Data Ecosystem Report to Enhance Sustainable Development in Egypt

December 2018

Preface by Head of CAPMAS

Based on Egypt Vision 2030 - which coincided with the United Nations supported sustainable development goals of the United Nations - and in order to fulfill its role in monitoring the goals of sustainable development - which has been translated into collaboration with UNFPA in utilization of the data ecosystem to support sustainable development goals at the national and international levels - CAPMAS is pleased to launch the Data Ecosystem Report in Egypt to Support Sustainable Development Goals, which was carried out under the supervision of the research team headed by Prof. Dr. Majid Khashaba, Professor at Institute of National Planning (INP).

CAPMAS extends its thanks to all those who contributed to this Report. It also extends special thanks to the UNFPA for their efforts and support to produce this Report.

CAPMAS hopes that the Report would achieve its objectives in identifying the new data communities in Egypt and the challenges it faces in building and developing process to support the sustainable development goals, and to achieve the desired goal for planners and decision-makers in policy-making and decision-making in all fields at the national and international levels to serve development purposes and to sustain them to improve human life.

Major General/Khairat Barakat
Head of CAPMAS

Preface by UNFPA

Imagine a world where every pregnancy is wanted, every child-birth is safe, and every young person's potentials are fulfilled. This is the world we are striving to realize. Universal access to reproductive health information and services cannot be achieved until everyone everywhere is counted, especially those furthest behind. To do that, UNFPA is working with the Government of Egypt to achieve the three transformative results of the UNFPA Strategic Plan, outlined in 2018-2022 Country Program:

1. ending unmet need for family planning;
2. ending maternal death; and
3. ending violence and harmful practices against women and girls.

Meeting these ambitious targets is important if we are to deliver on the Agenda 2030 for Sustainable Development as well as on Egypt Vision 2030. Ensuring that data underpins the pursuit of these transformative results, through high-quality population data and analysis, is critical for this endeavor.

Data Ecosystem to Enhance Sustainable Development in Egypt synthesis Report is a result of the strong partnership between UNFPA and CAPMAS. The Report sheds light on the current situation and role of data as a national asset that can add the value. The Report brings together a wide spectrum of information relevant to the data revolution. It's not limited to public official data communities, but also includes civil society, academia, and new data communities that are becoming active producers and users that go beyond traditional forms.

The Report also talks about the framework of the national statistics and role of CAPMAS being the key player. Egypt has already achieved progress within its national statistical system, yet the Report points to a number of challenges including absence of a national strategy for statistics, outdated legislative framework, and others. Important events, milestones, and relevant international bodies are clearly featured and referred to in the course of the Report. There is an emphasis on greater coordination and partnerships to ensure more open flow of information, application of new technologies and new data sources, data literacy and shifting to Population Register for population and housing census. In data driven world, nothing is more critical than to keep improving systems for data collection and analysis. We hope that this Report will serve that function.

Aleksandar Sasha Bodiroza
UNFPA Representative, Egypt

ACKNOWLEDGMENT

This Report on data ecosystem is considered as the forefront of this kind of reports in the Arab region. It is a result of the important initiative of both UNFPA and CAPMAS to assign a team of specialized experts to prepare this Report.

Accordingly, acknowledgment is due to President of CAPMAS; in addition to leaderships that supported this work, especially Mr. Tarek Rashad, Head of Central Department of Trade Statistics and Public Utilities; Dr. Yosr Abdel-Fattah, Head of Sustainable Development Unit, and researchers at the Unit; officials and researchers at the Sector of Information Technology, Sector of Regional Branches, Department of Research, and others.

Also, Mrs. Dawlat Shaarawy, UNFPA, and officials at UNFPA, presented important support to the research team, while UNFPA presented many important notes on the preliminary report.

Members of the research team contributed all possible effort to present the Report in the best possible form. Prof. Dr. Amany Helmy Al-Rayes reviewed the Report and presented important notes for formal and objective development. Prof. Dr. Ahmed Abdel-Aziz El-Bakly prepared the chapter of population. Dr. Hassan Rabee presented the major contribution to the chapter of new data communities in Egypt. Prof. Dr. Ezzat Zayyan presented many contributions across the Report and supported the team members, reviewed and edited the English version of the Report. Mr. Mohammed Hasaneen provided and prepared necessary data to prepare the Report.

In addition, thanks are due to the team of translation, and the secretary colleagues who printed the Report and presented it in a good technical form.

The research team hopes that the Report would achieve targeted objectives, and provide planners, decision takers, public policy makers, and workers in the statistical field in Egypt with due support to achieve the best utilization of data revolution to enhance sustainable development efforts in Egypt.

Prof. Dr. Mohamed Magid Khashaba
Principal Investigator

Research Team

Name
1. Prof. Dr. Mohamed Magid Khashaba - Principal Investigator
2. Prof. Dr. Amany Helmy Al-Rayes
3. Prof. Dr. Ahmed Abdel-Aziz El-Bakly
4. Prof. Dr. Ezzat Zayyan
5. Dr. Hassan Mohammed Rabee
6. Mr. Mohammed Hasaneen

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

AAPA : Addis Ababa Plan of Action for Statistical Development in Africa
ACS : African Centre for Statistics
CAPMAS : Central Agency for Public Mobilization and Statistics.
CEOS : Committee on Earth Observation Satellites
GWG : Global Working Group- on Big Data
Hadoop : Open-source software framework for storing and processing data
HDFS : Hadoop Distributed File System
HLPF : High-Level Political Forum on Sustainable Development
IAEG-SDGs : Inter-agency Expert Group on SDG Indicator
IEAG : International Expert Advisory Group
IoT : Internet of Things
ITU : International Telecommunication Union
MAPS : Marrakech Action Plan for Statistics
PARIS 21 : The Partners in Statistics for Development in the 21Century
RDBMS : Relational Database Management System
SDG's : Sustainable Development Goals
SDS : Sustainable Development Strategy: Egypt Vision 2030
SDSN : Sustainable Development Solutions Network
UN ECA : United Nations Economic Commission for Africa
UNOV : UN Office for Outer Space Affairs
UNSC : United Nations Statistical Commission

INTRODUCTION

The UN Sustainable Development Goals – SDGs 2030 approved by the General Assembly of the United Nations in September 2015 – represent a global comprehensive development initiative that aims to achieve substantial changes in the three dimensions of sustainable development: social, economic, and environmental dimensions; in the light of the experiences acquired and accumulated by different countries based on the experience of MDGs all over the world, during the period 2000-2015.

The New Global Agenda created unprecedented high demand for many and diversified packages of data, statistics, and indicators; that are characterized with comprehensiveness, integrity, quality, creditability, and comparability at all global, regional, and local levels. In fact, this made the world actually living in a state of Data Revolution and Internet of Things – IoT; and approaching a new and unprecedented age of information and statistics.

In fact, CAPMAS - as the official statistical agency - has been strongly active in the global and regional efforts and dialogues related to sustainable development and its statistical requirements, Data Revolution and its tools and applications. In addition, CAPMAS has been strongly present at the national level through multiple related initiatives, the most important of which is the creation of the specialized "Sustainable Development Unit" in 2016. Moreover, new and emerging data communities in Egypt assumed important roles in the national data ecosystem, where these communities positively interacted with developments of internet and data revolution to develop its community and development roles.

It is worthy to note that the era of sustainable development is characterized not only with increasing demand for data, but also it created a group of revisions and transformations related to data in the present and coming decades as follows:

- Increasing the Role of Data in Sustainable Development and Creation of Value; it is the role that is directly related to contribution to building societies and economies of information and knowledge, developing digital economy, and data-driven economy.

- Reflections of Data Revolution on Roles, Concepts, Applications, Tools, and Forms of Data; especially as for diversification of sources, diversity of national and non-national partnerships, developing administrative data systems, open data to support open and responsive governments, developing technology of processing, analysis, communication, and platforms to process big data.

- The Role of Data Revolution in Changing and Developing the Nature of Operation of National Statistical Agencies; where such agencies are practically at the doors of a new Data Revolution, which necessitates large changes in strategies, roles, partnerships, tools, technology, applications, resources, development and decision-making support at different levels, follow-up, evaluation, and measuring development and statistical impact.

- The Role of New and Emerging Data Communities in the Data Ecosystem; mainly social media networks and sites, cell phone data, NGOs at the local, regional, and global levels, in addition to the increasing role of aerial and satellite photography data.

Active participation of CAPMAS in global, regional and national efforts and dialogues - related to Sustainable Development and Data Revolution and increasing growth in the roles of new data communities in Egypt - resulted in availability of a large stock of statistical learning and experiences. This, in turn, represents a starting point to crystallize new roles for the Data Ecosystem in Egypt, to enhance achieving the objectives of both the global SDGs 2030, and Egypt Vision - SDS 2030.

In this context, the Report presents a future vision of the Data Ecosystem in Egypt, and the role of CAPMAS and new data communities in this system, in the light of a conceptual framework and acquired experiences as for the nature and execution of world initiatives to activate Data Revolution and Big Data, so as to enhance the objectives of sustainable development; characterize the components of the National Data Ecosystem, evaluate the status quo of data, shed light on new data communities in Egypt, analyze challenges facing system development, and crystallize a strategic vision to build and develop capacities of the system.

As the national and international reports of sustainable development and Data Revolution pay a special interest to population data and conditions - at the global, regional, and national levels - the present Report devotes a separate chapter to population data and its role in the Data Ecosystem, as the state recently conducted an ambitious project for the General Census of Population in Egypt 2017 through CAPMAS.

EXECUTIVE SUMMARY

Data Revolution carries many promising opportunities and capabilities that contribute to developing all life aspects and human activities on the global level. This can be achieved through a different global awareness of the role of data as a national asset; a tool to create value and wealth to enhance competitiveness, sustainability, and direct contribution to create knowledge and digital economies across the world; in addition to its particular contribution to enhance Sustainable Development Strategy 2030-SDSs that seeks to transform countries that signed the plan - 193 countries, including Egypt - into levels of more socio-economic and environmental sustainability and quality of life.

Data Revolution directly affects the nature of work fields of national/official statistics systems all over the world, where it provides unprecedented prospects and experiences to develop mechanisms of such statistical systems and agencies, legislatively, institutionally, technologically, and its human resources. Moreover, it provides unprecedented opportunities to develop the role of national statistics systems and agencies, in addition to the Data Ecosystems, to enhance the SDGs, with its 17 goals, 169 objectives, and 230 indicators.

Also, Data Revolution led to emergence of important roles for new and emerging data communities in data ecosystems across the world, such as: social media sites, cell phone data, satellite data, civil society data, scientific community data, citizens groups data, etc.

In this context, CAPMAS and UNFPA insist to translate the contents and tools of Data Revolution into enhancing and developing the Egyptian statistics system and the Data Ecosystem, on the one hand, and enhancing the SDSs-2030 and the SDGs, on the other. This insistence has been translated into concluding an agreement between CAPMAS and Prof. Dr. Mohamed Magid Khashaba, INP, on behalf of the Consultative Team, to prepare a scientific report on the role of Data Ecosystem in Egypt to enhance sustainable development, in the context of a complete interaction and coordination between the Consultant and CAPMAS, through the Sustainable Development Unit.

In its six chapters, the Report presents many approaches to achieve the targeted objective. **Chapter One** presents a conceptual introduction on the Data Revolution and the related concepts and tools such as: Big data, Open Data, Administrative Data, new data communities, Cloud Computing, and Data Ecosystem, etc., as for developing statistics systems in general and sustainable development in particular. It also presents the practical experiences and applications of Data Ecosystems and the related tools and data in many countries. Moreover, it presents the experiences learned from specific national experiences in developed, emerging, and developing countries, such as the United Kingdom, South Korea, and Ghana. Also presented are the goals and dimensions of the SDS 2030 in Egypt and its needs of data, information, and indicators.

Chapter Two deals with the Data Ecosystem in Egypt in the framework of the national statistics system and the role of CAPMAS, where it presents a legislative and institutional assessment of its role, and the different outputs of the Data Ecosystem in Egypt in the form of different publications

and bulletins, in collaboration with all agencies in the country. It deals in some detail with the role of CAPMAS in application of strategy, plans, and projects of sustainable development through the Sustainable Development Unit, established by CAPMAS for this purpose in 2016. It also deals with the initiatives and projects of CAPMAS in dealing with the tools and applications of Data Revolution such as Big Data, Administrative Data, and Cloud Computing that are enhanced by CAPMAS participation in many global and regional events related to such applications, as presented in the Report. It also casts light on related local roles such as those of Ministry of Planning, Follow up and Administrative Reform; Ministry of Investment and International Cooperation, in addition to some external roles such as those of the UNSC, Partnership in Statistics-PARIS21, SCA, and the Arab Union of Statisticians.

After identifying CAPMAS roles, **Chapter Three** sheds light on roles of new and emergent data communities in Egypt, such as data communities on social media networks, where Egypt comes the first of all Arab countries as for Facebook, with accounts number of about 34.5 accounts. It also presents the situation of cell phones networks, whose prevalence rate amounted to 110%, with 99.5 million lines. Moreover, it presents a general view of data community of civil society in Egypt, with pioneering models in this regard, such as Egyptian Food Bank, Federation of Egyptian Industries, and Egyptian Feminist Union. It concluded with presenting the situation of satellite and aerial photography data by main concerned agencies, such as National Authority for Remote Sensing & Space Sciences-NARSS, and Egyptian General Authority of Survey.

As the United Nations pays special attention to population as the controlling factor in application of sustainable development strategies, **Chapter Four** is devoted to the role of population and its data in the Data Ecosystem in Egypt. Thus, it presents some summarized features of the population in its relation to resources globally, while it presents the population issue in Egypt in detail. It deals with population challenges related to the gap between escalating population growth and available resources; population characteristics, and imbalance of population geographical distribution - as it is concentrated on only 7% of the total area - and some approaches to deal with such challenges. Also, it presents an integrated analysis of the quality, nature, and forms of population data in Egypt that are produced by CAPMAS through censuses, demographic sample surveys, and administrative records. Moreover, it presents the historical aspects of the censuses, the developmental roles of censuses; with more light casted on the last census of 2017. This Chapter also presents the detailed vision of developing the census in Egypt into a census based on Administrative Records, because of the advantages of such censuses compared to the traditional ones.

Chapter Five deals with many challenges facing the Data Ecosystem and the Egyptian statistics system, especially those related to absence of a national statistical strategic vision as is the case in many countries. It also deals with many challenges related to governance of the statistical system: legislatively, institutionally, organizationally, financially, humanly, and conceptually. In addition, it presents technological challenges facing the system in relation to Data Revolution, Big Data, Administrative Data, Technological Platforms, and the challenges of activating partnerships globally, regionally, and locally.

Chapter Six concludes a group of approaches, suggestions, and initiatives that may contribute to the development of the Data Ecosystem and the Egyptian statistics system in general. These aspects relate to the legislative development in the light of the global and regional developments; the strategic development through a national statistical strategy in the light of the global experiences; developing and improving governance of the national statistical system; developing technological and human capacities; developing tools such as censuses, technological development of platforms, portals, and programs; developing technological solutions and new technologies - such as Cloud Computing - to enhance statistical activity. Also, it concentrates on the importance of developing statistical partnerships globally, regionally, and locally, in the framework of the global interest in sustainable development and Data Revolution, and the importance of developing a new system for assessment, follow-up, and measuring the statistical impact on development.

CHAPTER ONE

The Data Ecosystem to Enhance Sustainable Development:

Concepts, Trends, and Experiences

Data Revolution - and the related development of Data Ecosystems - became a major interest for all developed and developing countries, as will be indicated later by the Report. Accordingly, developing Data Ecosystems became a basic condition to achieve socio-economic and environmental development in such countries.

It is noteworthy that the Report is paying a special interest to the African dimension - in addition to the Arabic and global dimensions - due to the effective contribution of Egypt to African affairs at all levels, especially as for the Agenda 2063 – The Africa We Want, and different statistical activities in which CAPMAS participates at the African level, which will be presented later through the Report.

1-1.Concepts and Attitudes towards Data Revolution, Data Communities and Data Ecosystem

1-1. Data Ecosystem: Basic and Related Concepts

Interest in Data Ecosystems is largely related to the global and regional developments in the field of Data Revolution and Big Data, and other trends related to crystallizing new roles for data in life and human activities in general, and the effective roles in enhancing sustainable development in particular, in the light of increasing roles of new and emerging data communities such as social media, Satellite data systems, and mobile phones records. In this context, the Report will cast some lights on the concepts of Data Revolution, the nature of some new and emerging data communities, and Data Ecosystems, as follows:

a- Data Revolution: IEAG refers to the Data Revolution as "an explosion in the size of data, velocity of producing data, the number of users of the data, data dissemination, and different forms of data produced by modern technology, such as the mobile phones and the internet. Also, data comes from other sources such as qualitative data, data generated by groups of citizens, and impressionist data (UN, 2014).

In addition, the Group presents another definition of Data Revolution in the framework of sustainable development as follows: "Integration of different groups or packages of new data with available traditional data to produce high quality and more detailed data, that are more related to user needs, and in suitable time to enhance multiple objectives and users so as to achieve and evaluate sustainable development". New and unstructured data include: satellite data (satellite images), records of mobiles, sensor data, and social media data, etc.

As for Data Revolution in the Arab region, ECA, Project of Partnership in Statistics for Sustainable Development, and Doha Declaration, give Data Revolution additional dimensions as follows (ECA et al., 2016; OECD, 2015; Doha Declaration, 2016):

- Data Revolution expresses deep transformations in use and governance of data to develop public policy and decision-making, build new cultures for providing and using data in all sectors and fields.

- Data Revolution is considered as a methodological and practical incubation for different subsidiary data communities, including multiplicity and diversification of data sources, diversification of innovative tools and methods to provide and analyze detailed data in an interactive and momentarily way for the sake of all society parties.

- Execution of SDGs 2030 depends on changing the attitude towards data and statistics on the part of the government, business sectors, and groups of citizens, in addition to re-governance of national statistical systems.

- The share of developing countries in Data Revolution; where Data Revolution has other aspects surpassing the duality of (Unprecedented Supply of Data) against (Unprecedented Demand for Data). Such aspects include the issue of data gaps between developed and developing countries, the right of developing countries to access to and utilize data to enhance progress towards sustainable development and quality of life in developing countries. Also, this makes governments and public administration agencies in such countries more open, transparent, accountable, and efficient.

b- Big Data: It is data with large volume, high velocity, and variety in sources and resources in a form that requires new forms of administration and processing to support decision maker and achieve any other objectives.

According to the definition and the following table, it becomes clear that there are basic determinants and measures for Big Data, including the following:

- **Volume:** This is related to an endless explosion in the volume of data produced or circulated. In this regard, some international reports refer to the explosion of Data Revolution in the last years that resulted in the fact that 90% of world data have been produced during the last two years only, and that data currently available in the world - related to socio-economic and environmental fields - witness an unprecedented availability due to modern technology. In the framework of repercussions of this Data Explosion, McKenzie Corporation estimates that demand for data specialists will be higher than their supply by 60% (See Table 1-1).

- **Velocity:** This is related to the continuous flows of data in all fields of life, and the human socio-economic, environmental, scientific, and technological activities.

Table (1- 1): The Most Important Differences between Traditional and Big Data

Item	Traditional data	Big-Data
Volume	(Terabyte-TB)	Petabyte (PB), Exabyte (EB), Zettabytes
Production Rate	Hourly, Daily, …	Every Moment, Momentarily
Type of Structure	Structured	Semi-Structured, Unstructured
Sources	Central	Distributed, Dispersed
Data Integration	Easy to Integrate	Difficulty, Complexity and Inclusion of Integration
Relations between Data	Known and Determined Relations	Unknown Integrated, and Complex Relations
Data Model	Fixed Plan	Unplanned
Data Storage	RDBMS	HDFS, NoSQL
Role in Organization	Collecting, Storing, and Providing data Related to the Field of the Organization	Of the Main assets, and Major Actor in Creating Value, Competitive Advantages, and Performance Improvement
Impact on Decision Support	Support Consumes Longer Time, and is less Comprehensive, Intensive, and Analytical	Direct, Rapid, and Continuous Support due to Velocity and Intensity of Comprehensive Capacity, Analysis, and Providing Alternatives

Source: Khashabah, et al., (2016).

- **Variety:** It is related to multiple and diversified communities and sources of data, including satellite photography, social media, mobile phones data, etc.

Due to the importance of the role of Big Data in developing official statistical systems in all countries, the UNSC formed a Global Work Group (GWG), specialized in Big Data - with the membership and participation of Egypt - whose objective is to ensure the effective use of such data, to enhance implementation of the SDGs. The GWG concentrates on different issues in this regard, including: adopted methodologies, quality, technologies, access to data, related legislations, privacy, administration and finance; in addition to analysis of cost and benefits related to Big Data, building (world platforms) for data, application, and services related to Big Data (Economic and Social Council, 2017).

c- Open Data: Open Data is defined as "Data provided by the government, business sector, groups of individuals, that are available, accessed, used, and exchanged by all individuals in the community. However, it must be stressed that being "Open" does not mean any data available by any means. Rather, it means data provided in an official and authorized way according to controls to protect privacy, and specific frameworks and rules to reuse and develop such data" (Open Data Institute, 2015).

Open Data play an important role to enhance sustainable development. In this regard, the World Bank (Global Partnerships, 2016) refers to the fact that Open Data disseminated by national statistical agencies and other governmental sources have an extremely positive impact on the plans of sustainable development, especially in vital fields, such as: enhancing economic growth and job creation; improving efficiency and effectiveness of public services; increasing transparency and the level of citizen participation in public issues; and improving exchanging data with government.

Later, in the present Chapter, the Report will present some pioneering global experiences as for using Open Data to enhance partnership, credibility, accountability, improving efficiency of governmental performance and public services, and improving business sector in many countries, especially the United Kingdom.

d- Administrative Data: They are defined as the data extracted from specific organized administrative units, especially those found in governmental institutions and agencies, such as data systems of education, health, taxes, housing, licenses, etc. Often, they are collected for purposes of civil registration and vital statistics, such as registration of births, deaths, marriage, divorce, political voting, and national censuses. Some consider such administrative data as belonging to the concept and system of Big Data (Connelly et al., 2016).

United Nations and its specialized statistical agencies concentrate on the statistical importance of such type of administrative data and registers to build specialized statistical data bases, on the one hand, and consider it as a basic condition for the success of registration censuses in different countries, on the other. In addition, it is considered as a tool to enhance transparency, accountability, and partnerships at the central and local levels in the framework of "the Right to Data" (Abdel-Fattah, 2014). The Report will present the role of Administrative Data in some world experiences. Chapter Four of the Report will also present the prospects and opportunities of developing the population census in Egypt into a census based on administrative registers.

e- Cloud Computing: Cloud Computing represents a space, framework, or platform of technologies, infrastructures, applications, and resources of entangled data and information, that allow providing data and information service through the internet. Since its development in 2008, this framework had large organizational and economic impacts on policy and decision making in the business sector and national statistics agencies across the world.

Cloud Computing, however, consists of three types as follows (Techtarget, 2017):

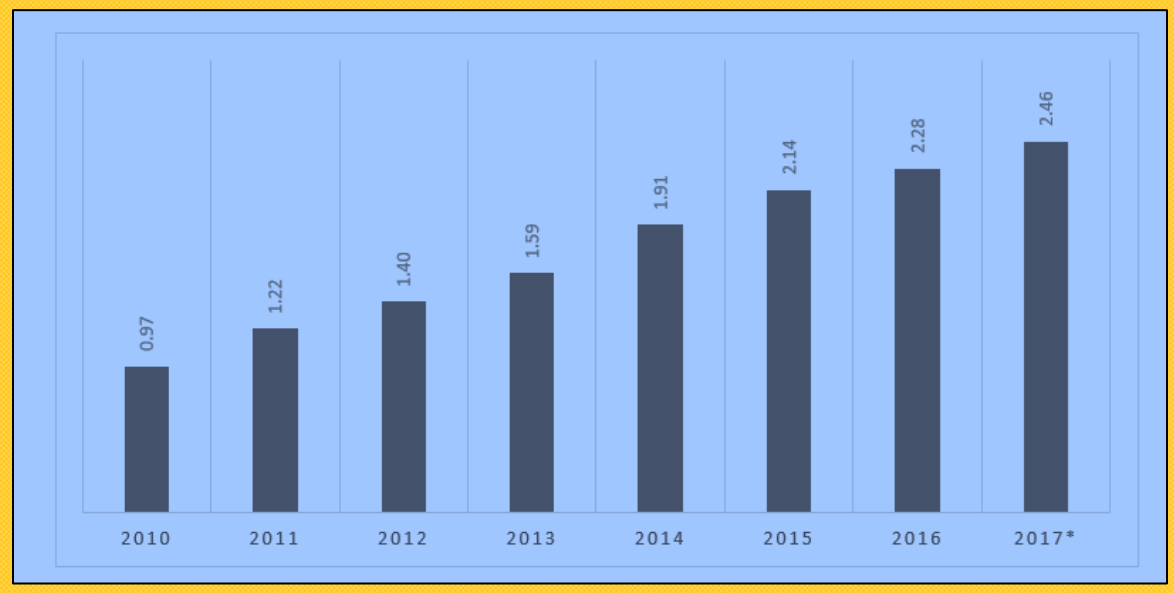
- **Private Cloud Computing**: It provides data service from data business centers to internal users (which is the model applied by CAPMAS).
- **Public Cloud Computing**: This provides data through a third party as a service provider by the internet on request, such as Amazon Web Services: AWS.

