El Manar are 33,000. Université de Carthage has instead 38,000 enrolled students. Université de la Manouba has 17,630 students while the student body is more than 25,000 at the Université de Sousse. Université de Monastir counts almost 20,000 students and finally, students at the Université de Sfax are 33,000. Other universities in the country have less than 15,000 enrolled students per year. Only two Tunisian Universities were listed in the **Times Higher Education World University Rankings 2018**, namely the Université de Monastir and the University of Tunis El Manar, both of them classified at 1000+ position. In particular, Université de Monastir was also included in the ranking for general engineering. Tunisian universities are instead not included in the QS World University Rankings.

There are also many private Universities in Tunisia. According to the official data from the *Ministère de l'Enseignement Supérieur et de la Recherche Scientifique,* they were about 70 in 2017.

The Ministry of **Vocational Training and Employment** in Tunisia organizes vocational training in 13 sectors: *agriculture*;

*fishing and aquaculture*; *building, public works and annexes; textile and clothing; leather and shoes; general mechanics and metallic construction; electricity and electronics*; *food*; *transport, driving and maintenance of vehicles and public and agricultural works and machinery*; *tourism and hotels*; *trades of art and crafts*; *office, commerce and computing jobs*, *diverse services and industries*. More information is required to assess the effectiveness of vocational training.

Overall, the Univeristy system seems to provide a favourable environment where to grow new capacity and competence in the field of NPR given also the high share of graduates students in the field of science, technology, engineering and mathematics.

## 2.4 Innovation and enterprise support institutions

Under the umbrella of the Ministry of Industry, there are some key agencies for innovation in Tunisia. Notably, the **Agency for the Promotion of Industry and Innovation** (http://www.tunisieindustrie.nat.tn/en/home.asp) supports all the actions for promoting innovation and industry development in Tunisia including enterprises incubators, technical centers and technopoles. The **Institut National de la Normalisation et de la Propriété Industrielle** (INNORPI, http://www.innorpi.tn/) provides the framework for industrial property issues in Tunisia. Finally, the Foreign Investment Promotion Agency (www.investintunisia.tn), set up in 1995 under the umbrella of the Ministry of Development Investment and International Cooperation, is in charge of providing all the support needed by foreign investors and of promoting foreign investment in Tunisia.

Notably, the Institut National de la Normalisation et de la Propriété Industrielle (INNORPI) and the Ministère de l'Enseignement Supérieur et de la Recherche Scientifique are Technology and Innovation Support Centers (TISCs) for WIPO in Tunisia.

*Tunisian government has established specific technical centers for supporting innovation in the key industrial sectors*

Tunisian government has established specific technical centers for supporting innovation in the key industrial sectors including, among others, wood and furniture industry (CETIBA, www.cetiba.com.tn), mechanical and electric industries

(CETIME, http://www.cetime.ind.tn), textiles (CETTEX, www.textiletunisia.com.tn), leather and shoes (CNCC, www.cnccleather.nat.tn), agribusiness (CTAA, www.ctaa.com.tn). Finally, there are some active technoparks like the Elgazala Technopark (www.elgazala.tn) in the field of ICT technologies, the **Technopark of** Monastir/El Fejja (Manouba) for textile (www.mfcpole.com.tn), the Technopark of Gabès (www.polegabes.com.tn), the BiotechPole of Sidi Thabet for biotechnology (www.biotechpole.rnu.tn), the Technopark of Borj Cédria for renewable energies, the Technopark of Bizerte for agribusinees (www.pole-competitivite-bizerte.com.tn) and the Technopark of Sousse for mechanics and electronics.
In addition to governmental supporting activities, there are private initiatives like the National Federation of Food Industry belonging to UTICA.

There are also many **incubators**, public and private that are listed below:

- Nabeul Elan Technologique - BP 209 - Espace ISET de Nabeul – 8000 Nabeul
- Sfax Innovation - ENIS Sfax - Km3 - Route de la soukra - Cité El Habib – 3052
- Gafsa Technologie du Futur - Espace ISET de Gafsa – Sidi Ahmed Zarrouk – 2100
- Gabès Promotech - Espace ISET de Gabès – Route Mednine – 6011
- Radès Technologie Plus - Espace ISET de Radès – Rue de Jérusalem – BP 172 – 2098
  Sousse Tech - Espace ISET de Sousse - Cité Erriadh – 4023
- Kairouan Innovation Technologique - Espace ISET de Kairouan-Rakkada – 3191
- Pépinière des Initiatives Innovantes (Ksar Hellal) - Espace ISET de Ksar Hellal - Avenue Haj
- Le Kef Essor Technologique - Espace ISET- Boulifa - Le Kef – 7100
- Jendouba Créatic - Espace ISET de Jendouba – 8189
- Djerba Création et Innovation - BP 461 - Espace ISET - Midoune Djerba 4116
- Mahdia Entreprendre - Espace ISET - Avenue El Mourouj - Hiboune 5111 – Mehdia