– **Hybrid Cloud Computing**: This provides data using both public and private Cloud Computing according to the type of applications.

The Sustainable Development Report, 2017 (UN, 2017), and Cape Town Global Work-Plan for Sustainable Development, concentrate on the importance of innovation, modernization, and new approaches - including Cloud Computing - to enhance the capacities of Data Ecosystems, and harness the technological power in this regard.

f- Social Media Data: Expansion of using social media globally is related to increasing number of internet users in the world, which is estimated at about 3.8 billion users in 2017, representing about 40% of world population (www.hotsuite.com). Fig. (1-1) indicates that the number of social media users in the world increased from less than one billion users in 2010 to about 2.5 billion users in 2017. Facebook assumes the first rank as for the number of social media users globally, with number of users amounting to about 2 billion users, representing more than half of total users of social media in the world, with a percentage of about 52.6%. (www.hotsuite.com).

Fig. (1-1): Development of the Number of Social Media Subscribers in the World. 2010-2017



Source: www.statista.com/statistics-/number-of-worldwide-social-network-users.
* Estimate.

UNSC is doing its best to prepare a manual presenting and explaining world experiences, especially those of developing countries, as for utilizing social media data in generating statistics to enhance development, using methods and programs of storage and analysis, to identify attitudes of public opinion and other purposes (UNSC, 2017).

g- Satellite Navigation Systems: They include a wide spectrum of aerial data systems that depend on satellites, including remote sensing, GIS, aerial communication, space and atmospheric

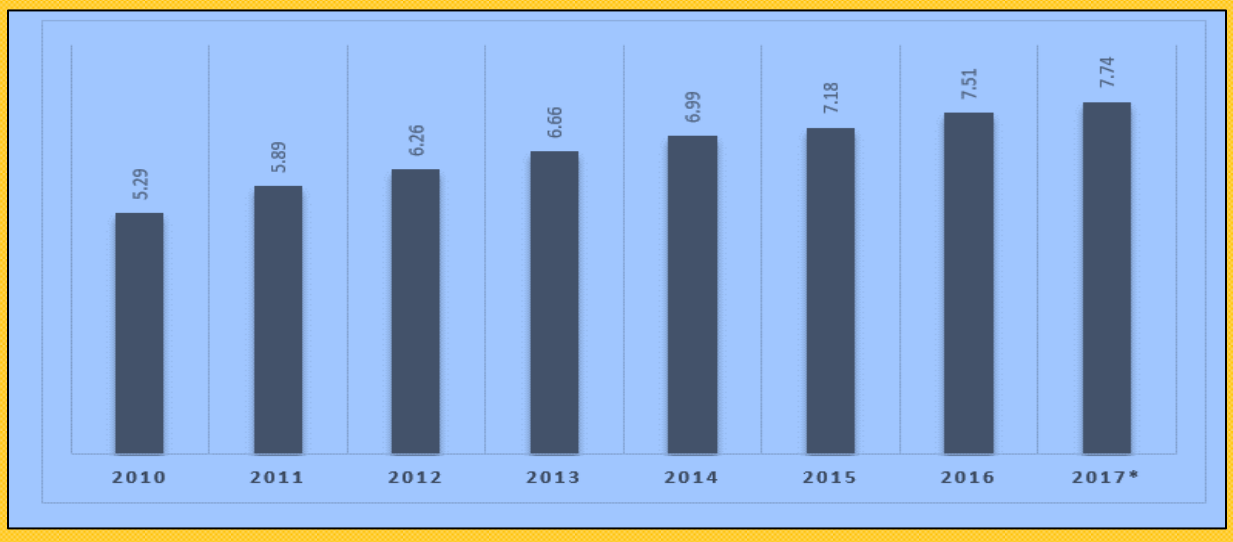
sciences, navigation satellites, natural resources management, environmental monitoring, crisis management, and climate change (Al-Mashat, 2017).

Specialized international organizations have been paying attention to this kind of data for decades. Its importance doubled within the framework of Data Revolution and Big Data, where UNSC - through its team (GWG) - created sub-teams concerned with satellite images, geographical spatial data, and remote sensing. These teams prepare specialized manuals for uses and applications of satellite images to enhance Data Revolution and sustainable development and its projects, and exchange experiences related to such applications in different countries (ESC, 2017).

The Report will cast light on some applications of satellite images regionally and globally, while Chapter Three devotes a special article to shed light on such applications in Egypt.

h- Cell Phone Data: Data Communities of mobile phones assume great importance within new and emerging data communities in the world, especially with the large increase in the number of users across the world, which increased from 5.3 billion users in 2010 to about 7.7 billion users in 2017, with a percentage increase of about 41.5% between the two years, as indicated in the following table. Similar to the case of social media, UNDC does its best to organize benefiting from data of mobile phones networks (UBC, 2017), where it is about to finish a manual based on international experiences, especially the European, to enhance efforts of developing countries in this regard. Applications concentrate on fields of tourism, travel, transport, and population statistics**.**

Fig. (1-2): Development of the Number of Cell Phone Lines in the World, 2010-2017



Source: www.itu.int.
* Estimate.

g- Concepts and Dimensions of Data Ecosystem:

ECA defines the Data Ecosystem as follows: "A complex system of relations among individuals, organizations, data packages, standards, resources, platforms, and all other elements that determine the (environment) in which each data source exists".

Moreover, "the system includes multiple data communities including (public, private, civil); and different kinds of data including (old and new); law and legislative frameworks; political frameworks; technologies, platforms and tools. Also, the system necessarily includes the dynamic interactions among different parties related to the adopted technology, infrastructure, or political and legislative frameworks" (ECA et al., 2016).

The definition casts light on some of the basic dimensions in the Data Ecosystem as follows:

- **The legislative frameworks organizing the statistical work and handling data**, which organize the relations among concerned parties and data communities inside and outside the country to support planners and decision makers.
- **The interactive institutional frameworks in the statistical work**, mainly the role of the national statistical agency that plays the role of the interactive organizer of statistical work - within the framework of statistical legislation - to enhance sustainable development.
- **The role of official statistics in the Data Ecosystem**: It is the controlling role - related to the role of the state in general, on the one hand, and the role of national statistics agencies in particular, on the other - in organizing statistical work to enhance development all over the world, including Egypt, and launch different initiatives and partnerships with concerned parties in this regard, internally and externally.
- **Classification and control of data communities:** They are considered the basic work fields in Data Ecosystems - including traditional, new and emerging data communities - and can be classified - according to ECA - as follows:
    - Official Data Communities (Government and national statistics systems).
    - Private Sector Data Communities.
    - Civil Society Data Communities.
    - Scientific/Academic Data Communities.
    - Open Data Communities.
    - Big Data Communities.
    - Citizen-Generated Data Communities.
- **The role of strategies, plans, and policies in the statistical work;** especially the national statistical strategies, or the policies related to Open Data or Big Data, as indicated by the Report later.

- **The role of technology and technical methods in treatment and handling of statistics and data;** where a great leap took place in the treatment of collecting, analyzing, and disseminating of data, especially Big Data and Open Data.

- **The pivotal role of human resources in the Data Ecosystem**; due to the complexity and integration of statistical work, and increasing dependence on information, communication, and internet, etc.

1-2. The Relationship between Sustainable Development and Data Ecosystems

SDGs 2030 include three dimensions: social, economic and environmental; 17 goals; 169 objectives; and 230 indicators. The United Nations gave the 193 countries that signed the Agenda the freedom to translate the Agenda according to the determinants, circumstances, and development priorities of each country at the national level.

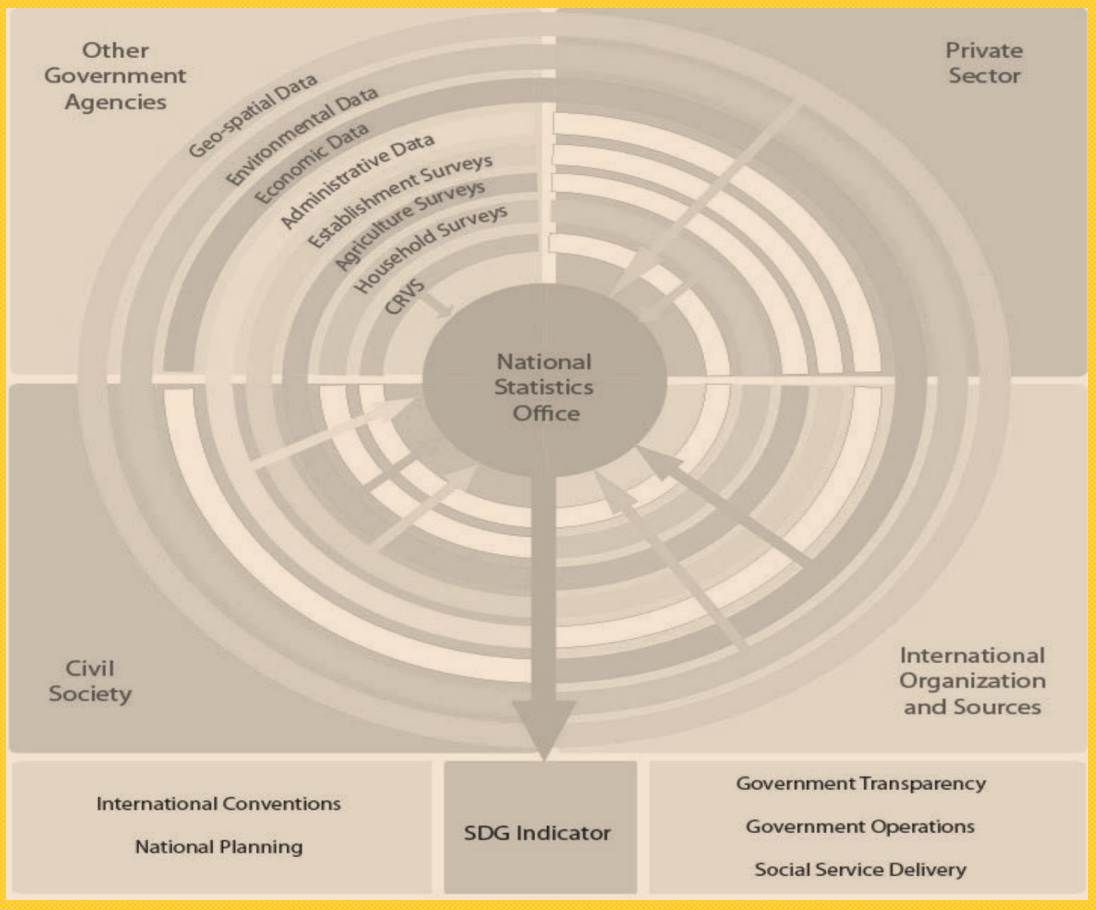
On the other hand, in 2016, the United Nations (through UNSC) formed a high-level team for partnership, coordination, and capacity building in the field of statistics; to monitor SDGs 2030; as it realizes the importance of coordinating global efforts, and enhancing national statistical capacities as for the follow-up and evaluation of the objectives of international and national sustainable development as such.

It can be said that there is an agreement among statistics experts of the United Nations and its concerned agencies (UNDS, 2015) that the effective system to observe and evaluate the extent of achieving the objectives **of sustainable development must include the following**:

a) A general framework/system for follow-up and evaluation; that can be used to control the objectives of sustainable development. It must include indicators that can be applied at the national, regional, and international levels; according to the levels of observation that can be faced later.
b) Agreement on suitable indicators; where such a framework must include a suitable number of initially suggested indicators that can be increased at later stages.
c) Providing suitable data-bases; where the success of applying the chosen indicators is related to the availability of data-bases at the national level, to enable planners and decision makers to calculate and apply such indicators.
d) Utilizing information and Data Revolution; which includes application of modern methodologies and technological tools to generate, process, and disseminate data related to monitoring sustainable development.

Moreover, Figure (1-3) presents a configuration of the effective components and parties of the targeted data system, in addition to the elements of basic data.

Fig. (1-3): "The Relationship between the National Statistical System and Objectives of Sustainable Development"



Source: PARIS21 et al., (2015) Data for Development - A needs assessment for SDG monitoring and statistical capacity development.

Indicators represent the backbone in measuring progress in achieving sustainable development. Thus, some requirements, and the conditions that must be fulfilled, are as follows:

- **Easiness and simplicity**; in order to facilitate collection and analysis to be presented to policy makers and decision takers.

- **Suitable timing**; in order to maximize expected benefits in policy making, so it is better to fix periodicity of publishing (annual, biannual, etc.).

- **Agreement with related global experiences and measures**; and following recommendations and the best global and regional practices, to facilitate comparisons at the global and regional levels.

- **Concentration on outcomes rather than the means**; as it is better to concentrate on achieved change, impacts and outcomes; to assure that sustainable development achieved actual development change.

- **Dynamics, flexibility, changeability, and adjustment with time**; developing experiences and feedback; due to changing global, regional, and national circumstances and developments, on the one hand; and the experiences generated by feedbacks on achievements, on the other.

Agencies and organizations of the United Nations, and other related international organizations, expect that data play the basic role as a major component in the national system of follow-up and assessment of sustainable development, through the official agencies of planning or statistics in different countries, including Egypt.

In this regard, such organizations depend mainly on the following statistical tools (Open Data Watch, 2016**):**

a. **National Surveys**; including household surveys, agricultural surveys, and labor force surveys.
b. **Censuses**; that are conducted at periodical intervals (10 years, or five years) in different countries.
c. **Administrative Data**; including civil registration, vital statistics, and education statistics.
d. **Economic Data**; including industrial and real estate data, in particular.
e. Geospatial Data.
f. Environmental Monitoring Data.

In addition, such organizations present suggestions as to the periodicity of using and applying such statistical tools to enhance sustainable development, as indicated in the following table:

Table (1-2) Statistical Tools to Collect Data for Sustainable Development

Statistical Tools and Methods	Periodicity (Within 10 Years)
Censuses	1
DHSs	4
LSMSs	2
LFS	10
Agricultural Surveys	2
Economic Establishment Statistics	10
Civil Registration and Vital Statistics	Continuous
Education Statistics	Continuous
Geospatial Data	Continuous
Environmental Monitoring	Continuous

Source: Global Partnership for Sustainable Development Data (2016); the State of Development Data Funding (2016).

It is greatly important to refer to that the system of monitoring, follow-up, and assessment of Sustainable Development, witnesses continuous flows in different forms of data, information, and experiences across a number of interactive levels, from the global, regional, and national levels to the level of subjects and issues, as shown in the following figure.

Table (1-3) points to the major role played by HLPF in assessment of SDGs across the globe; among the declared 17 goals, the 169 objectives, and their 230 indicators. In addition, it indicates the statistical actions and activities related to sustainable development at different regional levels, including the African and European levels, and the OECD.

Table (1-3): "Levels of Monitoring, Follow-up, and Assessment of Sustainable Development".

Level of Follow-up and Assessment	Item
Global Level	– This level is represented by a network of institutions, mechanisms, objectives, and policies in the framework of global and intermediate relationships among concerned parties with sustainable development (193 countries, including Arab countries and Egypt). – Mechanisms to activate and govern sustainable development globally, and present performance reports to the HLPF of the United Nations, which is responsible for follow-up and assessment of the status of sustainable development across the world. – Reports of SDGs Index represent the most salient follow-up reports.
Regional Level	– Executing and following-up sustainable development at the levels of different regional, political, and economic groupings, such as: European Union, African Union, Arab League, GCC, West Asia, etc. – European Union prepared a European strategy for sustainable development in 2001, and developed it in 2006. Also, African Union prepared a strategy for sustainable development (Agenda for 2063 - Africa We need).
National Level	– At this level, mechanisms, frameworks, and time schedule of applying sustainable development differ from one country to another; including strategies, plans, indicators, and other frames and mechanisms related to the government, private sector, and civil society. – In Egypt, it is exemplified in the form of the (Strategy of Sustainable Development - Egypt Vision 2030); and in the (National Strategy of Sustainable Development) in France; in the (National Strategy of Green Growth, 2009-2050) in North Korea; and in the form of the (National Strategy of Sustainable Development) in South Africa.
Sectorial & Local Levels	– Determine the priorities, objectives, and indicators of priority productive and service sectors (industry, agriculture, etc.), or at the region/governorate level, in the light of the strategies, plans, or policies of sustainable development at the national level.

Level of Follow-up and Assessment	Item
	– Periodical reports are produced as for the extent of achieving the objectives of sustainable development in each sector, local unit, governorate, or a region.
Issues/ Thematic Level	– Issues, in turn, are determined according to priorities at the national level, or the sectorial level, so as to present the issue of (governance) and its role in improving sustainability in some countries.

Source: Khashabah, (2016). "Fields and Determinants of the Role of Human Resources in Enhancing Sustainability in Arab Banking and Financial Institutions", Paper presented to the "First Arab Forum of Human Resources in Arab Banking and Financial Institutions".

1-3. Experiences of Development and Roles of Data Ecosystem in Developed, Emerging, and Developing Countries

Presenting the best experiences and practices related to the development of Data Ecosystems in groups of different countries aims to conclude the best practices that can be utilized in the Egyptian experience; and identify determinants and challenges facing different countries in this regard, and how to face them.

In the following section, we present such experiences in an aggregate form from the related global, regional, and local reports. In addition, light will be shed on examples of specific national experiences in developed, emerging and developing countries: United Kingdom, South Korea, and Ghana, respectively.

1-3-1. Overview of the Best Global Experiences and Practices.

Table (1-4) presents the conclusions of a survey by the Report Team of a group of global, regional, and national reports; to conclude the best experiences and practices as for the role of Data Ecosystem in enhancing comprehensive and sustainable development in all countries in general.

From the table that shows the good experiences and practices, the following facts can be concluded:

- **There is a global comprehensive interest in Data Ecosystems to enhance sustainable development:** This interest applies to both developed and developing countries, with varying degrees according to the level of socio-economic and knowledge progress in different countries.
- **There are multiple forms of interest in the developmental role of data:** The most salient features of interest include the making of national strategies and policies for data in some countries, or establishing institutes and centers specialized in data, in other countries, etc.

- **There are many new sources and data communities:** These include satellite images, civil society data, social Media data, etc.
- **There are important roles of environments and tools of developmental empowerment of the data:** In particular, developing infrastructure for ICT, developing human resources, activating cooperation with specialized global organizations to support and capacity-building, especially in developing countries.

Table (1-4): The Most Salient Global, Regional, and National Experiences and Practices Related to the Role of Data Ecosystem in Enhancing Sustainable Development in Different Countries

Field of Experiences and Practices	The Most Salient Experiences and Best Practices	National Experiences
Strategic Planning and the Role of the State	– National Strategies for Sustainable Development (developed, emerging, and developing countries). – National Statistical Strategies (developed, emerging, and developing countries). – Data Strategies, within the National Statistical Strategies, or Separated but Closely Related. – The State is a Major Player in all the Aforementioned Strategies.	– Strategies for Sustainable Development (France, South Korea, Brazil, Tunisia, and Egypt). – Statistical Strategies (Cameron, Congo, Algeria, and Saudi Arabia). – Policy for Data Revolution (Rwanda).
The Role of Data in Development in General, and Sustainable Development in particular	– Importance of the Role of Data in Building, monitoring, and Assessment of Sustainable Development Strategies and Plans; using Indicators; and Supporting Policy Making and Decision Taking. – New, Emerging, and Expected Roles for Data: Political, Economic, Cultural, Human, and Business. – Priorities to activate the developmental role of data, removing barriers to flow and participation, new governance for data administration.	– The role of the "Unit of Sustainable Development" at CAPMAS. – Many African countries relate the role of statistics and sustainable development at the national level to the African Strategy for sustainable development 2063 (including Ghana).
Types and Sources of Data	– New Resources, Communities, and Sources of Data: From satellites; geospatial data; data of civil	– There is an earlier and greater interest in developed countries (USA, Denmark, Australia, and Malaysia).

Field of Experiences and Practices	The Most Salient Experiences and Best Practices	National Experiences
	society, citizen groups, Social media and individuals. – Increasing awareness of the role of the official statistical system, and relating data to the needs of citizens, community, and population mobility.	– **There is slower interest in developing countries, due to shortage of finance and technical knowledge.** – Important European Applications for mobile phones: Spain, France, and Netherlands.
The Role of Big Data	– It is very important for governmental and public sectors that are the most intensive users of data in both developing and developed countries. – It is also very important for the business sector, as it provides endless opportunities to build and develop new business models; creates new products, services, and knowledge; in the framework of economies of digital data and information, internet, and the Fourth Industrial Revolution. – The importance of capacity building, especially in developing countries, and developing global platforms for Big Data and their applications under the auspices of the UN.	– In the Netherlands, there is a center for Big Data. In South Korea, another one is being established. – Using data of satellite images to support the agricultural sector in Mexico, Hungary, and Colombia. – They play important roles in projects of building national archives (United States and South Africa).
The Role of Open Data	– It is a Tool to Develop Public Administration towards More Transparency, Partnership, Creditability, and Accountability, Centrally and Locally. – It is a Tool to Develop Partnerships, Interaction, and Creation and Utilization of Opportunities among the Government, the Business Sector, and the civil society. – It is a Tool to Improve Governmental Performance and Develop Public Services.	– A Strategy for Open Data (Ireland). – Leading experiences in both developed and developing countries (Britain, Canada, Denmark, and Indonesia). – Ten African countries established platforms/portals for Open Data.

Field of Experiences and Practices	The Most Salient Experiences and Best Practices	National Experiences
	– The effectiveness of its roles is related to the levels and depth of political, cultural, and knowledge transformation in different societies.	
The Role of Administrative Data	– Developing its role is related to the quality of coordination among national statistics agencies, vital statistics and civil registration agencies, and the quality of administrative registers themselves. – It plays a controlling role in developing censuses in the light of availability of empowering environments and conditions (See Chapter Four of the Report).	– There is a great interest in both developed, emerging and developing countries (Canada, Singapore, and Ghana). – It is provided and utilized by many countries for the purposes of scientific research (Norway, Sweden, and Finland).
The Role of Satellite Data	- Important roles of international organizations to encourage using and exchange of satellite images, and develop capacities of different countries, especially the developing ones, such as the CEOS. - The role of UN (UNOV), UNSC, ITU, which formed work team to use satellite services.	- Using satellite images to enhance the agricultural sector in Mexico, Hungary, and Colombia. - Using satellite images to build climate scenarios to face natural disasters - Australia.
Supporting Resources and Infrastructure (including Cloud Computing)	– Professional Institutional and Legislative Frameworks and Professional Human Cadres in all Data Fields and Applications. – Infrastructure for ITC and Internet. – Infrastructure of International Standards for Education, Training, Scientific Research, Innovation, and Business.	– National strategies for ITC (Singapore, South Korea, Emirates, and Egypt). – National Strategy for Cloud Computing (Australia).
Capacity Building	– Important Roles for National Statistical Agencies. – Important Roles for Universities, Research & Development Centers and Institutes. – Important Roles for Global and Regional Cooperation and Partnerships.	– Establishing specialized institutes for data (Britain, South Africa, and Canada).

Field of Experiences and Practices	The Most Salient Experiences and Best Practices	National Experiences
The Role of Global and Regional Partnerships	– A Major Role to Transfer Technical Knowledge and Experiences to developing Countries, in addition to Financing Related Projects. – Major roles at the global and regional levels for the project of PARIS21. – Important statistical roles at the regional level: Arab Statistics Initiative, Gulf Center for Statistics.	– Developing statistical strategies and assessment of statistical conditions in collaboration with PARIS21 (Rwanda and Egypt). – The OECD countries provided experiences to assess national statistics systems in developing countries (such as Mexico).

Source: Compiled by the Research Team from Different Global, Regional, and National Sources. Refer to Bibliography.

1-3-2. Experiences of Developed Countries: Experience of the United Kingdom

This section of the Report depends on a recent study carried out by the Open Data Institute, which sheds light on the uniqueness of the British experience in this regard (Open Data Institute, 2015):

- **The Increasing Role of Digital Data and Technologies as Levers of Development and Decision Making;** where they represent tools to develop both the business and public sectors; and incentives to digital transformation in all fields and sectors; in addition to supporting decision taking and policy making at all levels.

- **Leading British Experiences in Treatment of Open Data to enhance all Development Fields;** where Britain comes in the front of countries in this regard. Some of the learned experiences are:

    - **Open Data is a tool to face future development challenges**: especially, in Britain, the challenges of transport, urban growth and town administration, and aging of the population structure.
    - **The importance of strategic planning for Open Data**: This is within a national strategy for data to ensure the optimal use in the socio-economic and environmental aspects.
    - **Open Data is a methodology to reinvent public administration in Britain**: Through multiple methods including providing mechanisms to disseminate data in all digital governmental services; providing more opportunities for citizens to identify the mechanism of government work, and control the results of such work at the national and local levels; enhance credibility, partnership, and political consensus; more openness and communication with the business sector, through

deepening transparency of the governmental purchase contracts, or other forms of open statistical practices.

- **Multiple benefits of Open Data for entrepreneurs and business sectors**: As they provide and enhance opportunities for inventions, initiatives, business growth, and new products and services; through using national data and information infrastructure; improving communication and creating business opportunities with governmental agencies. In addition, such data is used to change values, attitudes, and practices of business organizations through transforming them into data-driven organizations.

- **Important mechanism and tools to enhance the role of Open Data in development in Britain:** Mainly, spreading related training in the governmental, business and civil society sectors; relating activities of research and development to organizations and efforts of Open Data; and enhancing government to create opportunities to use and utilize Open Data, and not to be limited to publishing or providing such Open Data.

1-3-3. Experiences from Emerging Countries: The Experience of South Korea

The Korean development experience represents a source of inspiration for many development experiences in the world. It presented interesting contributions as for sustainable development and green growth, and the role of statistics and data in enhancing such contributions. **The most important experiences learned from the Korean experience are as follows:**

- **Green Growth**: A new Development Approach for Korea in the Framework of Sustainable Development: The state issued the "National Strategy for Green Growth, 2009-2050", which includes a future vision that looks forward to less-carbon green growth in Korea, to reduce carbon emissions by 84% by 2050, and by 30% by 2020. This strategy included the First Five-year Plan, 2009-2013, and the Second Five-Year Plan, 2014-2018.

- **Indicators of Follow Up and Assessment of the Strategy of Green Growth**, the Related Development Plans, and the Role of the National Statistics Agency: The national agency for statistics in Korea (Statistics Korea) presented the general framework of the indicators related to the three strategic objectives as follows: controlling the repercussions of climate change and energy independence; the green motives for the national economy; and improving life quality and the external role of Korea. The Package of Indicators is as follows**:** (Khashabah, et al., 2016)

    - **The Group of Indicators of Green Growth**: These indicators concentrate mainly on assessment of government policies concerned with green growth.
    - **The Group of Indicators of Green Life**: It concentrates on assessment of the current situation of the green aspects and practices that affect the life of the Korean citizens.

- **Indicators of Emissions**: These indicators are produced by the (Statistics Korea) annually.
- **Indicators of Green Industries**: There are continuous efforts to crystallize such indicators to attain stable forms or packages for such indicators.
- **Statistics of Green Production and Employment**: These are extracted mainly from the packages of economic data.

- **The Role of Big Data in Korea:** In South Korea, Big Data plays an important role in enhancing development in general, and sustainable development in particular. The most important features in this regard are as follows:
  - **Widespread Use of Big Data in Multiple Fields in South Korea:** This includes communication, transport, Medicine, and enhancing military capabilities, etc.
  - **Big Data and New Data Sources**: Some new data sources - by contrast to traditional data - are Big Data by nature in Korea. Such data are to be used in the coming stage to enhance public policies. They include satellite data, phone registers, etc. By nature, they need developing methodologies for processing, analysis, and communication.
  - **Establishment of a Center for Big Data by a Governmental Initiative**: It is planned to be launched this year, 2017, as an independent institution for administrating public data and storages in all governmental and public agencies. The prospected Center will communicate with business sector to create business opportunities in the framework of the new industrial revolution; with academic and educational institutions, public and private research centers, ITC companies; and with different localities and regions in the country. In addition, the Center will present analyses, results of processing, and specialized programs, etc. (Ko, 2017).

1-3-4. Experiences from Developing Countries: The Experience of Ghana

Ghana is considered one of the most important African countries, it's statistical and development experience presents many learned lessons and experiences, as follows:

- **Coordination and consistency between the framework of the medium-term development policy of Ghana (2018-2021), the SDGs, and the African Agenda for Sustainable Development (Agenda 2063- Africa that We Want).** At the beginning, global and regional objectives were adopted without change. Later, some adjustments were introduced due to the changing developmental conditions in Ghana.
- **Crystallization of five national development objectives for Ghana in the light of the SDGs and the African Agenda for Sustainable Development**, as follows (Statistical Services Ghana, 2017):

- Building a comprehensive and elastic industrial economy.
- Building a community dominated by equity, good health, and good administration.
- Developing a good planned and secure natural environment.
- Developing effective, efficient, and dynamic institutions that enhance national development.
- Enhancing the role of Ghana in the international affairs.

- **Sustainable development represents an opportunity to develop the Data Ecosystem in Ghana**: The state completed only 25% of SDGs indicators completely, in addition to another 25% of the indicators partially. This imposes the adoption of new statistical priorities including the following (Government of Ghana, 2016; Ghana, 2017):
  - **Legislative and institutional structuring of data institutions**; according to the international standards and the best practices to support decision makers.
  - **Enhancing and rationalizing statistics, censuses, and surveys;** in order to fill the current statistical gaps.
  - **Building a developed system for administrative data;** to diversify data sources and modernize data management systems in such type of systems.
  - **Discovering and developing new data sources;** especially satellite data, GISs, phone registers, etc.
  - **The important role of Big Data;** especially that related to enhancing digital transformation (Digitalization) in production and service sectors in Ghana.
  - **Enhancing the national ability to reporting;** related to sustainable development, as there are still many shortage aspects in this regard.
  - **Enhancing investments in ITC;** with more emphasis on the tools and methodologies of collecting and disseminating data.
  - **Building and developing new statistical partnerships**; at the national level and abroad.

1-4. Sustainable Development Strategy: Egypt Vision 2030, and Needs of Data and Information

The Sustainable Development Strategy: Egypt Vision 2030 represents an important shift in strategic planning for development in the light of the global, regional, and local transformations that surround and affect the path and capabilities of development in Egypt, which requires a strategic approach in development administration.

1-4-1. Structure of Sustainable Development Strategy and its Needs of Data and Information

Table (1-5) indicates the vision, dimensions, and axes of the strategy which took into account the agreement with the Sustainable Development Global - SDGs signed by the President with other countries (193 countries) at the General Assembly of the United Nations in September 2015.

The text of the Strategy referred to that it was prepared at the national level based on a (Partnership Approach), where both the private sector and the civil society played major roles in preparing this Strategy. In addition, the Strategy benefited from the global and regional experiences, including The African Agenda 2063, in the field of preparing strategies and plans of sustainable development.

With regard to the needs of Strategy in terms of data and information, it is possible to refer to the following:

- **There is continuous consultation and coordination between both Ministry of Planning and CAPMAS;** as the two institutions are practically within the national system of planning in Egypt. Coordination is specifically performed through the (Sustainable Development Unit) at CAPMAS, whose role will be indicated later.

- **There are important current partnerships between the statistics entity and the planning entity to support Sustainable Development,** including partnerships of the statistics entity with the SDG's follow-up and evaluation team, partnerships related to Project of Spatial Numbering, and building stable indicators of citizen satisfaction as for public services, etc.

- **There are no specific axes, programs, policies, or projects to support the national statistics system** within the components of the Sustainable Development Strategy: Egypt Vision 2030. However, some statistical aspects and issues related to data are covered within the Axis of Transparency and Efficiency of Government Institutions, within the document of the Strategy, or among the programs of the ITC sector within the same document.

Table (1-5): "Vision, Dimensions, Axes, and Objectives of Sustainable Development Strategy: Egypt Vision 2030"

Egypt Vision 2030 By the year 2030, Egypt is to be with a diversified, balanced, and competitive economy depending on invention and knowledge; based on social justice, integration, and partnership; with a diversified and balanced ecological system; investing the geniality of place and man to achieve sustainable development and raise the quality of life of the Egyptians.	
Dimensions and axes of the Strategy* (Three dimensions and ten axes)	1- Economic dimension: (economic development; energy; knowledge invention and scientific research; and transparency and efficiency of government institutions)

	2- Social dimension: (Social justice, health, education and training, and culture) 3- Environmental dimension: (environment, and physical development)
Objectives of the Strategy (General objectives up to 2030)	Egypt is to be among the best 30 countries as for basic global indicators: 1- Economy size (current rank: 41) 2- Corruption Perceptions Index (current rank: 94) 3- Market competitiveness (current rank: 116) 4- Human development Index: (current rank:110) 1- 5- Quality of Life (current rank: 135)
Strategic sub-objectives (45 objectives)	Each one of the ten axes has a major strategic objective (called strategic vision) and related strategic objectives up to 2030.
KPIs	These are related to all strategic sub-objectives at the level of outcomes, inputs, and outputs.
Innovative KPIs	They are different from the available KPIs, and a specific methodology is determined to measure and determine quantitative targets currently and in the future with concerned partners.
Quantitative targets	They are determined for each KPI, with the current and targeted situations for 2020 and 2030.
Policies, programs, and projects	They contribute to achieve the general objectives and the strategic sub- objectives with a framework of a time-period and indicative cost.
Stages of programs execution	They are executed through three time periods: 2016-2020, 2021-2025, and 2026-2030.
Mechanisms of follow up and assessment	This is to be through ten working teams related to the ten axes of the strategy (a team for each axis).

Source: The website of the Ministry of Planning, Follow - up and Administrative Reform (2016) "Egypt 2030", www.mop.eg.com

* There are additional axes considered as a general umbrella or a vital area for the three strategic axes: foreign policy, national security, and internal policy.

Some of such examples are as follows:

- **The Axis of Transparency and Efficiency of Government Institutions:** The Project of Developing the System of Planning and Follow Up; and the Project of Modernizing the Data Infrastructure of the Administrative Apparatus of the State (including developing databases of the government sector, and using Big Data to develop the system of periodical reports).

- **The Sector of ITC:** The Project of Transforming Egypt into a Global Digital Axis, the Project of High Speed Internet, building a digital community to enhance efficiency and transparency, and developing cloud computing.

1-4-2. Quantitative Indicators of Sustainable Development Strategy: Egypt Vision 2030

The Strategy depends on determination of a group of indicators, then determining the quantitative targets for such indicators through specialized workshops for the aforementioned ten axes. The document of the Strategy determines a group of considerations taken into account in choosing performance indicators as follows (Sustainable Development Strategy, 2016):

- The limited number of indicators, measurability, and applicability within the limits of available resources.
- Compatibility between a number of indicators and the objective to be measured.
- Separation between performance indicators and the initiatives suggested in the Strategy.
- Consideration of the logical linking among the three types of indicators; inputs indicators, outputs indicators, and outcomes indicators.
- Providing an integrated system to apply indicators and conclude outcomes.

The following table indicates indicators of the Sustainable Development Strategy: Egypt Vision 2030, (numbering 223 indicators, distributed on the three dimensions and the ten strategic axes):

Table (1-6): Distribution of the Indicators of the Egyptian Sustainable Development Strategy by Dimension and Axis in Egypt

Strategy dimensions	Strategy Axis	Strategy Indicators
Economic Dimensions	Economic Development	32 (30 original + 2 new)
	Energy	14 (13 original + 1 new)
	Knowledge, Innovation, and Scientific Research	37 (24 original + 13 new)
	Transparency and Efficiency of Government Institutions	13 (10 original + 3 new)
	Total	**96**
Social Dimensions	Social Justice	27 (10 original + 17 new)
	Health	20 (27 original + 3 new)
	Education and Training	16 (11 original + 5 new)
	Culture	29 (5 original + 24 new)
	Total	**92**
Environmental Dimensions	Environment	19 (18 original + 1 new)
	Urban Development	16 (13 original + 3 new)
	Total	**35**
Total Strategy Indicators:		**223 indicators**

Source: Compiled by the Research Team of the Report, based on the Document of the Sustainable Development Strategy: Egypt Vision 2030.

In the light of the aforementioned, and the revision of many global, regional, and national related sources, it can be said that there are basic experiences and requirements for the success of building an effective Data Ecosystem in the framework of the Data Revolution to enhance development plans in general and sustainable development in particular, as follows:

- **Data for All and from All** - New Partnerships and Cultures for Data towards Better Life for People and Planet: It is a tool to improve quality of life, enhance execution of development and sustainability plans. Thus, this necessitates different and new kinds of cultures and partnerships to produce, exchange, and use data among different parties of the society and abroad.

- **Data represents national values and assets**, a tool to create and reproduce wealth, values, and competitive advantages in all societies: This requires treatment of data from a different

strategic perspective in the coming decades, where it is no longer a pure statistical interest, rather, it became a socio-economic, cultural, technological, and human interest; as a basic resource, infrastructure, and capital for the comprehensive development.

- **Importance of awareness - on the part of planners, decision makers, and policy makers - of the new roles of data**: This requires understanding the impact of multiple types and forms of data and the tools and applications in improving public policies making and development plans, developing opportunities and creation of value in the production and service sectors in the country.

- **Major roles for the state, official statistics, and national statistics agencies** in launching and enhancing initiatives of maximizing data use in the community: In particular, capacity building and the organizational and legislative roles; to achieve optimal use of data in government and public sectors; secure freedom of data flow and handling under conditions of privacy protection; and securing and protecting data sources.

- **Development of the role of data with the development of the global development initiatives**: The global transformation into the Data Revolution was paralleled with a similar transformation in global development initiatives, from the MDGs (2000-2015), to the SDGs (2016-2030), which contributed - among other factors - to increasing demand for data all over the world to enhance the execution and assessment of national sustainable development plans side by side to the SDGs 2030.

- **A major role for population and population data to enhance sustainable development**: As the United Nations considers population as the controlling factor in achieving the SDGs 2030 (UN, 2017).

- **Promising Prospects for the role of Big Data and Open Data to enhance development**: This is in the government sectors to enhance trust and communication with citizens and improve performance; and in business sectors to create new opportunities and encourage business initiatives and reinvention of business models and organizations.

- **More importance for the role and impact of Administrative Data**: This is the experience learned from the global experiences in both developed and developing countries. It is expected to enjoy an equivalent interest in Egypt.

- **Increasing the role of satellite images and data:** Their capabilities are no longer limited to developed countries, because of the intervention of the UN and its specialized agencies and other international organizations in this field to enable all countries to utilize and apply them in many development fields, such as agriculture, climate, spatial, etc.

- **More investment in ITC**: Its infrastructure and innovative tools are the medium to acquire, generate, process, analyze, store, disseminate, communicate, provide, and use of data in all sectors in an unprecedented way.

- **Importance of classification and control of data communities**: They are considered the basic work fields in Data Ecosystems which diversified and multiplied during the last years with emergence and increasing importance of important data communities, such as cell phone records, social media data, satellite data, etc.

- **Follow up, characterization, and expectation of growth of demand for data**: The revolution of demand for data differs from one country to another, which imposes on the national statistics systems the follow up, assessment, and expectation of dimensions, limits, and attitudes of the aforementioned demand growth continuously; and the pursuit to utilize this as competitive advantages in socio-economic, cultural, environmental, and technological fields.

- **Diagnosis of challenges and continuous statistical learning**, especially in developing countries: There are still many gaps in policies, institutional frameworks, human and technological capacities in developing countries, including Egypt, that need to be filled to achieve full utilization of data to enhance execution, follow up, and assessment of sustainable development.

CHAPTER TWO

Features of the Data Ecosystem in Egypt

As the Data Revolution left its fingerprints on the statistical conditions and on the conditions of sustainable development in the world - as indicated in Chapter one - it also left its fingerprints on such conditions in Egypt. Moreover, as the previous Chapter indicated the vital role of official statistics and the role of national (or official) statistical agencies in all global experiences, the Egyptian situation is not greatly different from the global counterpart, where the national statistics agency (CAPMAS) plays an important role in developing statistics conditions, on the one hand, and provides statistical support to enhance achieving the goals of sustainable development on the other. It is greatly important to concentrate on the importance of new data communities and their role in Egypt, which will be presented in Chapter Three.

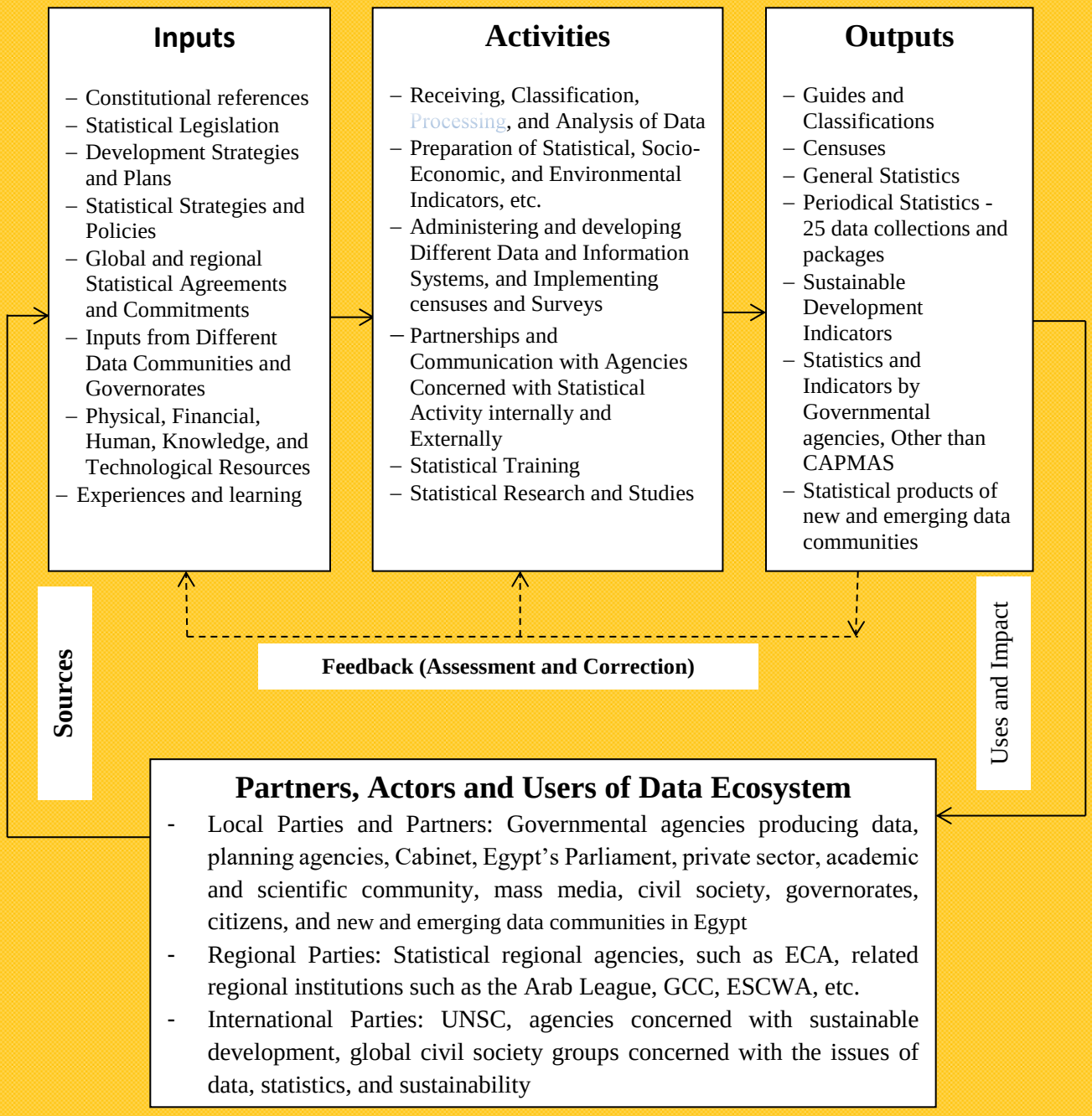
With launching Sustainable Development Strategy: Egypt Vision 2030 in Feb. 2016, the importance of CAPMAS escalated as for providing necessary date to planners, policy makers, and decision takers, the private and business sectors, and the citizens, towards achieving the goals of sustainable development nationally and internationally.

In this context, this chapter presents some important Egyptian statistical issues, some relations and interrelations among such issues locally - and at the external level - that are related to the role of CAPMAS in enhancing development in Egypt. Also, this chapter presents the roles of some global and regional statistical parties and agencies and their roles in enhancing sustainable development.

2-1. The Structure of data Ecosystem in Egypt and the Role of CAPMAS

CAPMAS plays an important role in the Data Ecosystem in Egypt, as indicated in Figure 2-1. The role of CAPMAS stems from the legislation that regulates the statistical activity in Egypt - which will be indicated later - and its roles, outputs, and relation to sustainable development.

Figure 2-1: Characterization of the Data Ecosystem in Egypt



Source: Compiled by the Research Team of the Report.

2-1-1. Overview of Inputs of Data Ecosystem in Egypt - with particular emphasis on the role of Legislative Framework

As indicated in Fig. (2-1), there are many inputs into the data ecosystem in Egypt to be overviewed. However, the legislative framework of statistical activity will be dealt with in more detail, because of its governing importance in developing this system. The most salient notes as for inputs of the data ecosystem in Egypt are as follows:

- **Attention and awareness of the Egyptian Constitution of the statistical activity importance:** Article 68 of the Constitution of 2014 clearly refers to that information, data, statistics, and documents belong to the people. The State provides them to citizens transparently, and the Law regulates controls of availability and secrecy.

- **Role of development strategies and plans in developing statistical work:** Sustainable Development Strategy: Egypt Vision 2030 and annual development plans depend on the role of CAPMAS in providing data necessary for planners to prepare and evaluate development plans. In return, such strategies and plans adopt programs and projects that develop statistical activity in the country.

- **Role of International Agreements Related to Statistical Activity:** These agreements provide important guidance and technical frameworks to control statistical activity according to global or regional agreed upon standards, to develop statistical activity, on one hand, and facilitate comparisons among countries, on the other.

As stated earlier, the Constitution gives great importance to the legal or legislative framework that organizes controls and rules to obtain and provide information to citizens in Egypt, where CAPMAS is considered the major agency in the Egyptian national statistical system, which witnesses a number of related legislative developments, the most salient of which are as follow:

- Law No. 19 of 1957, related to statistics and censuses.
- Decree of the President as to the Law No. 35 of 1960, related to statistics and censuses, as amended by Law No. 28 of 1982.
- Decree of the President as to the Law No. 2915 of 1964 as for the establishment of CAPMAS.

According to the last Law, and other later Decrees, the responsibilities of CAPMAS are as follows:

a. Conducting censuses and statistics needed by the government: CAPMAS is to determine the timing, and methods of conducting such censuses and disseminating the results, the agencies responsible of conducting such censuses, to ensure coordination between concerned statistical agencies and activities, and ensure quality and efficiency of such activities.

b. Presenting and controlling the system of statistics dissemination in the country: CAPMAS presents the annual programs of publications, bulletins, indicators, and statistical data needed by different sectors; and coordinates with concerned agencies. In addition, CAPMAS may issue all - or part of - the bulletins, indicators, and statistical data published by different government agencies.

c. Related to the controls and system of statistics publishing, of which CAPMAS is responsible, is the prohibition of publishing any statistical results, data, or information by any agency or individual in the state (government, public, or private sector) other than the statistics of CAPMAS. As for statistics produced by other agencies, not enlisted in the work program of CAPMAS, it is not to be published without the consent of CAPMAS.

d. Building the national statistical capacities: There are many dimensions related to the work of CAPMAS as follows:

   - Establishment of statistics departments related to CAPMAS in different agencies; such as ministries, governorates, public authorities; in which qualified and experienced cadres work.

   - Establishment of statistical training centers; where CAPMAS is responsible of the training programs and curriculum in such centers to raise capabilities of employees in different activities and agencies related to CAPMAS.

e. Statistical control and assessment; where the units of statistics and computer at the government and public sectors are subject to inspection and control by CAPMAS to secure the following:

   - Ensure the use and efficiency of equipment used to develop stated statistical programs and activities.

   - Ensure the sufficiency and qualifications of statistical human resources.

2-1-2. An Overview of Main Activities within the Data Ecosystem in Egypt:

- The Role of CAPMAS:

It has already been stated that current statistical legislation gives CAPMAS the main Duties and competences to regulate and administer the data ecosystem and statistical activity in Egypt in general. CAPMAS carries out these tasks in the light of specific vision, strategy, mission, and goals; in addition to organizational structure including some sectors to carry out the vision and goals.

a. Vision of CAPMAS:

It is to be a leading statistical agency distinguished in development efforts internationally.

b. Mission of CAPMAS:

It is to produce purposeful and reliable statistics that meet the needs of the state agencies, business community, universities, research centers, researchers and the public and international organizations according to international standards.