- Centre d'Innovation et de Développement (INSAT) - BP 676 - Centre Urbain Nord - 1080 Tunis
- Carthage Innovation (EPT) - BP 743 - Centre d'Appui Scientifique - Ecole Polytechnique de Tunisie - La Marsa 2070
- Zaghouan Terre d'Entreprendre - Espace ISET- Zaghouan
- Pépinière de Bizerte - Espace ISET Manzel Abderrahman 7035
- Pépinière de Kébili - Espace ISET Kébili 4200 Kébili
- Pépinière de Siliana - Espace ISET Siliana 6100 Siliana
- Pépinière de Manouba - ISCAE Campus Universitaire de la Manouba La Manouba, 2010
- Pépinière de Béja - Espace ISET Béjà
- Pépinière de Sidi Bouzid -Espace ISET Sidi Bouzid
- Pépinière de Kasserine - Espace ISET Kasserine
- Pépinière de Tataouine - Direction Régionale de l'API Tataouine
- Pépinière de Tozeur - Espace ISET Tozeur
- Pépinière de Sfax2 - Zone Industrielle La Poudrière II
- Pépinière de Soft-tech - Technopole de sousse

## 2.5 Linkages between the institutions

Industrial associations and governmental agencies and centers for innovation provide a potential framework for linkages between institutions.

However, these structures appear to be enforced with specific competence end capacity to catalyse and boost endemic innovations. Overall, the linkage between public institutions and private companies needs to be improved being one of the most relevant weakness for competitiveness in the country.

# 3.

# Conclusions

Once we have gathered all the information from section 1 and after exploring the national structural composition in section 2, we can now give a few key actors that could facilitate a future development of the nation. Furthermore, we can bring to the attention of the reader the actions believed to be the most promising to be taken, in order to lever the choice on the learning needs necessary for the future AILs.

## 3.1 Key actors in the national innovation system

There are some key actors that may support the introduction of NPR in Tunisia belonging both to the public and private sectors.

### *3.1.1 Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat (UTICA)*

The "Union Tunisienne de l'Industrie, du Commerce et de l'Artisanat", UTICA, was established in 1947 with the aim of grouping **private players** from different economic sectors with the exception of agriculture. Today, it counts almost 150,000 enterprises most of them being SMEs.

The UTICA has the mission to support private companies in doing innovation with a recent attention given to the potential of digital economy. UTICA has signed a memorandum of understanding with the Oxford Business Group for the realization of the report 2018 about economic investments in Tunisia.

### *3.1.2 Agency for the Promotion of Industry and Innovation*

The Agency for the Promotion of Industry and Innovation, API, has been created in 1972 under the umbrella of the Ministry of Industry and Trade. The Agency is responsible for the implementation of the **Government's policies** relative to the promotion of the industrial sector and provides a support structure for companies and promoters. The agency is organized in 5 branches, each with a specific role in the innovation ecosystem. Especially, the Center of Innovation and Technological Development (CIDT) aims at the promoting innovation, partnership and technological development, coaching, assistance and support to SMES; furthermore, the Support Center for Enterprise Establishment (CSCE) is responsible for training in the field of business creation and logistics for country enterprise incubators. Notably, the API has promoted the first Tunisian conference on Industry 4.0 in 2017 (http://www.tunisieindustrie.nat.tn/smartindustrie/home.asp).