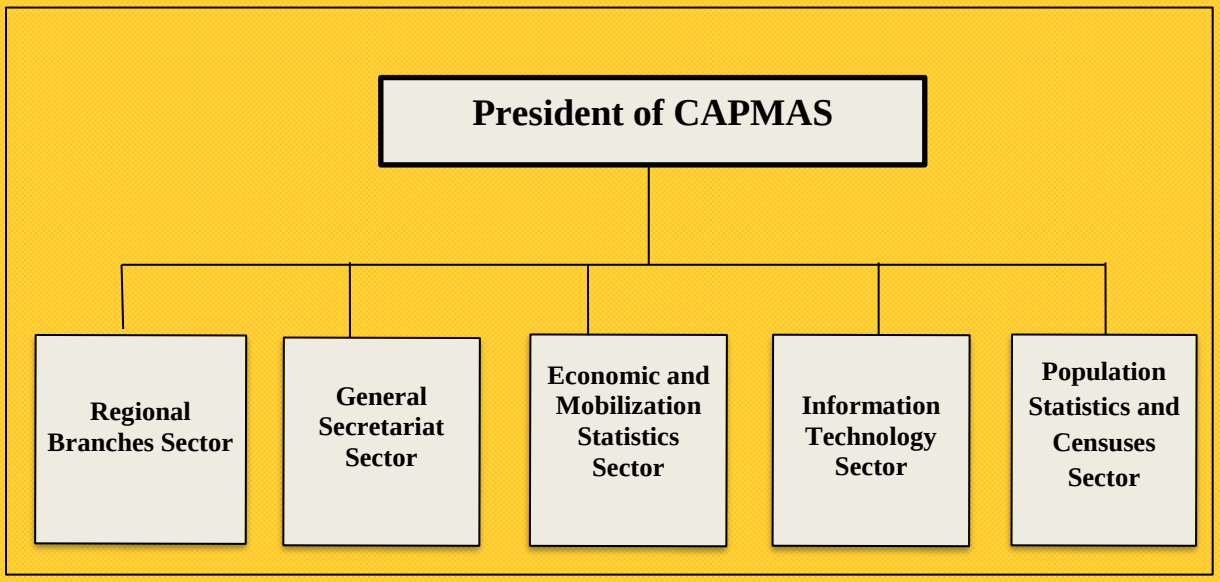
c. Goal of CAPMAS:

It is to build capacity of employees to produce reliable data according to international and ethical standards, with suitable cost, in suitable time, to meet the needs of users, and raise the statistical awareness in the community.

d. Organizational Framework of CAPMAS Activities:

The effective technical sectors at CAPMAS consist of four sectors, as indicated in Figure 2-2, which are: Population Statistics and Censuses; Information Technology; Economic and Mobilization Statistics; and the Regional Branches Sector.

Figure 2-2: Major Sectors in the Organizational Structure of CAPMAS



Source: Compiled from the website of CAPMAS

It is noted that Population Statistics and Censuses represent the major statistical activity at CAPMAS, which is dealt with in more detail in the fourth chapter of the Report. It is expected that Information Technology Sector will play a major role in the coming stage in the light of development of systems, tools, and technology of processing and analyzing Open, Big, and Administrative data, as presented in Chapter one.

Moreover, there will be a great importance for the Regional Branches Sector in the coming stage - in the light of the expected new Law of Local Development/or Administration, which is expected to give a push or more interest in statistical activities in the Egyptian governorates, to enhance regional and local development plans in the coming stage.

2-2. Outputs of the Data Ecosystem in Egypt - Types and Periodicity of Produced Data

Outputs of the Data Ecosystem in Egypt vary. For simplicity of presentation, they can be divided into the following:

- Outputs and publications of CAPMAS directly.
- Outputs and publications of other concerned agencies indirectly.
- Outputs and publications of CAPMAS at the governorate level, on which the Report will shed light due to their importance to enhance balanced regional development.

2-2-1. Data Outputs and Publications by CAPMAS

The most important outputs are: guides and classifications, censuses, general and periodical statistics as follows:

a. **Guides and Classifications**: They are presented in Table 2-1 as follows:

Table 2-1: Guides and Classifications Issued by CAPMAS

Guide - Classification	Definition	Notes
ISCO	Global Guide updated every 20 years	Last Issue, 2016
ISCED	Global Guide consisting of three global limits	Last Issue, 2017
ISIC	Global Guide consisting of four global limits	Last Issue, 2015
Guide of Administrative Units	Specific of the detailed administrative components in governorates	Last Issue, 2016
HS	Global Guide Updated Every 5 Years	Last Issue, 2012
CPC	Central Products Classification	Last Issue, 2016
Guide of Countries Coding	According to continents and geographical regions	Last Issue, 2012

Source: CAPMAS (2017), Guide of Publications and Services, 2017. Issue No., 13, Cairo: CAPMAS.

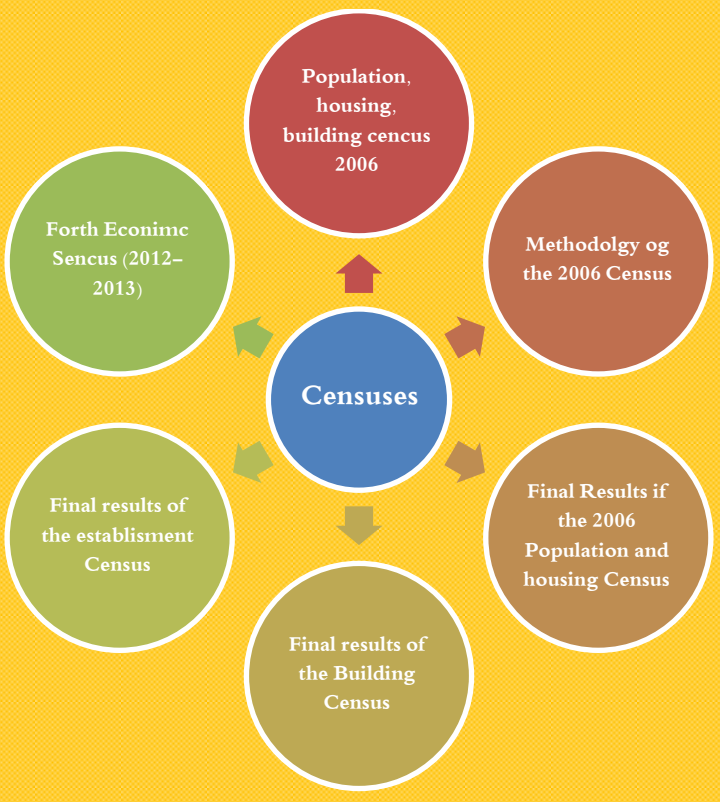
b. Censuses: The most important censuses are indicated in Figure 2-3 - and more light will be shed on such censuses in Chapter Four - as follows:

- General Census of Population and Establishments, 2006,

- Methodology of the General Census of Population, Housing, and Establishments, 2006,
- Final Results of the Census of Population and Housing Conditions, 2006,
- Final Results of the Census of Buildings, 2006,
- Final Results of the Census of Establishments, 2006, and
- The Fourth Economic Census, 2012-2013.

Chapter Four will cast more light on the "General Census of Population, Establishments, and Buildings, 2017", that is currently conducted by CAPMAS, in collaboration with all concerned government agencies, whose objective is to form comprehensive data bases at all levels to enhance all dimensions of sustainable development.

Figure 2-3: Types of Census Publications Issued by CAPMAS



Source: CAPMAS

c. General Statistics: They include three types, as indicated in Figure 2-4, as follows:

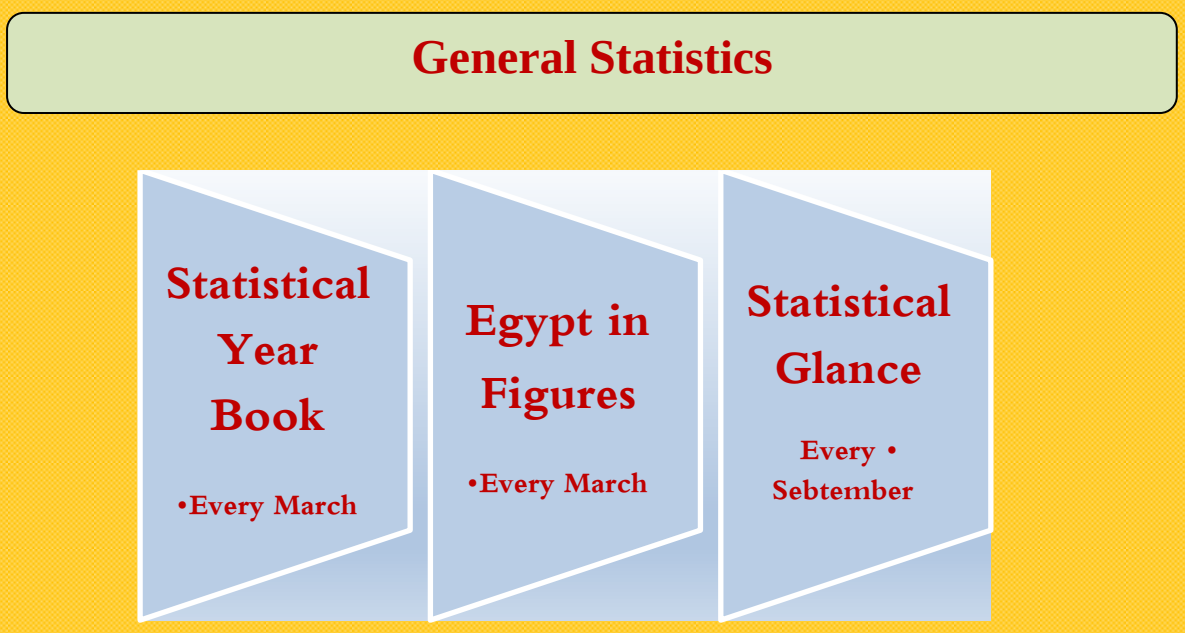
- Annual Statistical Yearbook: It is issued in September annually,
- Egypt in Figures: It is issued in Mars annually, and

- Statistical Outlook: It is issued in June annually.

d. Periodical Statistics: These are indicated in detail in Appendix 1, which includes a number of data sub-groups as follows**:**

- Vital Statistics,
- Statistics of Employment and Wages,
- Tourism Statistics,
- Statistics of Education, Social, Cultural, and Health Services,
- Statistics of Trade, Financial Statics, Prices and Price Indexes, and
- Statistics of Industry and Energy, Agricultural Statistics, and National Accounts.

Figure 2-4: Types of General Statistics Issued by CAPMAS



Source: CAPMAS

e. Other Statistics and Publications:

- Population Bulletin: Issued Biannually,
- Bulletin of Egypt Statistics: It is a periodical issued quarterly, dealing with current statistical issues,

- Book of Woman and Man in Egypt: It is issued every two years and covers many fields including population and education, and
- Information Bulletin: It is a monthly statistical bulletin, which concentrates on indicators of the macro economy.

f. Contractual statistical projects for other local agencies:

- Project of Basic Indicators to Measure Information Community: It is according to a protocol signed with Ministry of Communication and Information Technology, and issues a group of statistical indicators annually, as follows:
    - Information Technology Houses,
    - Companies of internet providers, including Space Internet and satellites,
    - Uses of IT by the private sector, and the impact of IT on the productivity in the private sector,
    - Uses of ITC in education: pre-university education, aggregate and detailed university education,
    - Hospitals and beds,
    - Internet users (family, government sector, public, and business sectors).
- Project of Tourism Spending Sample Survey: It is according to a protocol signed between CAPMAS and Ministry of Tourism, where the Ministry publishes the final data of the surveys conducted by CAPMAS, the protocol includes the following aspects:
    - CAPMAS conducts a field survey at the airports, land and maritime outlets, and primary data is to be delivered to the Ministry.
    - Computing the net value of tourism spending based on agreement between CAPMAS and the Ministry.
    - Expanding the sample later to include the whole community based on agreement between the two parties.

2-2-2. Data Issues and Outputs by Other Agencies

In addition to the basic role of CAPMAS in the Data Ecosystem, there are many other roles for other government agencies which produce data directly, while other agencies collect data and CAPMAS re-tabulate such data before publishing. Such types are as follows:

2-2-2-1. Data Published by other Agencies in the Final Form:

Such agencies include some ministries, public authorities, and data published at the local levels in villages, cities, and governorates. Table 2-2 presents some of such data:

Table 2-2: Data Published by Different Agencies in the Final Form among CAPMAS Publications in Egypt

Agency	Type of Data	Periodicity
Ministry of Interior	Bulletin of Car Accidents	Annually
Holding Company for Potable Water and Sewerage	Bulletin of Statistics of Potable Water and Sewerage	Annually
General Authority for Roads and Bridges	Census of Roads and Bridges	Every two years
General Authority for Egypt Railways	Train accidents	Biannual
Councils of Cities and Districts in Governments	Public Utilities Services	Annual
Immigration and Passports Authority	Monthly and Yearly Tourism Bulletin	Monthly and Yearly
General Directorate of Traffic	Licensed Vehicle Survey	Biannually
Telecom Egypt	Telecommunications Bulletin	Annually
Egyptian Postal Authority	Postal Services Bulletin	Annually

Source: CAPMAS, 2017.

2-2-2-2. Statistical Data Issued by Different Agencies and Re-Tabulated and Re-Published by CAPMAS

There are many data issued by many different agencies, and re-processed and re-published by CAPMAS, as indicated in Table 2-3.

2-2-3. Activities and Outputs of CAPMAS at the Local-Governorate Level

CAPMAS gives more interest to develop statistics at the governorate level by activating the role of regional statistical branches through the specialized sector at CAPMAS (Sector of Regional Branches, Figure 2-2)

Table 2-3: Statistical Data Issued by Different Agencies and Re-Tabulated and Re-Published by CAPMAS

Agency	Primary Issue	CAPMAS Issue	Periodicity
Ministry of Agriculture	Agricultural Income	Estimates of Agricultural Income	Annual
Ministry of Agriculture	Agricultural Statistics	Statistics of Crop Area and Plant Production	Annual
Ministry of Agriculture	Food Balance	Movement of Production, Foreign Trade, and agricultural Products Available to consumption	Annual
Ministry of Agriculture	Livestock Statistics	Livestock Statistics	Annual
Ministry of Agriculture	Mechanical Agricultural Machinery	Mechanical Agricultural Machinery	Biannual
Public Authority for Fisheries Development	Fishery Statistics	Fish Production Statistics	Annual

Source: CAPMAS, 2017.

The most important statistical activities at the governorate level in the last years can be indicated in the following:

- Regional branches (Central Statistics Directorates in governorates) issue reports of Population and the Most Important Population Activities in collaboration with CAPMAS annually, such as the report issued by Giza Governorate in 2016 (Giza Governorate, 2016). The report includes detailed statistics on 23 sectors at the governorate level, including the sectors of population, illiteracy, education, health, utilities, and public services.
- Preparation of the Guide of Administrative Units for governorates in 2016. It is one of the guides that support the preparations of the General Census for Population, Housing, and Establishments. In addition, there are other field research with the objective of raising the quality of data, and ensuring comprehensiveness of data and users access (CAPMAS, Guide of Administrative Units, 2016). The Guide adopts division of the Egyptian governorates into four types as follows:
    - Urban governorates,
    - Lower Egypt Governorates,
    - Upper Egypt Governorates, and
    - Border Governorates.

The Guide of Administrative Units includes the most recent administrative divisions of Governorates in Egypt, according to the laws passed up to 31/4/2016.

- Issuing the report of The Most Important Indicators of the Comprehensive Survey of the Characteristics of the Egyptian Countryside, 2015, which covers many important aspects including the following (CAPMAS, 2015):
    - Characteristics of villages (land areas, roads, and economic activities),
    - Village environmental services (services and utilities: electricity, gas, water, and communications),
    - Services available in villages (schools, health utilities, transport, etc.),
    - Services of civil societies and development initiatives (targeted groups and services provided).

2-3. The Data Ecosystem in Egypt and the Sustainable Development Strategy – SDS: Egypt Vision 2030: local, regional, and global related roles

There are many important roles that are related to the Data Ecosystem in Egypt and abroad, on the one hand, and to the sustainable development, on the other. The most important local roles in this regard are those of CAPMAS, Ministry of Planning, Ministry of Investment and International Cooperation. In addition, there are many other roles at the global, regional, and local levels, as follows:

2-3-1. Local Roles

2-3-1-1. The Major Role of CAPMAS

There are many dimensions which deserve indication as for the role of CAPMAS and its relation to sustainable development, and the role of the Data Ecosystem, especially the role of the "Sustainable Development Unit, interest in Big Data, and interest in administrative data, as follows:

a- The Role of the "Sustainable Development Unit"

Establishment of this Unit at CAPMAS in 2016 represents a direct relation between the national statistics agency and the issues of sustainable development in Egypt. This can be concluded from the responsibilities of the aforementioned Unit as follows (CAPMAS, 2017):

- Studying Descriptive Data and Indicators; as for understanding the definition and components of the indicator and its relation to the goal and target, including classifications, standards, measuring units; to unify concepts and methodology of computing indicators and the related descriptive data.
- Coordination with global, regional and local data sources; in order to unify methodologies adopted in the process of monitoring and following up the goals of sustainable development.
- Determining the level of classification and details of each sustainable development indicator, as for age, sex, geographical location, disability, etc.
- Identifying the extent of availability of indicator data in a regular periodical form; annually, biannually, or quarterly; the agency responsible of publishing data according to required details; and studying the necessary needs of resources to produce such data.
- Emphasizing the importance of gender data and woman conditions in all produced data, and documenting the partnership relations among all elements of the national statistics system; and establishing the principle of the need for innovative mechanisms to produce indicators.

Table 2-4 indicates the statistical situation of the SDGs according to the last report issued by CAMAS/ Sustainable Development Unit in this regard, which indicates the following facts:

- CAPMAS monitored and assessed the statistical situation of 77 goals, representing about 45% of total global goals amounting to 169 goals.
- CAPMAS monitored and assessed the statistical situation of 106 sub-goals, representing about 43% of total global sub-goals which amount to 244 sub-goals.

The Report refers to many challenges facing statistical coverage of goals and indicators of sustainable development 2030 in Egypt in the framework of data ecosystem, and classifies them

into general, legislative, legal, organizational, technical, technological, human, and consultative challenges as follows:

- The large increase in size and details of required data, and backwardness of tools and methods of collecting, processing, and analyzing related Big Data.
- Absence of developing statistical legislations, and its reflection on statistical activity and relations with partners.
- Multiple challenges related to transforming administrative registers into statistical registers.
- Shortage of suitable finance and technical support, and developing national statistical cadres according to global standards.
- Gaps in data and methodologies, globally, regionally, and locally.

Table 2-4: Extent of Availability of SDGs and Indicators in the Egyptian Statistical System

Item	Statistical Situation of Goals			Statistical Situation of Indicators			
	Total	Measured Goals (by one or more indicators	Not measured goals	Total	Available	Not Available	Not Applicable
1	7	3	4	14	6	8	
2	8	3	5	13	5	8	
3	13	8	5	27	16	11	
4	10	4	6	11	4	7	
5	9	7	2	14	11	3	
6	8	4	4	11	4	7	
7	5	3	2	6	4	1	1
8	12	11	1	17	13	4	
9	8	8	-	12	10	2	
10	10	**1**	**9**	11	1	8	2
11	10	2	8	15	3	11	1
12	11	1	10	13	2	10	1
13	5	1	4	8	2	4	2
14	10	3	7	10	3	7	
15	12	2	10	14	2	9	3
16	12	6	6	23	8	15	
17	19	10	9	25	**12**	**10**	**3**
Total	169	77	92	244	106	125	13
%	100		46.2		100		

Source: CAPMAS (2017) First National Statistical Report of SDGs in Egypt. Cairo: CAPMAS (Unpublished).

b- Interest in Administrative Data at CAPMAS

Chapter one of the Report referred to the importance of Administrative Data in the Data Ecosystem in many global and regional experiences. CAPMAS realized such importance in Egypt, as availability of such data over time provides the advantage of dispensing with large surveys and sufficiency of small surveys due to quality of data, and reducing the cost of producing data that can be obtained updated and momentarily.

In this regard, a Memorandum of Understanding between CAPMAS and the National Authority for Social Insurance, Ministry of Social Solidarity, is activated on 22/11/2015. The Memorandum states that CAPMAS receives the Comprehensive Framework of Establishments from the Authority every three months, after coordination between the classifications used by the Authority, and the Guide of Economic Activities used by CAPMAS, in addition to comparison between the framework of the Authority and the results of the current census of 2017, as a preparation to relate such administrative sources (Interviews, 2017).

Administrative Data are obtained by CAPMAS through some steps as follows: (Awad, Neveen, 2017):

- Identification of the complete and comprehensive status of administrative records available at different agencies, through a study of the current status of the agencies holding such administrative records.
- Selection of a mechanism to obtain individual data from different agencies.
- Defining different variables needed to transform administrative records into statistical records.
- Using other administrative records to check the credibility of the registers used.
- Using the record of statistical work to build the indicators of business demography, to determine trends of growth, the extent of continuity, and the factors affecting them.

Enhancing the role of Administrative Data in Egypt faces some challenges as follows (Awad, Neveen, 2017):

- The need for passing a new statistics law; to keep pace with current requirements and changes in the field of statistics and Data Revolution (as indicated in Chapter one of the Report). The legislation is to be enforced on all administrative sources without exception, and CAPMAS provides data at the administrative unit level, and secures the flow of data.
- Absence of a unified number for economic establishments; where it is not to be given to any other establishment, even after closure or end of activity. This number is to be the number of the establishment for all its dealings with all agencies.
- Shortage of mechanization of all different administrative sources; where mechanization facilitates connection between CAPMAS and other administrative sources. In fact, a

number of health offices have been linked to the Population Clock to know numbers of births and deaths continuously and instantly.

- Shortage of unified classifications used by administrative sources; where such unification facilitates the process of exchanging data among different agencies and CAPMAS.

c- Interest in Big Data at CAPMAS.

Chapter one presented some aspects of interest by different countries in Big Data and its role in enhancing national statistics and sustainable development. In turn, Big Data represents a good opportunity to develop the Egyptian statistical system and mechanisms of operation of CAPMAS, on the one hand, and the role of CAPMAS in preparing sustainable development indicators, on the other (El-Deeb, 2016).

Table 2-5 presents some projects and initiatives of CAPMAS related to Big Data, which indicates the following:

- Some projects began to take the practical feature; through the initial agreement with data sources, such as the Project of Consumer Price Index.
- Some projects take the form of initiatives; which are presented by CAPMAS to some concerned parties to study the possibility of transformation into actual practical projects, such as health initiatives/ projects.
- Utilizing international experiences; which is considered a very positive attitude on the part of CAPMAS, where it benefits from projects and experiences of developed countries, such as United States and Australia, in addition to other developing and emerging countries, such as Hungary and Estonia.

Table 2-5: Projects and Initiatives of Big Data at CAPMAS

Project	Main Features
Collecting data for consumer price index	– The aim of the Project is to produce the indicators of price indexes in a more innovative way, using internet to collect prices data in a way that is faster, more accurate, higher quality, and integrated; to produce instant reports to support decision taking. – There is an actual agreement with three sources to send a list of major commodity groups. Also, there is current coordination between the Sector of Regional Branches and the Sector of Economic and Mobilization Statistics to choose ten sources to collect prices data. – CAPMAS trains and qualifies (2) employees from the source on technological courses at CAPMAS, according to the protocol signed between the source and CAPMAS.

Project	Main Features
Measuring crop production by satellite images	– The project aims at utilizing satellite images (as a source of Big Data) in addition to agricultural statistics to measure the productivity of main agricultural crops, management of field irrigation and water allocation, similar to the Australian experience in this regard. – There is current coordination with Ministry of Agriculture and a protocol for cooperation with the National Authority for Remote Sensing and Space Sciences – NARSS and the Arab League to use periodically updated satellite images in the project.
Tracking the movements of patients with epidemic diseases, such as Hepatitis	– The aim is to track the movements of patients with Hepatitis through spatial data of mobiles, to control and reduce the prevalence rate, similar to the American experience in this regard. – Coordination with Ministry of Health to choose (2) governmental hospitals and (2) private hospitals to initiate the project.
Big Data and health care	– The Project aims to collect data on each cancer patient in the country, to determine and analyze patterns or trends, to suggest ways of treatment, follow-up treatment results, and provide tips to avoid illness in the community. There is coordination with Ministry of Health and some hospitals of cancer treatment, such as (57357), or National Cancer Institute to detail items of cooperation with CAPMAS to apply this initiative.
Big Data and Transport statistics	– The aim of the project is to utilize data of surveillance cameras to estimate the traffic movement on high ways, similar to the experience of Hungary, which helps to estimate the traffic movement across borders, in addition to using data on vehicles to estimate the traffic movement.

Source: - An interview with General Manager of the General Administration of Programs; and the Head of the Team of Big Data - Sector of Information Technology at CAPMAS.
- El-Deeb, Khaled (2016) "Using Big Data in Official Statistics". Research paper presented at "Workshop of Data Ecosystem for Sustainable Development". Cairo: CAPMAS (in Arabic).

In this regard, it is worthy to note that CAPMAS represents Egypt as a member of the Global Working Group on Big Data, GWG, which held its first meeting in China in 2014, the second in UAE in 2015, and the third in Ireland (Duplin) in 2016. The last conference stressed on capacity building and using Big Data in an integrative way with indicators of sustainable development.

d- Interest in Cloud Computing at CAPMAS:

Interest in Cloud Computing at CAPMAS comes within a larger framework of interest at the country level, where Ministry of CIT prepared the "Strategy of Cloud Computing in Egypt" (Ministry of CIT, 2014), as a basic entrance to use the internet in improving efficiency of public, business, and private services. It is considered one of the bases of developing information

infrastructure in the country. This is related to integrating a comprehensive program into SDGs 2030 to develop Cloud Computing in Egypt.