### *3.1.3 Université de Tunis El Manar*

The University of Tunis El Manar counts around 33,000 and has been listed in the **Times Higher Education World University**

**Rankings 2018**.
The university is constituted of 15 organizational units consisting in 4 faculties, 9 institutes and 2 schools. Notably, the *Faculté des Sciences Economiques et de Gestion de Tunis (FSEGT)*, the *Faculté des Sciences Mathématiques Physiques et Naturelles de Tunis (FST),* the *Institut Supérieur d'Informatique (ISI)* and the *Ecole Nationale d'Ingénieurs de Tunis (ENIT)* may provide a potential great contribution for innovation in NPR in the country.
It is also remarkable the starting of a programme for E-learning developed together with the l'Université Virtuelle de Tunis (UVT)

### *3.1.4 Elgazala Technopark*

The Elgazala Communication Technologies Cluster "Elgazala Technopark" is part of a national strategy for the development and promotion of scientific research, innovation and high value-added innovation. The Technopark Elgazala promotes innovation in the field of ICT combining together the development of small and medium enterprises as well as relation with multinationals and large groups in the sector of Information Technologies and Communication. Its main purpose is to support the development of high-tech activities, promote research, development and technology transfer.
In addition, the The Technopark hosts support institutions for training and formation with the aim to create synergy and cross-fertilization between these actors. More than 250 companies including 10 subsidiaries of major global groups (Microsoft, ST Microelectronics, Ericsson, Alcatel Lucent, ...) as well as Tunisian success stories (Telnet, Omniacom, Picosoft, Cynapsys, EBSYS ...) are hosted in different spaces in Technopark Elgazala.

## 3.2 Challenging, opportunities and learning needs

*Tunisia shows an articulate innovation ecosystem that is promising for introducing the NPR in the country*

Tunisia shows an articulate innovation ecosystem that is promising for introducing the NPR in the country. Human capital is well developed with significant investments in basic education and a well-established university system, among the best performing in Africa. Although the service sector is the most relevant for the Tunisia economy, the industrial system is also well established with some important manufacturing

sectors including Textiles and clothing, Food, beverages and tobacco, Chemicals, Machinery and transport equipment. Agriculture is also an important sector where NPR solutions can be applied. Therefore, the **digitalization of production** has many opportunities in the driving economic sectors of Tunisia including manufacturing and agriculture as well as in the service sectors. Furthermore, there is the opportunity to introduce **additive manufacturing** in specific industrial compartments such as the mechanical or the aerospace sector. Finally, **bioeconomy** can revitalize the agriculture sector increasing its competitiveness and diversifying markets.

*The digitalization of production has many opportunities in the driving economic sectors of Tunisia*

At the level of enabling infrastructure for NPR, Tunisia has its own plan for digitalization, "Digital Tunisia 2020", that first aims at digitalizing the public administration. Although energy infrastructure is well established in the country, it is still relying massively on fossil fuels and therefore a big effort for renewable energy integration at national scale has to be done enforcing the "Tunisian Renewable Energy Action Plan 2030". Mobility infrastructure is also well established and some efforts could be done in enforcing intermodal transport.

| Leading Industries<br><br>NPR Enabling Transformations | Agriculture, forestry and fishing (ISIC codes 01 to 03) | Manufacture of food products, beverages and tobacco (ISIC code 10 to 12) | Manufacture of textiles & Manufacture of leather and related products (ISIC codes 13 to 15) | Fabricated metal product and manufacturing of electronic and electrical equipment (ISIC codes 25 to 27) |
|---|---|---|---|---|
| **Energy** | / | Using advanced and delocalized technologies for electricity and heat production to improve energy efficiency, affordability and enhance productivity. | Using advanced and delocalized technologies for electricity and heat production to improve energy efficiency, affordability and enhance productivity. | Refurbishment of existing facilities could lower product price and enhance the quality of product produced. Integration with RES could also ensure increased production availability. |
| **Mobility** | Increased and facilitated road mobility could allow the southern regions to become more accessible and therefore favourable to a renewed exploitation. | Prioritizing and improving international freight transport through ports and airways could allow local products to reach foreign markets more easily. Products total shipment costs may also decrease thanks to improved logistic performances. | Improved road transportation allows for better organised and efficient supply chain. More competitive, less expensive products. | Improved road transportation allows for better organised and efficient supply chain. More competitive, less expensive products.. |
| **Digitalization** | Digitalization can improve food production activity spreading the country towards more sustainable production and consumption pathways. | All the opportunities coming from ICT for handling, storing, transforming, packaging local agricultural produces. | Better control of processes though IT technologies that can increase productivity while reducing wastes and increase quality. | Digital assisted techniques for design and prototyping. Use of these technologies coupled with advanced manufacturing techniques like additive manufacturing. |