Interviews with leaders of CAPMAS who are concerned with applications of Cloud Computing indicated some facts related to CAPMAS interest in such applications as follows:

- Interest in applications of Cloud Computing in statistical activities at CAPMAS has begun since 2014, and developed during the last two years to provide servers, storage units, and using related programs.
- Systems of Private Cloud Computing are applied; concentrating mainly on providing services and support to projects and research carried out by CAPMAS, such as the General Census of Population, Housing, and Establishments, hosting the website of CAPMAS, supporting other research carried out by CAPMAS. Activities of Cloud Computing are administered through a specialized administration at the Sector of Information Technology.
- Using Cloud Computing provides many advantages to enhance statistical activities at CAPMAS, such as providing technical flexibility in administering the infrastructure of servers, and achieving large savings in electricity consumption.
- One of the most important challenges facing developing activities of Cloud Computing at CAPMAS is the shortage of finance necessary for equipment, programs, and related technology in general; exchanging experiences with other agencies; learning about the latest developments in the field; maintaining the readiness and professionalism of human resources through continuous training internally and externally.

e- Partnership, Participation, and Communication of CAPMAS with the Global and Regional Events of Data Ecosystem:

Statistical learning, acquiring and exchanging experiences represent a major part in the statistical work. CAPMAS paid more interest to this kind of learning and acquiring specific experiences by its cadres at all levels, in the fields of sustainable development or the Data Ecosystem, and Data Revolution in general, through participation in such events globally, regionally, and locally.

Table 2-7 presents an important aspect of CAPMAS contributions in this regard between 2013-2016. In addition, Appendix 2 presents such contributions in 2017, which amounted to 64 events this year alone.

Table 2-6 Contributions of CAPMAS in Events Related to Data Ecosystem and Sustainable Development Regionally and Globally, 2013-2016

Nature of Activity	Title of Activity	Time	Place	Organizing Agency
Meeting	HLPF	18 July 2016	New York	Un-ESC
Training Program	Environment and Sustainable Development	22-26 May 2016	Kuwait	Arab Planning Institute
Workshop	Workshop on SDGs 2030	8-12 May 2016	Amman - Jordan	AITR
Workshop	Launching Arab Portal for Development, and a Regional Workshop on SDGs	25-27 April 2016	Amman - Jordan	UNDP
Meeting	Group of Experts of SDGs Related to Water	12-13 April 2016	Beirut - Lebanon	ESCWA
Meeting	Third Meeting of the Inter-Agency Expert Team concerned with IAEG-SDGs	30 Mars-1 April 2016	Mexico	UN
Meeting	SDGs Expert Team of Statistics, and Contribution of the Informal Sector to National Accounts	11-14 January 2016	Addis Ababa	ECA
Meeting	The Fourth Round of the Council of Trustees of the AITSR, and the Discussion Session in the Field of Statistics Supporting SDGs	17-19 November 2015	Amman - Jordan	AITR
Workshop	Discussion of the Periodical Reports to Measure Development in Implementing the Strategic Framework and SDGs	3-4 November 2015	Lusaka - Zambia	COMESA
Training Program	Improving Capacity of Produce Formal Statistics Related to Indicators of SDGs	11 August- 19 December 2015	Japan	JICA
Meeting	The Second Meeting of the Expert Team Concerned with Indicators of SDGs	26-28 October 2015	Bangkok - Thailand	UN
Meeting	Expert Team to Review and Update the Report of MDGs 2015, Progress towards Achieving MDGs, and a Consultative Meeting to Review and End of SDGs	3-6 May 2015	Algeria	AU
Workshop	Workshop on SDGs indicators	13-17 April 2015	Pretoria - South Africa	South Africa - Central Statistical Service
Workshop	A Regional Workshop on Monitoring Progress Attained Towards Achieving MDGs (Especially the seventh goal of Slum Areas).	12-14 November 2013	Nairobi - Kenya	UN- HABITAT
Meeting	Meeting of Work Team of SDGs 2015, and beyond.	11-14 November 2013	Kigali - Rwanda	AU
Workshop	Workshop on SDGs	13-17 April 2015	Pretoria - South Africa	South Africa - Central Statistical Service

Source: CAPMAS, 2016

2-3-1-2. Role of Ministry of Planning, Monitoring and Administrative Reform

In addition to its role in preparation of Egypt Vision 2030, Ministry of Planning is responsible for the process of follow up of the development strategy in the framework of the follow up system arranged for this purpose, which includes the following: (Ministry of Planning, 2016)

a- The National Committee to Follow up SDGs 2030, affiliated to the Cabinet:

This Committee is restructured by the Decree of the Prime Minister No. 1125 of 2017 to include seven ministers; the chairpersons of both the National Council for Women and the National Council for Motherhood and Childhood; and representatives of some other ministries and agencies, including CAPMAS. The Decree stated that Ministry of Planning is to be the Rapporteur of the Committee.

The National Committee to Follow up SDGs 2030 is responsible of the following:

- Coordinating among concerned ministries and agencies as for implementation of the strategy.
- Facing and solving challenges and obstacles.
- Adopting the plan of capacity building that enhances implementation of the strategy.
- Reviewing and adopting performance reports to be presented to the President and the Parliament.

b- Follow up Teams: Ministry of Planning formed ten work teams covering the ten axes of the Sustainable Development Strategy- SDS: (See axes, Figure 1-2)

The work of the ten work teams relates directly to the issues of indicators, data, and information of SDGs, as indicated by the tasks of the teams as follows:

- Reviewing the three dimensions, and the basic axes as for goals and targets of SDS.
- Determining development partners related directly or indirectly to the work of each sector: government, private sector, or civil society.
- Determining challenges facing each axis and suggesting solutions to overcome such challenges.
- Preparing the executive plans: annual, medium-term, sectorial, or regional.
- Feeding the electronic system Dashboard which provides the strategy of development with required data and information.
- Providing data necessary to determine the current situation of indicators of performance measurement, and forming specialized committees to suggest new related indicators.

- Participating in suggesting programs for developing capacities, to raise and improve the level of performance of all agencies responsible of implementing the strategy and its related plans.

2-3-1-3 Role of Ministry of International Cooperation

Ministry of International Cooperation plays an important role as for sustainable development in Egypt. The last report of the Ministry (Ministry of International Cooperation, 2016) on the national revision of SDGs refers to some facts that embody the role of the Ministry in this regard as follows:

- Sustainable development is a constitutional and development value, so the government enhances implementing SDGs as it enhanced MDGs previously.
- Effective participation is a major means to achieve sustainable development, where the goals of sustainable development can be achieved through active participation of all concerned parties.
- Integrating SDGs into the policy making and planning process, both in SDS and development plans and government work programs.
- The state realizes the importance of technology and information development for sustainable development, as science and technological development represent the engine of sustainable development, which requires opening prospects of foreign cooperation in this regard.
- Importance of providing necessary finance and investment in human resources and enhancing institutional capacities, as these represent major aspects in enhancing sustainable development in Egypt.
- Importance of learning and not leaving anyone behind, as partnerships, comprehensiveness, justice, and equality are the most important values in the present stage.
- Effective government steps to enhance sustainable development:
    - Participation in the related international events, where Egypt was chosen among 22 countries to present the progress of sustainable development before the HLPF.
    - Participation in the related regional events, especially those related to the African Agenda for Sustainable Development 2063, where Egypt was chosen among members of the tenth committee for Sustainable Development in Africa.
    - Important steps at the national level, where a national committee at the Ministry has been formed to follow up the implementation of the Sustainable development strategy, in addition to establishment of the Unit of Sustainable Development at CAPMAS.

The Report also casts light on many challenges that face sustainable development in Egypt, such as:

- The high population growth rates, which amount to five-times population growth rates in developed countries, and many times higher than those of developing countries.
- Shortage of finance and innovative solutions to solve such a problem.
- Gaps in developing human and institutional capacities may represent serious obstacles (shortage of planners and executives in the government and public sectors).
- Shortage of water, especially in the light on increasing population growth rates as stated earlier, and increasing demand for water by production and service sectors in the country.
- Regional differentials and gaps and the importance of redirecting investments to fill such gaps.
- The pressing global and regional changes, such as climate change, migration, and refugees.
- Gaps in the international coordination as for sustainable development, which are reflected on developing countries in particular, including Egypt.

2-3-2 Roles at the Regional level

There are many effective agencies at the regional level that are related directly or indirectly to the activities of CAPMAS as for the development of Data Ecosystem. Appendix 2 indicates part of participation of CAPMAS with many other agencies, whose role in developing Data Ecosystems to enhance sustainable development is presented in the following:

a- Economic Commission for Africa- ECA: African Center for Statistics- ACS and Statistical Committee for Africa- Stat Com: Africa:

- ECA was established by the United Nations Economic and Social Council in 1958 to achieve socio-economic development in African member states, amounting to 54 states, concentrating on many aspects including (statistics).

  The ECA enhances the activities of the ACS, as it is one of its related agencies, which was established in 2006. It also enhances the activities of the Stat Com: Africa as it is the agency concerned with developing statistical capacities in Africa. It was established in 2007, and formally inaugurated in 2008.

- **The most important statistical activities of the ACS**: It was established within the ECA in 2006 to achieve the following:
  - Improving and developing statistics in Africa.
  - Spreading and coordinating statistical activities in Africa.

- Preparing economic statistics, national accounts, population and housing, statistics of civil registration and vital statistics, and geographical statistics at the African level.
- Improving household surveys at the African level.
- Providing statistical technical support to the ECA and African countries.

As ECA and different African statistical agencies pay special attention to provide statistical support for Sustainable Development Strategy in Africa 2063 and SDGs 2030, the ASC became responsible of many statistical commitments to support sustainable development as follows (www.uneca.org):

- Reviewing and evaluating statistical efforts and activities in African countries to achieve SDGs.
- Exchanging knowledge, experiences, and best practices regionally and globally in collaboration with UNSC, in addition to regional statistical cooperation.
- Concentrating on data administration and developing and improving capacity building in this regard.
- Other statistical interests, such as: developing statistical indicators in some fields like informal sector, gender statistics, and national accounts in Africa.

In the same context, ECA held a statistical conference for this purpose in Cote d'Ivoire in 2016 to enhance economic statistics in Africa and support African and global SDGs, and concentrate on the following: (www.uneca.org)

- Issues of collecting, analyzing, and publishing economic statistics in Africa to enhance sustainable development regionally and globally.
- Challenges of increasing demand for data and statistics, and developing strategies of collecting and analyzing data to enhance sustainable development in Africa.

b- Arab Statisticians Union: Established within the framework of the Council of Arab Economic Unity among agencies of Arab League, to achieve the following:

- Enhance Arab economic integration through the statistical work
- Develop economic activities and relations among member states.
- Provide statistical support and enhance statistical capacities among member states.
- Develop Arab statistical human cadres.

2-3-3 Roles at the Global Level:

a- UN Statistical Commission: (www.unstas.un.org)

- Establishment: Established in 1974, and is considered the top of the world statistical system, as it is also considered as a gathering of national statistical agencies across the world. It supervises the UNSD.

- Main objectives are to develop global and national statistical agencies through developing measures, methods, concepts, and capacity building.
- Main fields of interest, 2010-2017:
    - Population and social statistics
    - Economic statistics
    - Other important statistical fields: Big Data in official statistics, statistical governance, building and developing statistical capacities, statistics of climate change, and regional statistical integration, etc.
- The relationship to SDGs, where it contributes to many statistical activities and launches related initiatives, such as:
    - Holding the First International Forum for Data, Cape Town, attended by representatives of 100 countries, and produced a global plan for data. The Forum concentrated on developing national statistics systems to prepare and publish data of sustainable data to achieve SDGs 2030.
    - Using Big Data for the purposes of official statistics and relating such data to SDGs. This was discussed in its Round 48, Mars 2017, which concentrated on the role of Big Data in providing detailed indicators at a higher level of detail and accuracy to enhance the implementation of the SDGs and provide a global platform for this purpose (UN, 2017).
    - Publishing sustainable development data to secure implementing the SDGs

b- PARIS21:

- Established in 1999 by joint efforts of UN, European Commission, OECD, IMF, and WB. It includes a network of world statisticians, analysts, and concerned policy makers across the world.
- Main objectives: The Partnership adopts a vision to alleviate poverty and improve governance in developing countries through integration of data and statistics for the process of decision taking (making people life better through statistics, especially in developing countries).
- Major interest fields: The most important of which are as follows (www.paris21.org):
    - Coordinating efforts between data users and public policy-makers.
    - Producing more accurate data on suitable time.
    - Providing knowledge and technical support to help different countries to plan, implement, and assess national strategies of statistics, NSDSs, and national statistical systems, NSSs.
- Major interest fields according to the Partnership Strategy 2016-2020:
    - Exchanging knowledge and innovation incubators in the statistical field.
    - Meeting the needs of developing countries to build statistical capacities.

- Providing technical support and additional finance to produce needed data for all countries.
- Concentrating and paying more interest to statistical awareness.

- The relation to SDGs according to its strategy up to 2020: The Partnership continues its efforts in the following fields (www.paris21.org):
  - Enhancing opportunities of developing countries to benefit from Data Revolution and SDGs through developing national statistical systems.
  - Providing finance and technical support to statistical activities in general, and to activities related to SDGs in developing countries in particular.

Accordingly, and in the light of reviewing many of the related sources, interviews, reviewing partnerships and contributions of CAPMAS locally and externally in the framework of Data Revolution and development of ecosystems to enhance sustainable development, one can conclude the following experiences:

- **Direct impact of data revolution on the national statistical system in Egypt**: It is effectively reflected on the partnerships and activities of CAPMAS to adapt foreign experiences, systems, and applications to support decision takers and the Sustainable Development Strategy: Egypt Vision 2030.

- **Direct impact on developments of the Data Ecosystem on the national statistical system in Egypt:** CAPMAs developed many projects, mechanisms, and initiatives to apply Big Data, Administrative Data, and Cloud Computing in some statistical activities.

- **Official statistical systems represent the essence of the Data Ecosystem in Egypt**: It is similar to its counterparts in both developing and developed countries. Thus, it is greatly important to develop such systems to satisfy the escalating demand for good and trusted data, in all fields, and for all users in Egypt.

- **The need for overwhelming developments in the national statistical system** in the light of Data Revolution: Such developments are legislative, institutional, organizational, and technological; in the framework of the comprehensive statistical strategy, as is the case in other developing, emerging, and developed countries.

- **Multiplicity of activities, issues, and outputs of the national statistical system:** These range from the publications related to censuses to manuals and classifications, general censuses, and periodical statistical books. In addition, they include publications of CAPMAS and publications for other agencies under the supervision, revision, and auditing of CAPMAS.

- **Importance of joint statistical projects between CAPMAS and other local agencies:** Such agencies include Ministry of Communication, Ministry of Tourism, etc. There is, however, a great need to expand such projects in the future to enhance the system and applications of Administrative Data, in collaboration with other ministries and agencies in the country.

- **Important statistical activity at the governorate level**: CAPMAS presents direct statistical contributions as for the Egyptian governorates, such as: “The Comprehensive Survey of the Characteristics of Rural Areas in Egypt”, “The Guide of Administrative Units”, etc. In addition, CAPMAS supports publications of the central administrations of statistics as for the reports of population and population activities at the governorate level annually.

- **The pivotal role of CAPMAS in the statistical support of the Sustainable Development Strategy- SDS:** This is specially the case in the statistical coverage of indicators through the “Sustainable Development Unit” at CAPMAS; participation in work teams to follow up application of the strategy; and continuous cooperation and coordination with Ministry of Planning and Ministry of Investment and International Cooperation as for the Sustainable Development Strategy-SDS.

- **Importance of statistical learning and participation through knowledge of the best statistical practices**: This is achieved through participation of the statistical cadres at CAPMAS in various statistical events - at the global, regional, and local levels – in order to attract and apply suitable statistical experiences to support the national Data Ecosystem.

- **The important role of global and regional agencies and initiatives**: Such agencies and initiatives provide valuable opportunities for the technical support of the national statistical system. The most important agencies are: UNSC, PSD, PARIS 21, ECA, UAS, etc.

CHAPTER THREE

The Role of New Data Communities in the Data Eco-System in Egypt

As indicated in the introduction of the Report, the global momentum of Data Revolution and Big Data strongly shed light on new and renewing or uprising data communities all over the world, especially social media networks, mobile phone records, satellite imagery, administrative data and registers, spatial geography data, fiscal transactions data, sensor data, etc.

Egypt has not been far from this world scene, where the scope of new data communities widened and became present in the national data eco-system in some form or another. The present Chapter will present some aspects of the presence of new data communities in Egypt, with particular reference to the social media networks.

3-1. General Overview of the New and Uprising Data Communities in Egypt

As occurring in the world data scene - some of whose aspects are presented in Chapter One - and in addition to the role of the national official statistical agency (CAPMAS) the roles of the new and uprising data communities in Egypt are represented in the roles of many actors, such as social media networks, mobile phone records, public and private sectors, satellite imagery, etc.

Table (3-1) presents a general overview of the new and uprising data communities in Egypt, where some of them are dealt with in detail later. The Table indicates some of the most important features as follows:

- Escalating the importance of social media networks, especially among youth, which is related to the youthful Egyptian population structure, where the age group (< 15) years represents about one-third (34.2%) of the population, and the age group (15-29) represents about 26.8% of total population according to Egypt Census 2017.
- Increasing the developmental role of civil society in supporting sustainable development in collaboration with private sector and concerned state agencies in the light of new legislation of civil societies passed in 2017.

Table (3-1) The Most Salient New, Renewing, and Uprising Data Communities in Egypt

Data Communities	General Description	Notes
Social Media Networks	- The total number of Facebook accounts exceeds 7.6 million accounts, and about 2.2 accounts on LinkedIn.	
Mobile Phone Records	- The total number of subscribers is about 99.50 million subscribers in three companies up till August 2017.	- The fourth company is launched in September 2017.
Civil Society- NGOs	- The total number of civil societies working in the field of civil work in Egypt exceeded 48000 in 2017.	- A new legislation is passed to regulate their work in 2017.
Private Sector Companies	- The number of normal and investment companies performing economic activities is about 5.8 million (Egypt census 2017). - The number of private manufacturing establishments is about 54000 establishments (Federation of Egyptian Industries).	- About 70% of these companies take the pattern of shops, according to the General Census of 2017.
Public Business Sector Companies	- The number of holding companies is 21 companies in the framework of Law 203 of 1991, of which 8 companies belong to Ministry of Public Works Sector, including 126 affiliated companies. - There are other 13 specific holding companies affiliated to other ministries. - There are other two companies in the framework of Law No. 159 of 1981: The Electricity Holding Company and Telecom Egypt (80% public ownership) belonging to Ministry of Electricity and Ministry of Communication.	- This sector assumes increasing importance in the light of creating a special ministry for it (Ministry of Public Business Sector).
Government Sector	- The total number of employees in government sector amounts to about 5 million persons in 2016-2017, of which about 56% work in local administration (According to CAPMAS).	-There is a great importance for this sector as for administrative data and open data.
Communities of Satellite imagery and Aerial Photography	- National Authority for Remote Sensing & Space Sciences- NARSS - Egyptian General Survey Authority. - Activity of the private sector in the field of satellite and aerial photography.	- Many projects to enhance macro, regional and spatial planning in Egypt.

Source: Different sources and web sites of specific agencies - References.

- New and important roles of satellite imagery, especially in enhancing effective spatial planning in Egypt, on the one hand, and discovering Egyptian resources in remote areas

of the country, on the other; in addition to technically enhancing the projects of spatial analysis to enhance development plans and decision making.

- The growing role of Egyptian private sector in the national economy, as private investments constitute more than half of total investments in annual development plans.

- The government and public sector: Its importance increases in the light of multiplicity and variety of affiliated data bases and communities in this sector as indicated in this Chapter, on the one hand, and the need for new measures of governance, accountability, and transparency in the government sector; and improving the quality of public services provided to citizens, in addition to quality of services of business and investment sectors, on the other.

The controlling issue in multiplicity and variety of new, emerging, and traditional data communities in Egypt is that of (networking), among data bases and communities to achieve the targets as follows:

- Supporting planner, decision taker, and policy maker in building development plans according to reliable data and information that could be obtained on time.

- Interrelating and integrating new and emergent data bases and communities with traditional data bases and communities in the framework of National Statistical System-NSS to fill the gap of data and information in the country.

In this context, Administrative Control Authority- ACA in Egypt adopts an ambitious imitative - based on Presidency directives - to build and activate this (networking) across the country in the framework of (National Integrated Information System Project) which includes the following dimensions (Republic Presidency, 2017):

- The Project faces important challenges that hinder building the modern Egyptian state, such as weakness of information infrastructure, weakness of institutional memory, and shortage of integrative and accumulative planning.

- Interrelated and integrated information system improves quality of national resource allocation, and concentration on the most needy areas and social categories.

- The most important work pivots in integrated information system are; administrative, human development, economic development, education and technology, and integrative and accumulative planning.

- The National ID System is a basic step to build an integrated information system, as it includes reliable data of tens of millions of Egyptian citizens.

- The Project depends on communication and coordination among agencies concerned with data and information in Egypt, especially Ministry of Planning and Ministry of CIT.

- In addition, related legislative frameworks play an important role in controlling and regulating utilization of traditional and new **data communities at two levels**:

- First: Developing current legislations, especially the obsolete national statistical legislation of statistics and censuses, legislations of intellectual property, etc.
- Second: Passing new legislations related directly and indirectly to data communities, such as Freedom of Information Act, and laws that regulate handling Big, Open, and Administrative Data.

3-2. Data Communities on the Social Media Networks (SMNs) in Egypt

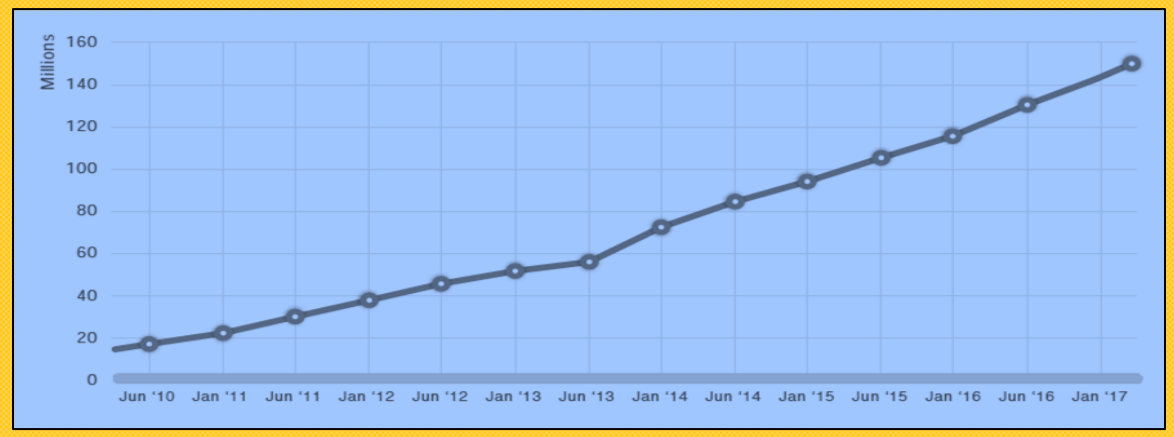
During the last decade, expansion and impacts of social media networks increased at all local, Arab, and world levels. In this regard, the site of the statistical portal (Statista) indicates that the number of SMNs users amounted to 2.46 billion users in 2017. It is expected to amount to 3.02 billion users by 2021.

Statista also indicates that (Facebook) is the most famous site, where the number of its users amounted to 2.72 billion users during the third quarter of 2017.

In the following, we present some aspects and developments of using SMNs in Egypt:

a) **Facebook**: It comes at list top of the most used SMNs in Egypt and Arab area, where the number of users amounted to more than 156 million in 2017 (according to results of series of reports of Arab SMNs issued by College of Mohammed bin Rashed for Governmental Administration). This figure increases by 41 million users compared to the figure of the beginning of 2016, and amounts to 115 million users, with a percentage increase of about 35.65%. Figure (3-1) indicates the increasing and continuous growth of number of Facebook users in Arab world a year after another.

Figure 3-1 Development of Number of Facebook Users in Arab Area, 2010-2017.



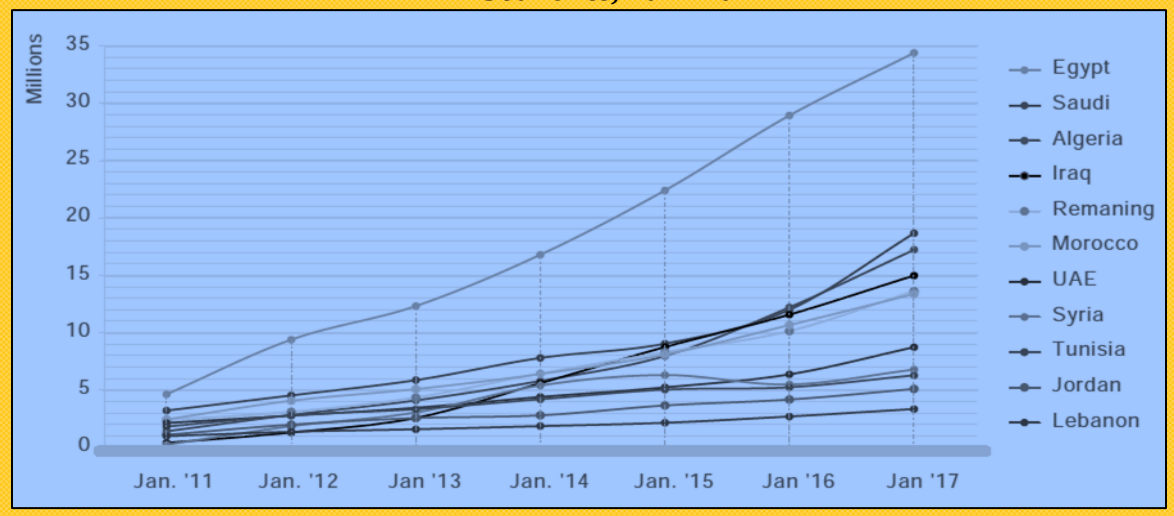
Source: F. Salem (2017) Social Media and the Internet of Things - Towards Data-Driven Policymaking in the Arab World: Potential, Limits and Concerns. Mohammed Bin Rashid Al Maktoum Global Initiatives, Dubai.

At the country level, rates of growth of using Facebook differed among different Arab countries during that period, as they were affected by many political and socio-

economic factors within each country. For example, after the events of the Revolution of 11 January 2011, there was a large increase in growth rate of Facebook users' number, due to increasing use of both citizens and government as well. Figure (3-2) indicates that number of Egyptian users was about 5 million in 2011, but it doubled to about 10 million users in 2012.

It also shows the development of number of Facebook users in Egypt compared to the highest 10 Arab countries as for the number of Facebook users.

Figure 3-2 Development of Number of Facebook Users in Egypt and Some Arab Countries, 2011-2017

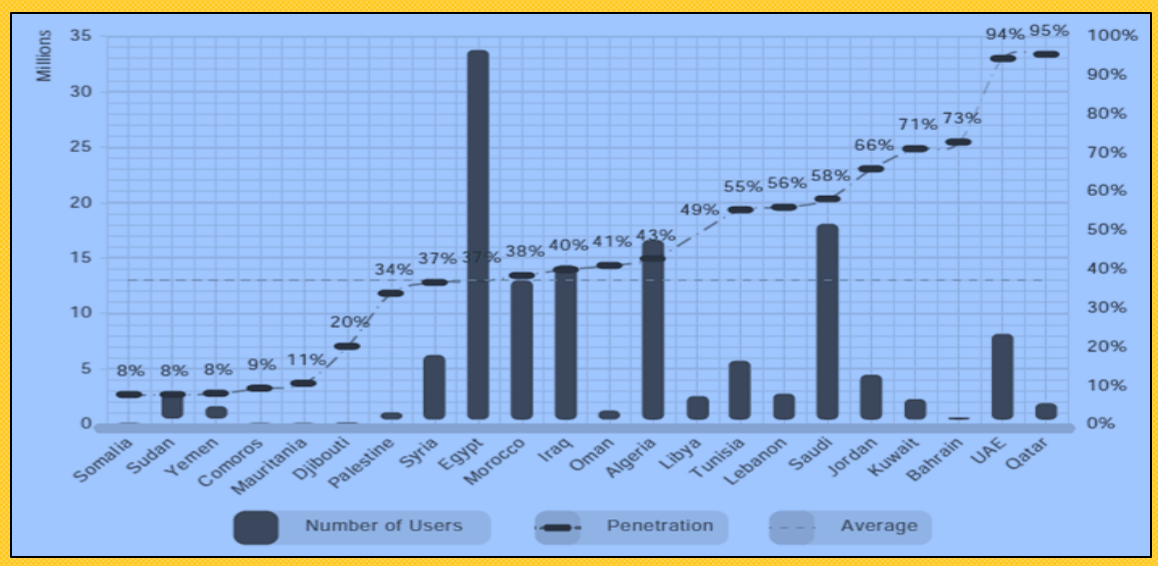


Source: Ibid.

As for number of Facebook accounts in Egypt and Arab countries, it is noticed that average number of accounts for each Arab country amounts to 6.7 million, while in 7 out of 22 Arab countries the figure exceeds that level: Egypt, Saudi Arabia, Algeria, Iraq, Morocco, UNA, and Syria. In addition, Egypt has the largest number of Facebook accounts, with a big difference compared to other Arab countries, where it has 34.5 million accounts against only 18 million accounts for Saudi Arabia. In fact, number of Egyptian accounts exceeds its equivalent in 16 Arab countries (all Arab countries, except for Saudi Arabia, Iraq, Morocco, and UAE).

On the other hand, average prevalence rate of Facebook in Arab countries amounts to 34% (i.e. one out of three persons in the Arab area has an account on Facebook), exceeding 90% in some countries - such as Qatar (95%) and UAE (94%) - and 50% in other countries such as Bahrain, Kuwait, Jordan, Saudi Arabia, Lebanon, and Tunisia. However, Egypt comes in the 14th rank, with a Facebook prevalence rate of 37%, as indicated in Figure (3-3) which shows the prevalence rate of Facebook users in Arab countries including Egypt.

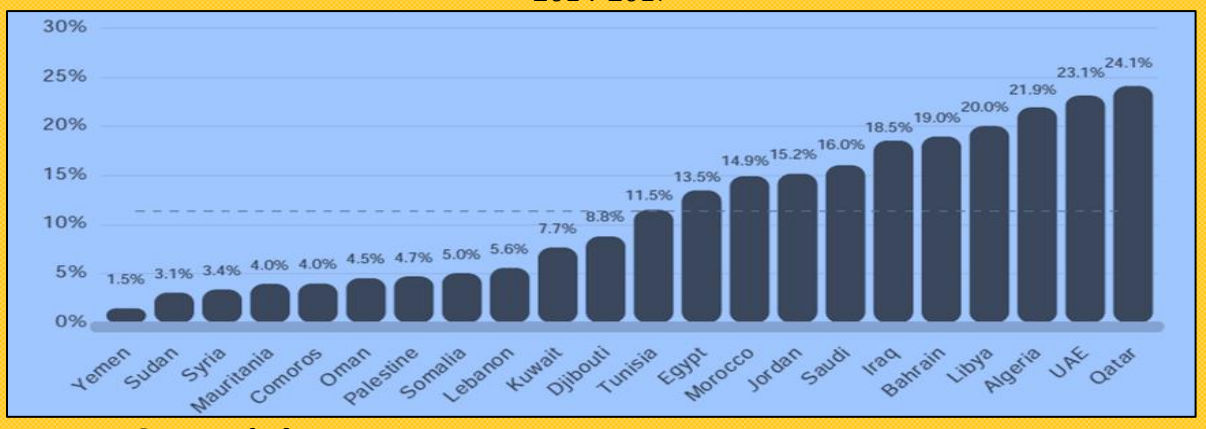
Figure 3-3 Prevalence Rate of Facebook Users in Egypt and Arab Countries



Source: Ibid.

As for widespread of Facebook, it is noticed that prevalence rate of Facebook in Arab Area increased by 11.5% during the period from June 2104 to January 2017, with higher increase rates in Qatar, UAE, Algeria, and Libya, amounting to 20% between 2014-2017. Egypt, however, assumed the 10th rank with a percentage increase of 13.5% between the two years, as indicated in the following figure.

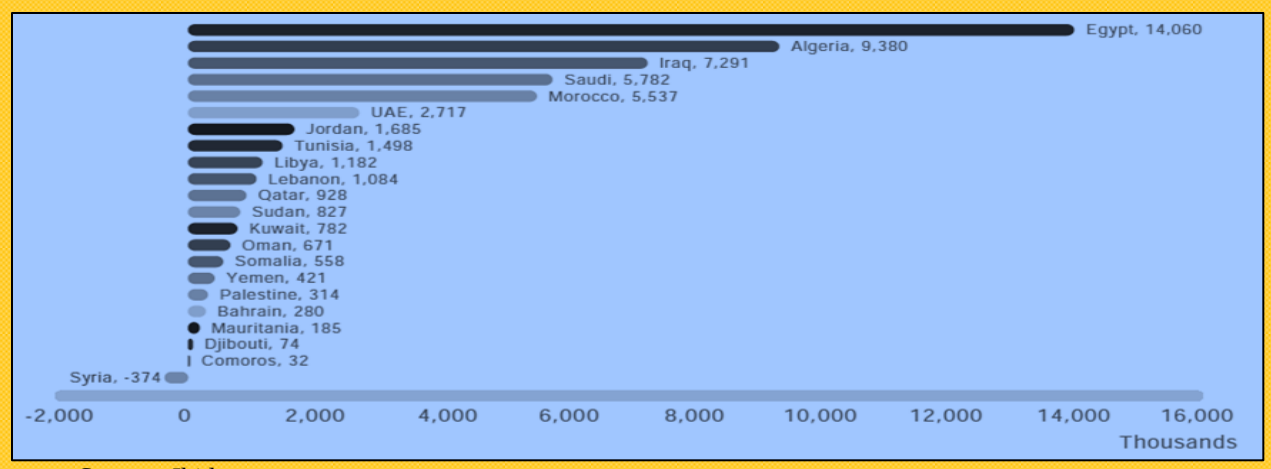
Figure 3-4 Change Rate in Percentage of Facebook Users in Egypt and Arab Area, 2014-2017



Source: Ibid.

The following Figure (3-5) shows that Egypt witnessed an addition of 14 million new users during the period June 2014 and January 2017, which is larger than the number added in 16 Arab countries (all Arab countries, except for Algeria, Iraq, Saudi Arabia, and Morocco).

Figure 3-5 Change in Number of Facebook Users in Egypt and Arab Countries, 2014-2017



Source: Ibid.

At the beginning of 2017, Egypt accounted for 23% of Facebook users in Arab region, with a slight decrease from 25% along the last five years.

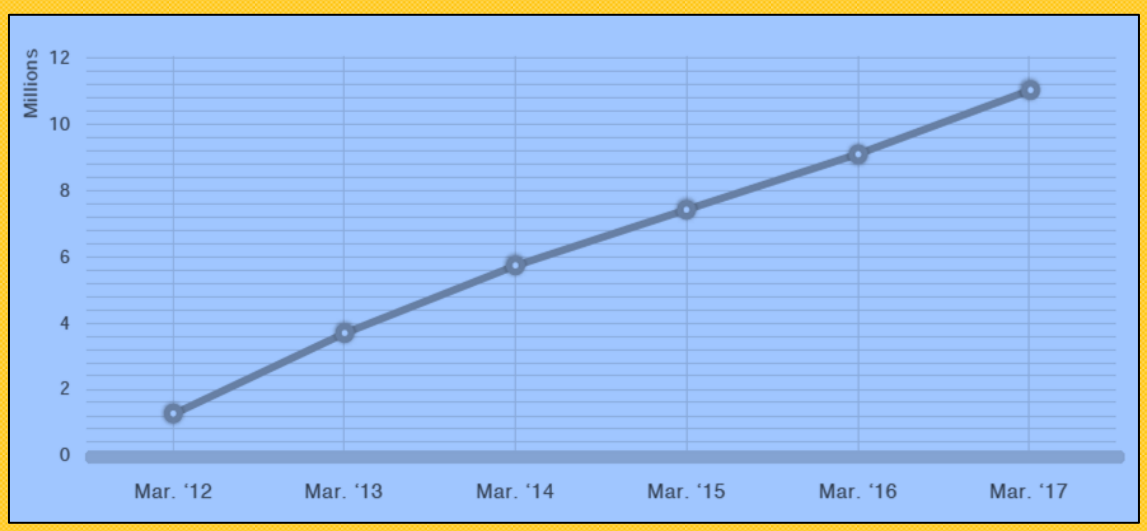
As for age differentials among Facebook users in Egypt and Arab countries, it is noteworthy that about 64.3% of Facebook users in the Arab world are youth (< 30 years). This percentage, however, witnesses a continuous decrease due to entrance of new age-groups, as it was about 67% in 2014 and 70% in 2012. Although most of Facebook users are youth, the age balance for Facebook users is forthcoming. As for Egypt, it is not different from other Arab countries, where most users are youth with a percentage of 65.8%, which is higher than the average of Arab countries. However, this percentage is lower than that of 2011, by about 9.2%, where it was 75%. It is also noticed that percentage of males is higher than that of female users in Egypt, where it amounts to 65.8%, which is close to that of 2011 (64%).

It is also noteworthy that Arabic language is the main language for Facebook users in the Arab region, where 94% of Egyptian users of Facebook use Arabic, as Egypt is the second largest user of Arabic.

b) Twitter: It is a small site of social media networks that allows users to send and read comments of no more than (140 letters or symbols). These comments are known as (tweets). In July 2017, the size of messages was doubled to (280 letters) for all countries, except for Japan, Korea, and China. Registered users can publish tweets, but non-registered can read them only.

At the beginning of 2017, the number of monthly active users was estimated at 10.8 million users (according to the reports of Arab SMNs issued by College of Mohammed bin Rashed for Governmental Administration). This figure is expected to grow to exceed 11.1 million users in March 2017, to be nearly double that of Mars 2014. Total number of Twitter accounts is estimated to be 16.3 million accounts.

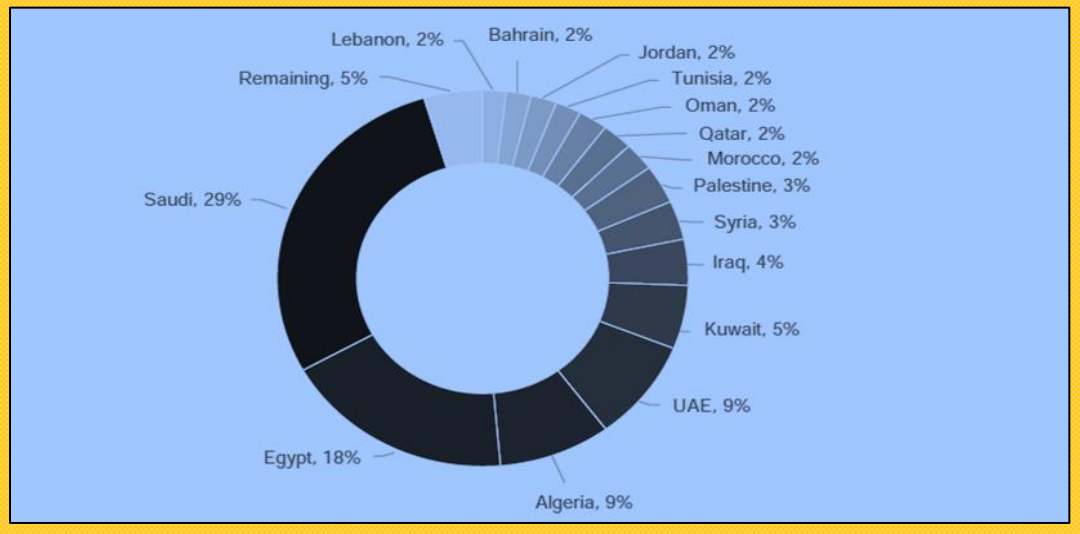
Figure 3-6. Total Number of Active Twitter Users in the Arab Region.



Source: Ibid.

Saudi Arabia has the largest number of active Twitter users, amounting to 29% of total active users in the Arab region. Egypt assumes the second rank, with a percentage of 18%. In fact, Egypt also has the second largest number of new users since 2014, where 590 thousand Egyptian users joined Twitter.

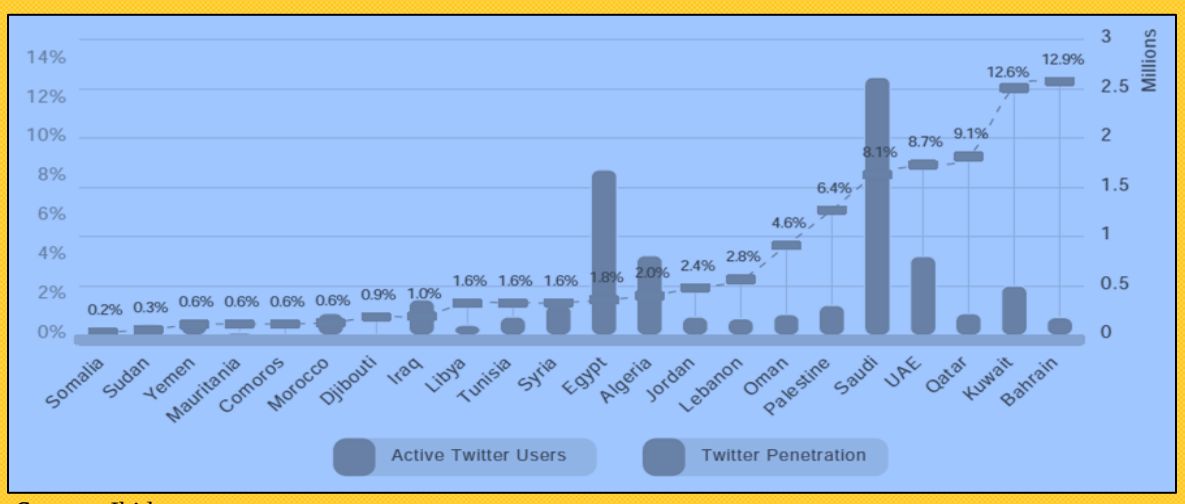
Figure 3-7 Distribution of Active Twitter Users in Egypt and Arab Countries



Source: Ibid.

The following figure indicates that the percentage of Egyptians using Twitter amounts to 1.8% of total Egyptian population, thus assumes the eleventh rank among Arab countries. Bahrain comes at the first rank (12 9%), while Somalia comes at the last. In general, Gulf countries have the largest prevalence rates for active Twitter users in the Arab region, as indicated by the figure.

Figure 3-8 Prevalence Rates of Twitter Users in Egypt and Arab Countries



Source: Ibid.

With respect to characteristics of Twitter users as for sex differentials, statistics show that one-third of Twitter users in the Arab region are females, which is lower than the world average. In Egypt, however, the percentage of female users amounts to 29% of total users.

Arab citizens write about 27.4 million tweets a day, against 17.2 million tweets two years before. More than half of these tweets are written by Saudi and Egyptian twitters, with percentages of 32% for the earlier and 18% for the latter. Table (3-2) casts some light on the aforementioned facts, where Arab countries can be divided according to daily tweets into three groups:

- Countries that write more than million tweets daily: 6 countries (including Egypt).
- Countries writing from 100 thousand to million tweets daily: 12 countries.
- Countries writing less than 100 thousand tweets daily: 4 countries.

Kuwait is the largest active Titter user, as for average daily tweets, where Kuwaiti users write about 4.2 tweets a day, with a relatively large difference compared to other Arab countries, while Egypt occupies the sixth rank, as Egyptians write about 2.9 tweets a day.

Table 3-2 Number of Tweets in Egypt and Arab Countries

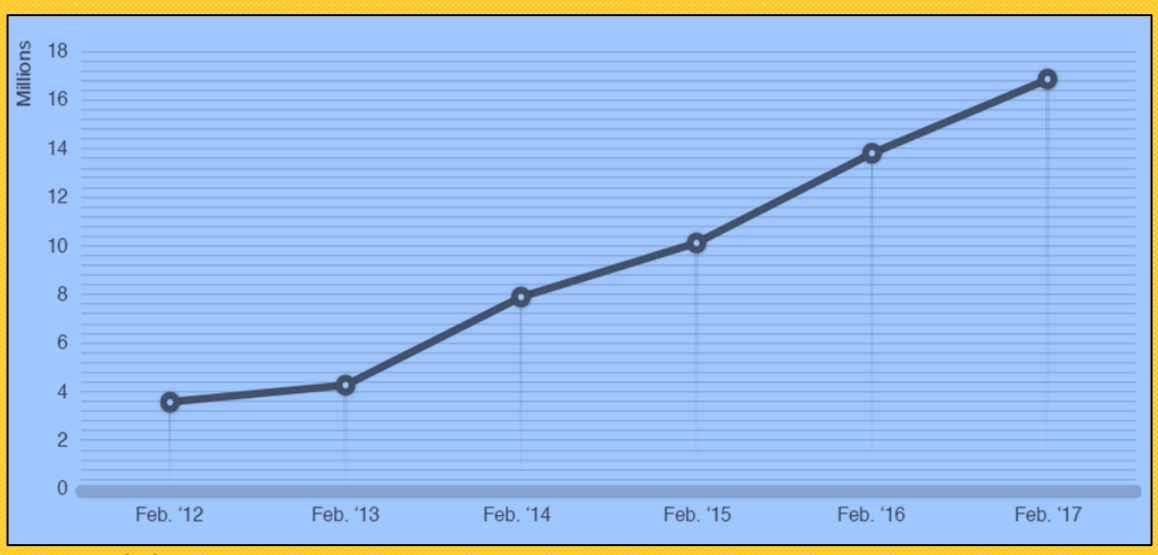
No. of Tweets	No. of Countries	Countries
More than a million	6	Saudi Arabia, Egypt, Algeria, Kuwait, UAE, Palestine.
100 thousand-million	12	The rest of Arab countries.
Less than a million	4	Mauritania, Somalia, Djibouti, The Comoros.

Source: F. Salem (2017), op. cit.

Basically, twitters use Arabic language, where 72% of tweets are written in Arabic, against 16% in English, and 12% in other languages. Arabic language dominates tweets in Saudi Arabia, Kuwait, and Egypt, which is the first producer of Arabic tweets. Also, mobile phones dominate the tweets media, where no less than 80% of active twitter users tweet using mobile phones, while this percentage amounts to 74.8% in Egypt.

c) **LinkedIn:** The site was established in December 2002, while actual operation began in May 2003. It is used as a professional communication network, which is available in 24 world languages. At the beginning of 2017, number of users of this site in the Arab region amounted to about 16.6 million users (according to the series of reports of Arab SMNs issued by College of Mohammed bin Rashed for Governmental Administration), with a growth rate of 22% compared to the last year, due to the widespread of the site in all Arab countries, where its prevalence rate in the Arab region amounted to 6.8%.

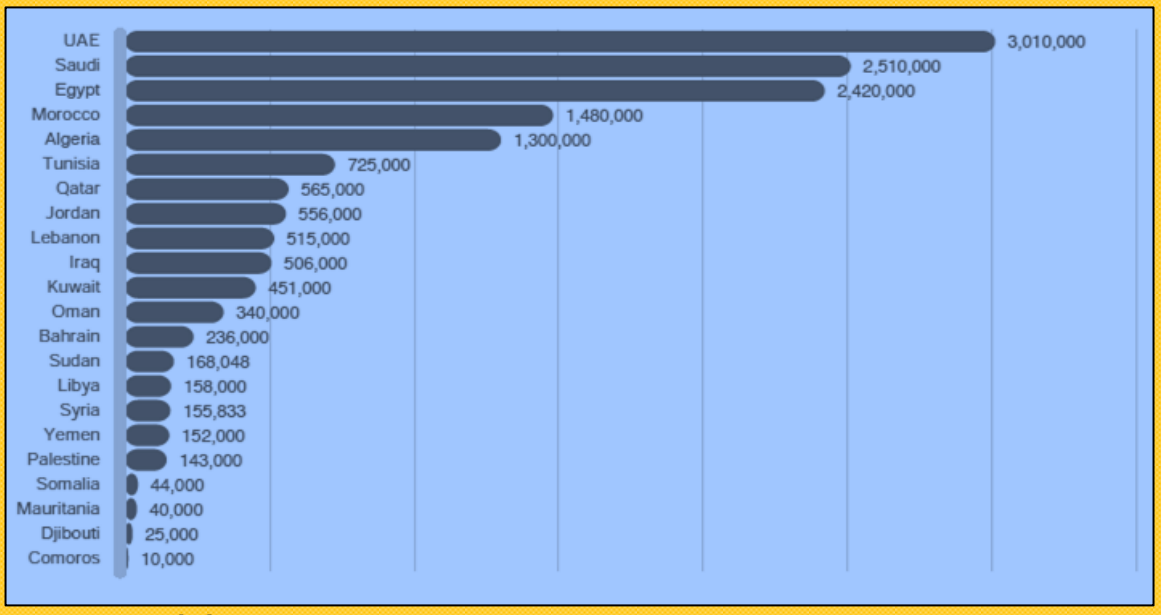
Figure 3-9 Development of the Number of LinkedIn Users in the Arab Region



Source: Ibid.

d) Egypt occupies the third rank as for number of LinkedIn users, where number of Egyptian users amounted to 2242000 users. UAE comes at the top, with a number of users amounting to 3010000 users, followed by Saudi Arabia (2510000 users).