*A few examples of the NPR potential for leading industries.*

# Appendix A

*Table A.1* presents an extended list of possible key actors and related contacts for Niger. Actors have been selected according to their relevance within the NIS, according to an interviewed local expert. Furthermore, each actor has been classified according to the specific type of institution and ownership (e.g. Government, University, Enterprise, etc./e.g. Private, Public, etc.).

| Actor & website | Contact(s) | Type of Institution & Ownership |
|---|---|---|
| Tunisian Union of Industry, Trade and Crafts<br>http://www.utica.org.tn/Fr | Rue Ferjani Bel Haj Ammar,<br>Citée El Khadhra, 1003 Tunis, Tunisia<br>Telephone: (+216) 71 142 000<br>Fax: (+216) 71 142 100<br>Mail: contact@utica.org.tn | Supporting organization<br>(Private) |
| Chamber of Commerce and Industry in Tunisia<br>https://www.ccitunis.org.tn/fr/home/ | 31, Av de Paris - 1000 - Tunis<br>Telephone: (+216) 71 247 322<br>Fax 1: (+216) 71 339 422<br>Fax 2: (+216) 71 354 744 | Supporting organization<br>(Private) |
| Ministry of Development, Investment and International Cooperation<br>http://www.mdici.gov.tn/en/ | 98 Avenue Mohamed V 1002<br>Belvedere, Tunis<br>Telephone:(+216) 71 798 522<br>(+216) 71 798 051<br>Fax: (+216) 71 798 069<br>Mail: boc@mdici.gov.tn | Government |
| Ministry of Industry<br>http://www.tunisieindustrie.gov.tn/ | Ministère de l'Industrie Immeuble Beya, 40 Rue Sidi Elheni Montplaisir, 1002 Tunis<br>Telephone: (+216) 71 905 132 - 71 904 216<br>Fax: (+216) 71 902 742<br>Mail: contact@industrie.gov.tn | Government |
| Ministry of Energy, Mines and Renewable Energies<br>http://www.energymines.gov.tn/ | Immeuble Panorama 40 avenue Japon Montplaisir, 1002 Tunis<br>Telephone: (+216) 71 951 404<br>Fax: (+216) 71 909 149<br>Mail: contact@energy-mines.gov.tn | Government |

| | | |
|---|---|---|
| Ministry of the Environment and Sustainable Development http://www.environnement.gov.tn/index.php | Cité administrative, rue de développement, cité El Khadra, 1003 - Tunis<br>Telephone: (+216) 70 243 800<br>Fax: (+216) 71 955 360 | Government |
| Ministry of Higher Education and Scientific Research http://www.mes.tn/ | Avenue Ouled Haffouz - 1030 Tunis<br>Telephone: (+216) 71 786 300<br>Fax : (+216) 71 801 701<br>E-mail : mes@mes.rnu.tn | Government |
| Ministry of Vocational Training and Employment http://www.emploi.gov.tn/en/the-ministry/missions/ | 10, street Ouled Haffouz 1002 Tunis<br>Telephone (+216) 71.791.331 - 71.798.196<br>Fax: 71.794.615<br>Mail: webmaster@mfpe.gov.tn | Government |
| Ministry of Communication Technologies and Digital Economy https://www.mtcen.gov.tn/index.php | 88, Avenue Mohamed V Tunis<br>Telephone: (+216) 70 244 695<br>Fax: (+216) 70 244 699 | Government |
| University of Tunis El Manar www.utm.rnu.tn | Campus Universitaire Farhat Hached B.P. n° 94 - ROMMANA 1068 Tunis, Tunisie.<br>Telephone: (216) 71 873 366<br>Fax: (216) 71 872 055<br>Mail: utm@utm.tn | University |
| Agency for the Promotion of Industry and Innovation http://www.tunisieindustrie.nat.tn/en/home.asp | 63, rue de Syrie, 1002 Tunis Belvédère - Tunisie<br>Telephone: (+216) 71 792 144<br>Fax: (+216) 71 782 482<br>Mail: apii@apii.tn | Policy support institution<br>Government |
| Foreign Investment Promotion Agency www.investintunisia.tn | Rue Salaheddine el Ammami Centre Urbain Nord 1004, Tunis, Tunisia<br>Telephone: (+216) 70 241 500<br>Fax: (+216) 71 231 400<br>Mail: fipa.tunisia@fipa.tn | Foreign Investment support center<br>Government |

*Extended list of possible key actors and contacts.*

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