Figure 3-10 Comparative Data of Numbers of LinkedIn Users in Egypt and Arab countries

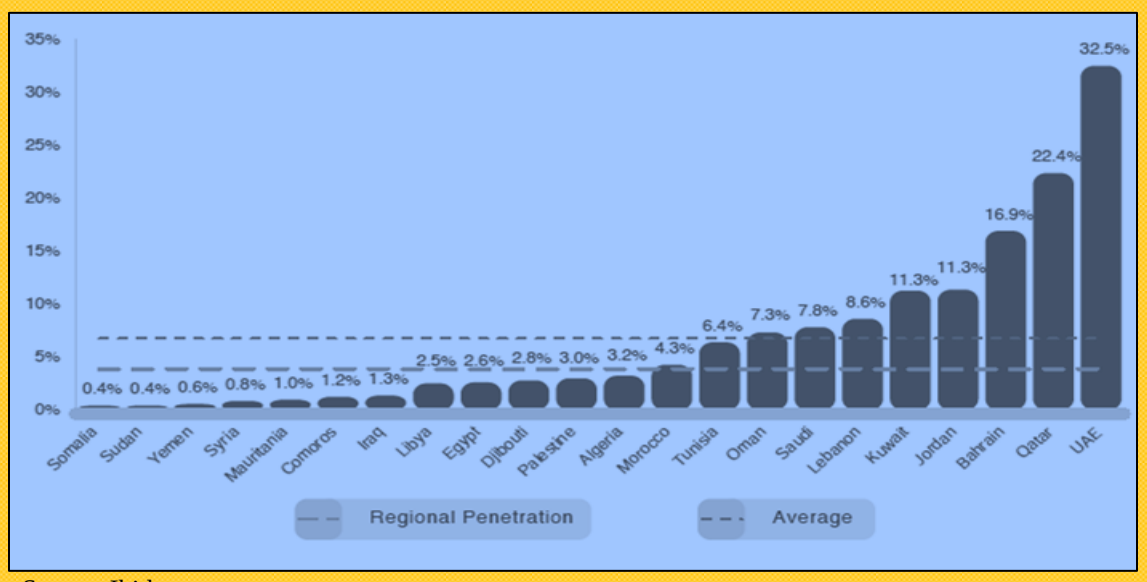


Source: Ibid.

As for the prevalence rate, the following figure indicates that Egypt assumes the 14th level, as for the percentage of population using LinkedIn (2.6%), which is a late order to a large extent. By contrast, UAE comes at the forefront, with a percent of 32.5%. On Average, one-third of persons in UAE have accounts on LinkedIn. As for sex differentials, females represent about 28% of total users, with Lebanon having the highest level (44%), while Egypt has the tenth rank (25%).

As for age-structure of LinkedIn users, the percentage of youth users (18-34 years) amounts to about 68% of total users. Morocco has the highest level of youth users (84.5%), while Egypt assumes the fifth rank (74.5%).

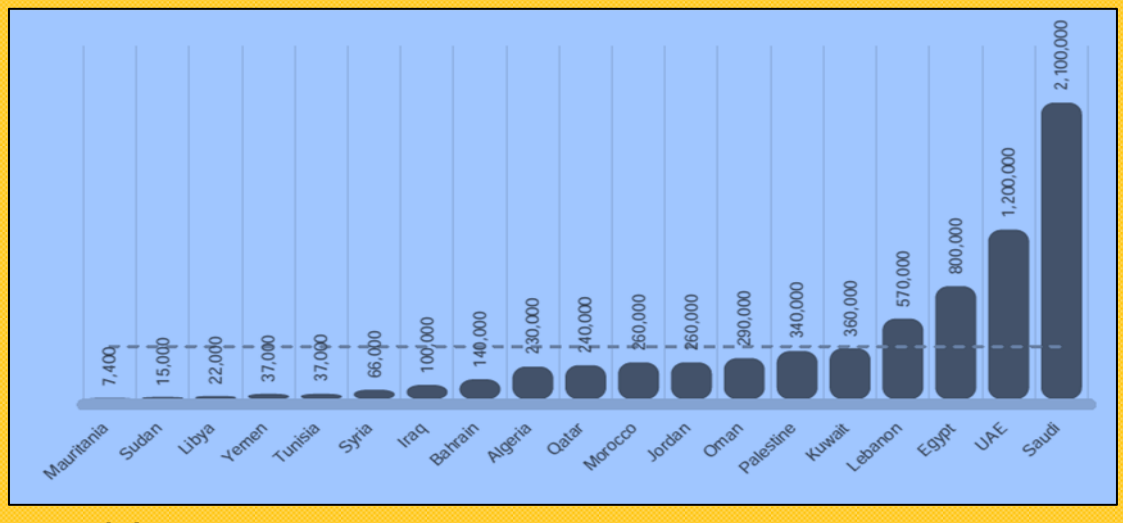
Figure 3-11 Prevalence Rate of LinkedIn in Egypt and Arab Countries



Source: Ibid.

e) **Instagram**: It is a free application to exchange photos/images and a social media network launched in 2010. It allows users to take pictures, add digital filters to them, and share them in a group of social media networks other than itself. In the Arab region, there are about 7.1 million users, which mean a prevalence rate of 1.8%. Saudi Arabia assumes the first rank (2100000 users), followed by UAE (1200000 users), and Egypt (800000 users - 11.3%). The English language surpasses the Arabic language among users of this site, where 55% of them use English, compared to 36.8% using Arabic.

Figure 3-12 Number of Instagram Users in Egypt and Arab countries



Source: Ibid.

3-3. Data Communities of Mobile Phone Records and Satellite Data in Egypt

Networks of mobile phones, aerial photography and satellite data systems present promising opportunities to develop data ecosystem in Egypt. They also widen capabilities and contributions of this sector in many fields of environmental and socio-economic development. By acquiring and adapting significant international and regional experiences in this regard, these kinds of data communities would present more opportunities in the future.

3-3-1. Data Communities of Mobile Phone Records

The sector of ITC plays a major role in socio-economic development all over the world, including Egypt. SDSs-2030 pays attention to importance of such a role and defines the most important challenges facing this sector as follows (Sustainable Development Strategy: Egypt Vision 2030):

- Weakness of business environment that could attract investments to the sector.
- Weakness of spread of digital culture and e-commerce system.
- Weakness of public spending on locating ITC.
- The late rank of Egypt as for some related international indicators, such as e-friction, which relates to access to, and use of, the internet. This, in turn, hinders the efforts of transformation into knowledge/digital economy in Egypt.
- Shortage aspects in prevalent legislative environment, including legislations of intellectual property.

In the face of such challenges, the Strategy document includes a number of programs and projects that aim to promote this sector as follows:

a) Transforming Egypt into a global digital hub/center, and developing entrepreneurship in this regard.
b) National Broadband Internet Project.
c) Construction of a digital community to enhance institutional efficiency and transparency.
d) Establishing technology regions and developing electronic manufacturing.
e) Developing cloud computing, and ITC industries.

Achievement of such ambitious programs and projects mainly depends on improving situation and indicators of ITC in the community, especially users of mobile phones and internet, where they play a major role in developing businesses in both developed and developing countries alike.

Table (3-3) indicates the most important indicators of ITC, especially internet and mobile phones as follows:

- The overall prevalence rate of cell phones exceeded 110%, due to development of their numbers to 99.50 million lines in August 2017, compared to 95.8 million lines in 2014.
- The number of internet users through cell phones increased to 31.8 million users in 2017, compared to 20.3 million users in 2014, with a percentage increase of 56% between the two years.

Table 3-3 Some Indicators of the ITC Sector in Egypt, August 2014 - August 2017

Item	August 2017	August 2016	August 2015	August 2014
Subscribers of Cell phone (million line)	99.50	96.25	93.50	95.84
Prevalence rate of cell phone (%)	110.34	108.64	107.47	112.19
Users of internet through cell phones (million users)	31.78	28.77	25.24	20.28
Users of USB Modem (million user)	3.28	3.36	4.03	4.02
International Capacity for Internet (billion b/s)	1213.86	961.62	649.14	406.5
Users of ADSL (million user)	4.92	4.35	3.65	2.93
Percentage of users of internet through cell phones to total users of mobile phones (%)	31.94	29.89	26.99	21.16
Total capacity of PBX (million line)	19.21	15.88	17.50	15.42
Number of fixed/land line subscribers (million subscriber)	6.27	6.33	6.00	6.85
Prevalence rate of fixed/land line (%)	6.8	7.19	7.0	8.15
Number of centrals	1550	1496	1580	1668

Source: Summary Report on Indicators of ITC. Cairo: Ministry of ITC. Issues Dec. 2017, Sept. 2016, and Sept. 2015).

It is noteworthy that intensive spread of cell phones in Egypt can provide important opportunities that can be utilized in many important applications as follows:

- Health care and monitoring of patients with specific diseases, to provide direct medical advice, monitor recovery cases and disease developments. In particular, this can be applied in monitoring patients with hepatitis or cancer. In fact, CAPMAS adopts two projects in this regard (see Chapter Two, Table 5-1).
- Investigating specialists and citizens' opinions as for important community and development issues through organizing partnerships between specialized public and private agencies that measure public opinion and companies of mobile phones under the systems of communication organization in the country.

3-3-2 Satellite Data and Aerial Photography

It has been stated in Chapter One of this Report that interest in satellite and aerial photography at the global level is not new. Rather, it began many decades ago to support decision takers and public policy makers at local, national and global levels. Importance of satellite data doubled in the framework of increasing roles of Big Data to enhance sustainable development.

As for conditions of satellite and aerial photography data, it is noticed that aside from activities of the military institution, there are major agencies related to this kind of data, mainly concerned governmental agencies, such as National Authority on Remote Sensing & Space Sciences-NARSS, and Egyptian General Survey Authority.

3-3-2-1 Roles of National Authority on Remote Sensing & Space Sciences

NARSS has been established in 1991 as a national agency related to State Minister for Scientific Research. Then, it was reorganized by Presidential Decree No. 261 of 1994 as a national agency related to Ministry of Higher Education and Scientific Research. Currently, a bill is being prepared at Parliament to establish Egyptian Space Agency.

NARSS vision states pursuing to be one of the best scientific agencies in conducting research and providing services in the field. It depends on strong scientific relations with more than 44 comparative and related specialized agencies and institutes across the world (www.narss.sci.org). The most important related specializations and services are as follows:

- Producing satellite data and images, especially from the station of Aswan.
- Using satellite images in preparing digital maps, atlases, and documents in collaboration with concerned local and world agencies.
- Producing survey maps for villages and cities using space and aerial photography.
- Producing atlases based on satellite images.

One of the most important related initiatives of the NRSS is (Digital Portal for Spatial Data and Information to Support Decision-Taking), whose objectives are as follows:

- Forming policies to exchange spatial data and geographical information.
- Establishing an integrated system including concerned agencies to provide aerial photography, satellite images, and related consultation services.
- Providing technical support to spatial data infrastructure projects, and establishing digital portals to exchange geographic information and related decision support systems.

In addition, NARSS provides important services to different Egyptian governorates to support efforts enhancing regional and sustainable development at the country level. The following table presents models of Commission projects in some Egyptian governorates.

Table 3-4 Projects of Remote Sensing in Some Egyptian Governorates

Governorate	Basic Features of Projects
New Valley	Joint cooperation protocol between Governorate and Commission to enhance planning capabilities in Governorate through: - Establishing knowledge and information infrastructure to enhance development activities in Governorate. - Providing information on agricultural natural resources, such as: water, underground reservoir and uses, torrents streams, and aggression on land and water. - Providing information on economic minerals and raw materials.
Fayoum	Joint project with Commission: "Project of Regional Evaluation of Development Capabilities and Environmental Sensitivity, July 2017-June 2018, which acts on 2 aspects: - Diagnosis of current situation of environmental sensitivity and problems. - Monitoring development capabilities and resources available to achieve it.
Kalyoubia	Joint cooperation protocol between Governorate and Commission to achieve the following: - Establishing data-base for Governorate, using data of remote sensing and GISs. - Supporting development of strategic plan and urban space of Governorate. - Limiting environmental and natural dangers that might threaten Governorate.

Source: Compiled from Sites of Commission www.narss.sci.org and different governorates.

3-3-2-2 Roles of Egyptian General Survey Authority

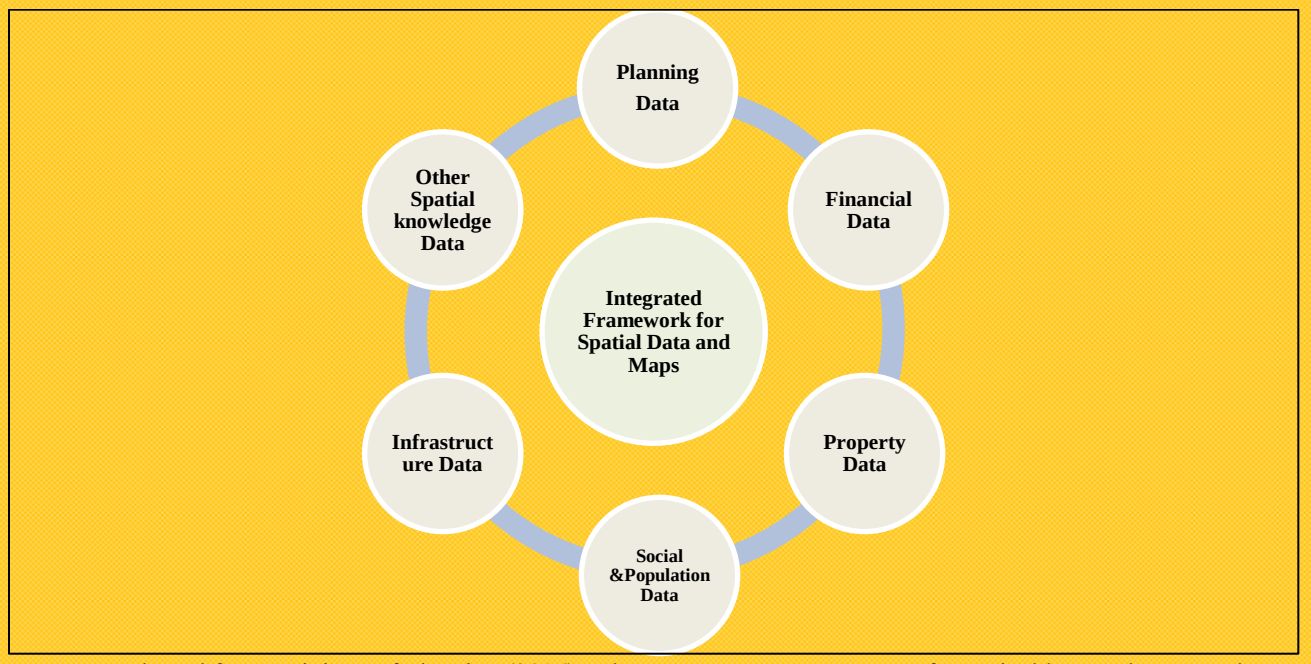
Authority is considered one of the oldest agencies in Egypt, where it has been established in 1898, then transformed into public authority in 1971, and into economic authority in 2001. **The main tasks of Authority as for satellite and aerial photos are as follows:**

- Creating topographic maps with small and medium scales using developed methods of aerial survey to be used for military and internal security purposes; projects of reconstruction and locating population; agricultural expansion and land reclamation, and large planning and urban projects.
- Creating detailed maps with large scales using developed methods of aerial survey of agricultural lands and cities, to be used for purposes of determining properties; tax collection; and small projects such as schools, factories, irrigation and drainage canals, etc.
- Creating different geographical maps and atlases for using in different studies.

The most important projects of the Authority are as follows:

1. **Project of Integrating Information Infrastructure of Egyptian Planning System**: The objective is to enhance integrating information infrastructure of that system through establishing (National Center for Spatial Data) at the national level to be affiliated to Egyptian General Survey Authority, to create a secure base-map with scales of 1: 5000 and 1: 50000.
2. In this context, the (Spatial Numbering Project) has been launched among Egyptian General Survey Authority, Ministry of Planning, and CAPMAS. The Project provides many services to support planners and agencies responsible of SDSs-2030, according to a scientific seminar held for this purpose at INP. The most important services provided by the Project are as follows (Seminar on Spatial Numbering, 2011):
    - Facing gaps of distributing services and allocating investments, especially at the governorate level, concentrating on the neediest regions, to enhance the goal of SDSs-2030 in achieving balanced comprehensive growth in Egypt.
    - Enhancing information infrastructure of national planning system by providing data of integrated spatial maps that contribute to shorten the time gap of decision taking, and evaluate their effects. (See Figure:3-13)
    - Covering many development variables and indicators, such as urban spaces and blocks in urban and rural areas; water surfaces and resources across the country; and natural resources including mines and quarries.

Figure 3-13 Integrated Framework of Spatial Numbering Data to Support Planners in Egypt



Source: Adapted from: Ministry of Planning (2016) "The Most Important Features of Sustainable Development Plan for the Fiscal Year 2016-2017: The First Year of SDSs-2030. Cairo: Ministry of Planning.

These services are integrated with projects and services provided by NARSS in three Egyptian governorates, as indicated in Table (3-8).

- **Project of Surveying State Properties**: The objective of the Project is to survey and register all data related to state properties and publish such data at the governorate level. It has been carried out in many governorates, such as: Cairo, New Valley, Aswan, and Assiut. In addition, it has been carried out with some agencies, such as: Egyptian Endowments Authority and Railway Authority.

  Urban Registry Project: The objective of the Project is to provide integrated solutions to protect real estate property in Egypt, fighting processes of fraud, manipulation, and aggression on state and agricultural lands. This mainly depends on building (National Data-Base for Property) representing the basis of integrated geographical information system for lands and properties in cities and new urban communities in Egypt.

- **Project of Egyptian-American Cooperation**: Its objective is to produce detailed maps for agricultural lands within the Nile Valley, in addition to topographic maps for Delta and Fayoum. In fact, aerial photographing has been carried out for required regions, in addition to producing maps for Sharqia and Behera governorates.

3-4 Data Communities in the Civil Society and Government Sector in Egypt

SDSs-2030 concentrates on the role of civil society and NGOs in the field of charity works, reducing poverty pressures, and neutralizing the negative impacts of community gaps, in addition to the developmental role of such organizations in building community capacity, achieving empowerment, facilitating social mobility through coordination and integration with concerned state agencies (Sustainable Development Strategy, 2016).

In the following, the Report shortly presents status of NGOs in Egypt, and some examples of NGOs with specific nature, such as Egyptian Food Bank, Egyptian Feminist Union, and Federation of Egyptian Industries.

3-4-1 Data Communities in the Egyptian Civil Society

3-4-1-1 Status of Egyptian NGOs, and the New Legislative Framework of Civil Society in Egypt

Due to attention paid by State to role of civil society, number of NGOs in Egypt amounted to about 47312 societies, according to Ministry of Social Solidarity in 2016, as stated in the following table. The table also indicates that number of registered NGOs amounted to 773 in 2016, in addition to 43 civil institutions, and 3 civil federations in the same year.

Table 3-5 Status of NGOs in Egypt, 2016

Status of NGOs	No.
NGOs registered on the data-base of the Ministry	47312
Registered Associations	773
Registered institutions	43
Registered federations	3
Registered organizations	4
Dissolved Associations and institutions	810
Associations whose Board of Directors dissolved	1

Source: Ministry of Social Solidarity (2016) Report of Ministry of Social Solidarity: Protection - Care - Development: from Sept. 2015 to Dec. 2016. Cairo: The Ministry.

Minister of Social Solidarity (at the World Youth Forum, Sharm-el-Sheikh, November 2017) declared that number of NGOs in Egypt amounted to 48300, including 29543 active NGOs, concentrated mainly in 3 governorates: Cairo, Giza, and Alexandria.

In a special session, World Youth Forum shed light on the relationship of NGOs to sustainable development, through highlighting the following facts (World Youth Forum, 2017):

- The large community spending by NGOs and domination of local finance, where the concerned Minister estimates that about 12000 active NGOs spend about LE 10 billion a year on community activities in Egypt, and about 98% of NGOs spending depend on Egyptian citizen donations.
- NGOs cover all goals of SDGs, where their roles and activities include cultural and social services; local community development; economic empowerment; SCI and micro finance; social responsibility, consumer protection, and environmental issues, such as fresh water and disposal of wastages, etc.
- Participation of NGOs in forming SDSs-2030, based on an invitation by government to many NGOs to participate in different stages of preparing the strategy.
- NGOs have important and vital role in fighting poverty and providing some health services, where they provide direct monetary and material assistances to about two million poor citizens, participate in training directed to economic empowerment, and provide micro finance.
- Also, NGOs participate in providing some health services through building hospitals, medical centers, infant nurseries, and primary health centers in governorates.

On the other hand, State is keen to develop legislative frameworks supporting NGOs, where it passed Law No. 70 of 2017, which includes 89 articles concentrating on some important aspects to enhance civil society activities in Egypt, such as:

- Securing freedom of work for NGOs in the framework of the new Law.
- Clear determination of civil work tasks, to include all non-profit activities that are practiced for developing communities in any of the fields stated in the basic system of those entities.
- Relating civil work to development plans in the country, where the Law states that NGOs are to work to achieve their purposes of developing communities according to state plans and developmental needs and priorities.

3-4-1-2 Important Models and Experiences of Civil Work in Egypt

In the following, we present three different models of civil work in Egypt, which achieved tangible results in their fields, as follows: Egyptian Food Bank, Federation of Egyptian Industries, and Union of Egyptian Women Feminist Federation.

a. Egyptian Food Bank.

It has been established in 2006, in the framework of a vision to have Egypt free of hunger, with the best infrastructure, human capabilities, and effective relief and supply system. In 2006, the Bank distributed 1333786 dry food meals. Number of families benefiting from the Bank's "Meat of Sacrifices" amounted to 676485 families, and number of those who benefited from material donations amounted to 225120 individuals. Also, the Bank provided 4926376 school meals for 30 schools in the same year.

In the framework of its vision, the Bank works on the following axes:

- Providing food for the poor people.
- Building and developing capacities.
- Raising awareness so as not to waste food.
- Organizing the random charitable work in Egypt.
- Effective investment to secure sustainability.

Moreover, the Bank adopts a group of objectives as follows:

- Satisfying one of the basic human needs (food).
- Specialization in specific problem, and concentration on solving it.
- Continuity of donating.
- Professionalism in carrying out tasks and missions.

Vision, mission, goals, and targets of Bank activities are translated through a group of basic programs, as indicated in the following table.

Table 3-6. Main Programs and Activities of Egyptian Food Bank

Program Type	Nature and Objectives of Programs
Food Programs	– Instruments of Sacrifices, Meat of Charity, Monthly Food, School Nutrition, Zakat al-Fitr, Money Zakat, Expiation of the Oath Vows, Fasting Breakfast, and Ongoing charity
Development Programs	– Illiteracy Eradication, Employment and Rehabilitation, Giant Project, and School Food Factory.
Volunteer Programs	– Individual Volunteerism – Institutional Volunteerism – Food Bank Generation
Relief Programs	– Relief Program – Save my People Campaign
Awareness Programs	– Awareness Programs for Restaurants, Hotels, and Cafes – Awareness Programs for Individuals
Mother 's Day Campaign	– Aged Mother Gifts – Mother and Children Gifts

Source: Compiled by the Search Team from the Bank Site: www.egyptianfoodbank.com

Bank activities include a wide network of partners at all levels inside and outside the country, including companies, banks, charity organizations, restaurants, cafes, etc. Partnerships with the Bank take many forms including:

- Contributing a percentage of sales to support the Bank activities.
- Sponsoring campaigns of the Bank.
- Volunteering to prepare food boxes and packages for the Bank.
- Donating in-kind products.
- Hosting marketing site of the Bank for specified time periods.
- Donating for a specific program.

b. Federation of Egyptian Industries- FEI.

FEI is considered one of the most important civil professional organizations. It has been established in 1915 to support Egyptian industries, to enhance socio-economic development and growth of the country, and to defend interests of Egyptian manufacturing sector. Due to the nature of work and activity of the Federation, it has partners at three levels: national, regional, and global levels. It represents about 60000 manufacturing establishments, about 90% of which belong to the Egyptian private sector. Also, it includes about 1.2 million workers, and contributes about 20% of the national economy.

As a result, the FEI has data bases including names and products of member companies of industrial chambers, which amount to 20 chambers. In addition, it has data bases for companies providing services which choose to register their data with the Federation (Site of Federation of Egyptian Industries, 2017).

Structure of the Federation consists of a group of chambers, committees, and units which represent main work mechanisms as indicated in the following table.

Table 3-7. Structure of Administrative Mechanisms of Federation of Egyptian Industries-FEI

Work Mechanisms	Items	Notes
Industrial Chambers (20 chambers)	– Each specific chamber represents a specific manufacturing sector as follows: Food, Timber, Medicine, Oil and Mining, Printing, IT, Leather Tanning, Cinema, Health Care, Chemicals, Minerals, Engineering, Textiles, Clothes, Leathers, Cereals, Building Materials, Mass Communication, Real Estates, and Handicrafts.	Chambers present different kinds of support to member companies.
Technical Committees (15 committees)	– Each committee studies the important issues related to the Federation work as follows: Civil Society, Social Security, Resource Development, Deepening local production, Human Resources, Small-Scale Industries, Employment, Energy and Mining, New Energy, Internal Trade, Exhibitions, Training, Investment, Taxes and Customs, and Local Product.	Committees are considered the major engine of Federation work.
Units (2 units)	– Environmental Compliance Office- ECO – Social Responsibility Unit	ECO has been established 2001.

Source: Compiled from the site of the Federation: www.fei.org.eg

c. Egyptian Feminist Union - EFU

According to the last Population Census of 2017, females represent about 48.4% of total Egyptian population. Thus, there is a great importance for the role of female NGOs in the light of the many problems facing Egyptian women.

In this regard, SDSs-2030 refers to weakness of institutional efforts to empower women and marginalized groups in the Egyptian society. This, of course, assures the need for state and NGOs efforts, especially of female efforts, to enhance political and socio-economic empowerment in the Egyptian society.

In the framework of women empowerment efforts at the community level, the EFU has been established in November 2011. At that time, it included 15 Egyptian female NGOs,

which increased to 280 NGOs in most Egyptian governorates, including South Sinai and Aswan.

According to EFU vision, it seeks to integrate and interrelate efforts related to women issues, to create a society believing in equality, citizenship, social justice, human dignity, respect of family and human rights through the following activities:

- Project of Enhancing Women in Local Councils Elections.
- Campaign of Women for Egypt.
- Campaign of Mtkhafish (Don't Fear).
- Towards a National Campaign for Advancement of Egyptian Women Conditions.
- Discovering and Supporting Administrative Leaderships.

Practical and field Union activities refer to important contributions to support efforts of Egyptian women empowerment in multiple fields across different governorates, with different internal and external participations and partnerships. The following table presents some aspects of community empowerment efforts for Egyptian women.

Table 3-8 Some Fields of Egyptian Feminist Union Activities to Empower Egyptian Women in 2017

Activity	Objectives	Beneficiaries	Partners
Field Research	Analyzing the relationship between education and economic empowerment of Arab women	Women policy makers in 6 Arab countries, including Egypt	Arab Women 's Union
Workshop	Supporting Egyptian female leaderships	20 Egyptian NGOs	6 Egyptian governorates
Workshop	Enhancing capabilities of female leaderships to survey community needs	5 NGOs	4 Egyptian governorates
Workshop	Enhancing community communication skills of female leaderships	Local women NGOs	Menoufia Governorate - Female Parliament Representatives
Technical Enlightenment Project Against Discrimination with Capacity Development	Activating the role of theater and culture against discrimination - Developing youth capacities	Women NGOs and youth in Egyptian governorates	Cairo University, Ministry of Youth and Sports, European Union
Training Course for Innovation	Developing innovative youth capabilities	Youth of both sexes in Egyptian governorates	Cairo, Alexandria, and Menya Governorates

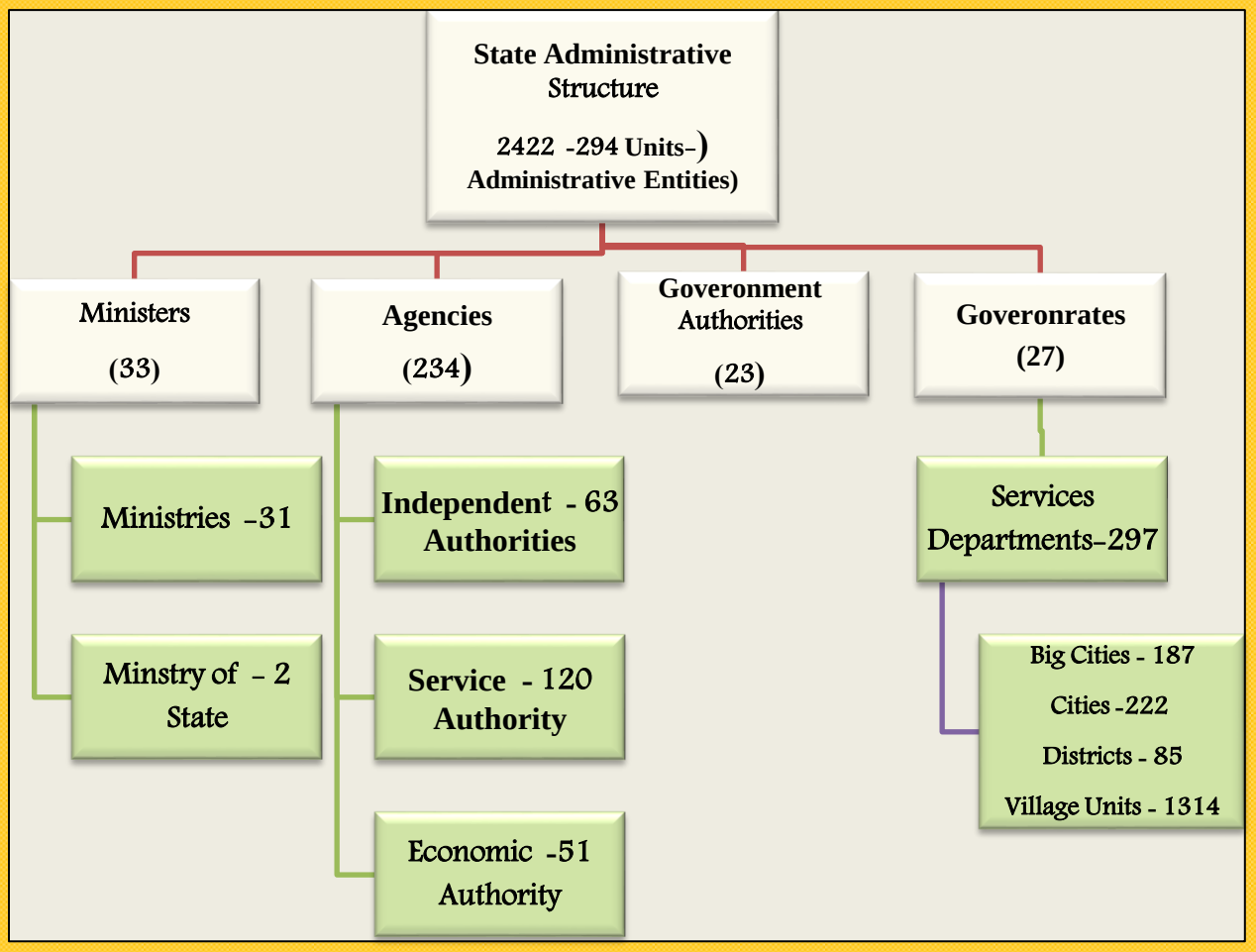
Source: Compiled from different publications of Egyptian Feminist Union in 2017. www.efuegypt.com

3-4-2 Data Communities in the Government/Public sector in Egypt

In spite of integrating most communities of this sector into the formal statistical system, whose components and outputs are presented in Chapter Two of this Report, the work team is interested in referring to the structure of this system and its data and information peculiarities in the light of the following:

- **Multiplicity, variety, and differentiation of sub-data community in government/public sector:** As indicated by Figure (3-14), this sector includes the following sub-data communities:

Figure 3-14 Sub-data Communities in the State Administrative Structure



Source: Al-Hadary, Tarek (2011) "Governance of State Administrative Apparatus in the Light of Law of Civil Service", Lecture in a Meeting with Saudi Leaderships Delegation at Ministry of Planning. Cairo: Ministry of Planning.

- **Egyptian Governorates (27)** include health and educational service administrations (297), in addition to local administrative divisions such as centers, cities, districts, and village units.
  Central Departments of Statistics and Information and Decision Support Centers in the Egyptian governorates play major roles in building and developing data communities in these governorates.

- **Government Authorities (23)** include many important authorities related to citizens, such as Real Estate Authority which includes major data community of real estate in Egypt; Tax Authority and Customs Authority which represent very important sub-data communities.

    - **Public Agencies (243) ,** include a good level of sub-data communities such as:
        - **Independent Agencies**: such as Central Bank of Egypt, and many other control agencies, such as Accountability State Authority , Administrative Control Authority, and Financial Regulatory Authority.
        - **Service Agencies**: such as National Population Council, National Council for Women, Consumer Protection Agency, and Egyptian Competition Authority.
        - **Economic Agencies**: such as Suez Canal Authority, Egyptian General Petroleum Corporation, New Urban Communities Authority, Industrial and Mining Projects Authority, and Egypt Post.
    - **Ministries: include** 31 specific ministries, and two state ministries.

- **Important Role for Data Bases and Information Systems in Developing Government Administrative Apparatus:** SDSs-2030 and related sustainable development plans are greatly interested in projects concerned with activating role of data and information systems in government administrative apparatus, such as:

    - Updating Information Infrastructure of Government Administrative Apparatus: The goal is to complete building and updating data bases and information systems, so as to facilitate collection, storage, and use of data, and use available data in issuing periodical reports to support decision taking.
    - Developing Cloud Computing in the Governmental Sector: The goal is to improve performance and reduce costs.

In the light of the aforementioned, and reviewing many sources related to important development roles of new and emerging data communities in Egypt, we can conclude the following experiences:

- Multiplicity, variety, and intensity of new and emerging data communities in Egypt in a form similar to that prevailing in other developing, emerging, and developed countries. Data communities include social media, mobile phones data, Egyptian civil society data, public and government sector data, private sector data, public business sector data, aerial and satellite photography data, etc.
- New and emerging data communities are not less important than their traditional counterparts in Egypt, where those communities are characterized with large and continuous information and data richness, such as mobile phones lines whose prevalence rate exceeds 110%, social media, etc.
- Important role of social media data in Egypt, especially in the light of the youthful population structure, and great demand by youth for treatment with such sites, which represent an important platform to spread thoughts and services and identify community

attitudes, where number of Facebook users, for example, amounted to more than 34 million citizen, representing more than one-third of the population.

- Pivotal role of new and emerging data communities in professional and community issues, where number of NGOs exceeded 48 thousand, covering all social issues, and spreading in all areas, which creates an effective role in targeting poverty, access to community marginalized groups, such as women and children, and access to areas with the least share of development returns and fruits. In addition, occupational organizations of the Egyptian private sector (such as Federation of Egyptian Industries) play an important role in improving industrial activity, including all aspects and workers, where its membership includes about 90000 industrial establishments, 90% of which belong to the private sector, and more than one million workers.
- New roles for communities of public/government data, where they include many affiliated data communities for ministries, government agencies, public authorities, and localities with different administrative divisions.
- These community data assume importance in light of calls for improving public and business services, the need for enhancing transparency and accountability in governmental sector, and requirements of, and calls for, balanced regional development.
- Expected important roles for aerial and satellite photography: In spite of widespread uses of such data in many countries, they do not assume the same amount and spread in Egypt. It is expected that concerned agencies in Egypt - such as National Commission on Remote Sensing and Space Sciences, and Egyptian General Survey Authority - would play larger roles in the future to use data to enhance development, especially in the light of some current projects in some governorates, and projects of spatial numbering to enhance general planning process.

CHAPTER FOUR

The Role of Population Data in the Data Ecosystem in Egypt

The population issue imposes itself on all countries with different elucidations, due to its interactions with all socio-economic and environmental development aspects, especially the imbalance between population and resources, where the number of world population amounted to about 7.6 billion persons in mid-2017, with the highest population growth rates concentrating in the least developed countries (UN, 2017).

The period of MDGs witnessed a great emphasis on the population issue, and the interest moved into the current period of SDGs that deals with the issue of the population pressure on the resources of food, water, energy, job opportunities, poverty issues, urban expansion, quality of life, aging, or atrophy of the population structure in some countries against population explosion in other countries.

In Egypt, the population issue imposes itself in the period of sustainable development similar to many other developing countries, especially for the relationship between population growth and available resources, on the one hand, and population pressure on all aspects of development, on the other. This requires an integrated socio-economic and environmental vision grounded on clear data and information, which will be dealt in the present chapter.

4-1 The Population Issue in Egypt: Features, Dimensions, and Relation to Sustainable Development

4-1-1 Nature of the Global Population Problem

The population problem is the imbalance between the number of population and the resources and services. In particular, it refers to the increasing number of population without similar increase in education opportunities, health utilities, job opportunities, and raising economic level. This leads to a gap between high population increase and low development rates, which results in lower standard of living.

The report of State of the Future in the world (The Millennium Project, 2016) embodies the aforementioned problem of imbalance globally, where world population is expected to increase by a billion persons during 12 years, and by 2.3 billion during 35 years. This will result in a global increase in the demand for food, water, energy, and job opportunities. The difficulty of the population situation is aggravated because the highest increases concentrate in 49 countries that are the least developed in the world. Moreover, it is also aggravated because of increasing population in urban areas that is expected to reach about 70% of the world population by the year 2050. This would be accompanied with socio-economic and environmental problems, especially in cities in developing countries.

It is worth mentioning that there are many countries having high population density, but they do not suffer from the population problem, because they achieved the desired balance between population and resources. However, the population problem is not confined to population increase; rather, it results also from population decrease, or negative population growth, which causes many problems, such as shortage of labor force, and social and family related problems, etc.

4-1-2 Population Problem Dimensions in Egypt:

On May 15, 2017, CAPMAS declared that the number of population in Egypt amounted to 93 million, which means that it increased by a million person in less than six months, as it was declared by CAPMAS that population number reached 92 million on November 24, 2016.

The National Strategy of Population and Development (2015-2030) determines the most salient population challenges as follows: acceleration of fertility rates; increasing percent of families under poverty line; deteriorating status of woman in general, and decreasing female employment in particular; negative impacts of population growth on per capita share of public services; the environmental situation and quality of life; and regional disparities, etc. (Ministry of Population, 2015).

Looking at the population problem in Egypt from a scientific point of view requires the analysis of its three dimensions: growth, spatial distribution, and population characteristics, which will be reviewed next.

a- Population Size and Growth:

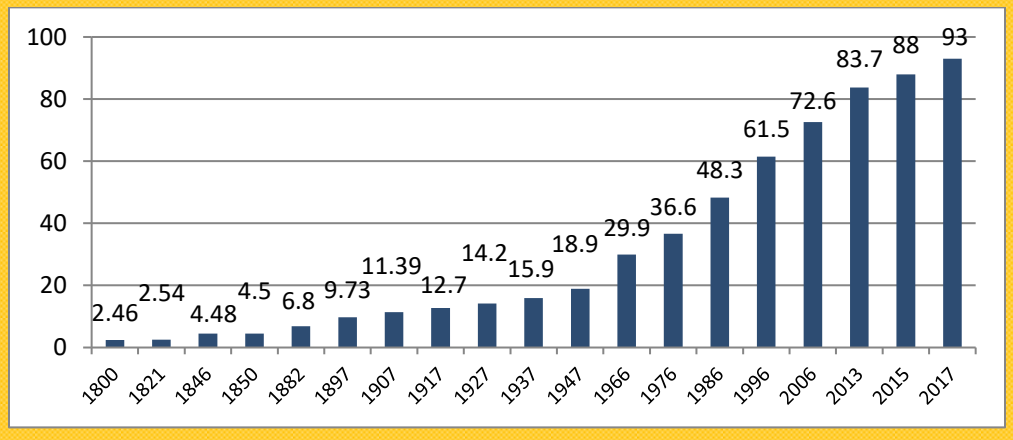
Egypt has a long history distinguished with its specific geography that has limited population existence into a narrow strip in the Nile Valley and its Delta since the pharaoh's era, where the current inhabited area is only about 7% of the total area of the country.

Figure (3-1) shows the development of the number of population in Egypt from 1800 to 2017. It indicates that the population number was estimated at 2.46 million in 1800, during the French Campaign. Then, it amounted to 2.54 million in 1821; in 1846 it reached 4.48 million, and in 1850 in a statistical census it reached 4.5 million. Population number continued to increase to amount to 11.39 million in 1907, 29.9 million in 1966 census, and according to 2006 census it reached 72.6 million. The figures show that the number of population amounted to 88 million at the beginning of 2015, and jumped to 93 million in May 2017, as stated earlier (Treasury authority, 1911; CAPMAS, multiple issues 2008-2015, its website, and the Population Clock).

Figure 4-1 Development of the Population Number

During the Period 1800- 2017, Egypt

(In millions)



Source: Figure is based on the aforementioned numbers.

From the figure and the previous numbers some facts can be indicated as follows:

- **A continuous increase in the average annual increase in the population number**: During the last century, the population number was increasing by about 351 thousand persons per annum during the period 1917 to 1966, to more than 1.2 million per annum during the period 1966 to 2015, then by 2 million per annum since 2015.
- **A high natural increase rate**: It increased from 2.11% in 2000 to 2.52 in 2014, attaining its maximum in 2012, where it amounted to 2.55%. Upper Egypt governorates have the highest natural increase rate.
- **Doubling the population number across many time-periods, and extension into the future:** Population number doubled during 50 years (1897-1947) from 9.73 million to 19 million persons, and doubled again in less than 30 years (29 years) during the period (1947-1976), where it amounted to 36.6 million. Once again, it doubled during the next 30 years to amount to 72.6 million in 2006.

  It is also noticed that the population number increased by about 1.24 times during the period (2006-2015), and in case of sustaining that increase rate at the same pace since 2006, it is expected that the population number will double during 24 years from 2006, i.e. by the year 2030.

The importance of population size and growth stems from the fact that they are among the factors affecting the standard of living of population. Economically, it is agreed upon that sustaining the standard of living in any community requires that economic growth rate must be three times higher than the population growth rate, i.e., the economic growth rate must surpass 6% annually, while it is still in the limits of only 4% (Ministry of Planning, 2017).

b- Spatial Population Distribution:

As stated earlier, the inhabited area represents a very small share of the total area (about 7.7%), which leads to a high population density in the inhabited areas.

According to the above data, the following facts can be concluded:

- **The increase of average general population density** by more than 37 times during 215 years, as it increased from 2.5 person/ km^2 in 1800 to about 90 person/ km^2 in November 2015 (General Authority of Information, 2015).
- **The increase of Average net population density and the concentration in urban areas**, where Cairo governorate attained the highest density (47285 person/km^2), followed by Giza governorate (6122 person/km^2), while the lowest densities were in South Sinai governorate (9.7 person/km^2) in inhabited areas only, followed by Suez governorate (67 person/km^2) (General Authority of Information, 2015).

  Cairo governorate comes at the forefront as for the number of population (9.5 million, representing 10.6% of total population), followed by Giza governorate (7.8 million, and 8.6%), and Sharqia governorate (6.6 million, and 7.4%). South Sinai governorate has the lowest population number (173 thousand) followed by the New Valley governorate (230 thousand person). Population of Upper Egypt represents about 25% of total population of Egypt, while it is responsible of 40% of newly born babies.

High population density in large cities creates pressures on infrastructure (water, electricity, and drainage), on social services (health and education facilities), beside problems of environmental pollution, and increasing demand for housing. Due to shortage of available areas, housing crept on the relatively limited agricultural lands near cities.

c- Levels of Population Characteristics:

In the Following, we will focus on some aspects and indicators of population characteristics, particularly dependency ratios and educational levels.

– **High Dependency Ratios:**

Children represent about 40% of total population, due to the high birth rates. This figure classified Egypt among the highest countries with respect to percentage of children in the age groups less than 15 years, which raises dependency ratios and economic burden on the Egyptian family. In addition, it imposes more pressures on government services, where children need more services, compared to youth and the aged.

Rapid population growth - due to high fertility and low mortality rates - resulted in a wide-based population pyramid (population under age of work), which imposes a burden on the society, as it is a consuming category for relatively limited services and resources. Adding aged population - which is also unproductive category and in need of more aging related services - the total dependency ratio amounts to 1.8 (percent of dependency amounted to 56% on average) during the years 2006-2014, according to calculations of the team-work using CAPMAS data. These figures mean that each person of the working age endure the responsibility of 1.8 person of the dependent category. Moreover, such a category often has a negative attitude towards the environmental aspects.

– **Low Levels of Education:**

Illiteracy rate - as an indicator of the educational status – is of great importance for planners and decision takers. During the period 1986-2006, illiteracy rate witnessed a great decrease, but not sufficient, as it is still high compared to any global or local standards. Illiteracy rate decreased from 50% of total population (10 years +) in 1986, to about 39.5% in 1996, then to 30% in 2006. This, of course, refers to the continuous efforts to raise the educational levels and eradicate illiteracy, to positively deal with the socio-economic and environmental issues and challenges in the next stage.

In addition to the low educational levels, there are other important and dangerous threats to population characteristics, such as the low level of female participation in economic activities (23%), the high unemployment rate (12%), and the increasing poverty rate, which exceeded 27%. In this regard, it is worthy to refer to the relationship between poverty and high birth rates, as many poor families consider the large number of children as a mean to

increase income, without realizing the negative repercussions of such increase of birth rates on raising dependency ratios in the society.

4-1-3. Indicators of Preliminary Results of General Population Census of Egypt, 2017

In spite of successive Egyptian government interest in the issue of increasing population growth, and adopting all possible ways and methods to decrease population growth rates, data of population census of 2017 indicate that total number of Egypt population amounted to more than 94 million. This indicates that population number increased by more than 22 million during the period 2006-2017, which means that population growth rate increased from 2.04% during the period 1996-2006 to 2.56% during the period 2006-2017.

One of the negative impacts of high population growth rate - as indicated by 2017 population census data - is that percentage of population aged <15 years represents more than 34% of total population, which means more health and educational needs and requirements are needed for this age group and higher negative impacts on dependency ratios.

Importance of population size and growth rates stems from the fact that they are among factors affecting population standard of living, as it is generally agreed upon that maintaining standard of living in any society stipulates that economic growth rate exceeds population growth rates three times at least, i.e., economic growth rate has to be more than 6% annually, while it is still in the limits of 4%.(Ministry of Planning, 2011).

As for the issue of population distribution, it is already stated that populated area doesn't exceed 7.7% of Egypt total area. Although successive governments adopted population redistribution policies, population spatial distribution is still concentrated in specific governorates. In particular, population concentration increased in some governorates, where Cairo governorate is still at the forefront as for population number, assuming 10.1% of total population. Giza governorate occupies the second rank, with 9.1% of total population, followed by Sharkya governorate with 7.6% of total population. Border governorates - South Sinai, New Valley, and Red Sea - have the lowest numbers of population.

It is greatly important to shed light on the third element of the population issue, i.e., population characteristics. Although illiteracy rate decreased in 2017 compared to 2006, it is still high, where numbers of illiterate amounted to 18.4 million, representing more than 25% of population (10 years +).

Illiteracy rate among females is higher than 30%, and it is more than 30% in some governorates, such as Menya (37.2%), Beni Suef (35.9%), Assuit (34.6%), and Sohag (33.6%).

More dangerous than illiteracy issue is that 2017 census data indicate that about 27% of population (4 years +) are not attaining education, and more than 50% of whom do not join the educational system because they, or their families, do not have desire to do so. This, of course, refers to a catastrophic change in attitude of a large group of people towards importance of education in general. This will have future negative impacts not only on the illiteracy issue, but also on environmental and socio-economic development in general.

In addition to the low educational level, there are other dangerous challenges as for population characteristics, such as low level of participation in health insurance, where percentage of population not participating in, or benefiting from, health insurance amounted to more than 49% of total population. Moreover, it is noteworthy that employment status data have not been

published yet, although data published by other sources refer to that unemployment rate amounted to 12% in 2017, increasing to 24.7% among females. In addition, poverty rate surpassed 27% in general, and 66% in Middle Upper Egypt region (El-Megharbel, 2011).

4-1-4. Population Challenges and Sustainable Development:

As indicated earlier, the UN considers population as one of the most important factors controlling implementation of its Sustainable Development Agenda 2030 - SDGs, In this regard, it attempts to achieve better results, particularly the social ones, compared to the modest one that was achieved during the era of the MDGs, especially facing poverty, hunger, and low level of population characteristics in several parts in the world.

Enormous population increase, and its concentration pattern, represents the prime challenges to the UN efforts in this regard, where world population is expected to increase by 2.2 billion between 2017-2050. The largest share of such increase is expected to concentrate in the poor countries, the developing and the least developed ones. The UN estimates that more than 50% of the expected increase will be concentrated in Africa, which is expected to contain about 1.3 billion of such population increase, while Asia is expected to contain about 750 million of the total expected increase (UN, 2017).

Population increase aggravates the difficulty of life conditions for a large part of the world population, and directly threatens the opportunities of achieving sustainable development in large areas, where 748 million have no access to potable water. In addition, there are many other millions of people who have no sustainable water sources, and 27% of people living in cities in developing countries have no water pipes in their houses (The Millennium Project, 2016). In spite of expecting an increase in the world demand for water by 40% by the year 2030, compared to the current situation, estimates refer to that about 50% of world population by 2030 will live in areas suffering from severe water pressure (including Egypt and Arab countries). Such water conditions have direct negative impacts on socio-economic activities of the population, especially in developing countries. For example, about 80% of diseases in such countries relate to water (The Millennium Project, 2016).

4-1-5. Facing the Population Problem in Egypt to Enhance Sustainable Development:

To face population challenges, Egypt National Strategy for Population and Development (2015-2030) relies on a group of principles, of which: (Ministry of Population, 2015)

- Population is one of elements of the overall power of the State, as long as population increase rate does not negatively affect development.
- The right of the family to determine the number of its children, while the state endures the responsibility to raise awareness of the risks of high fertility rates.
- Integration of population component into development planning, concentrating on empowerment of the poor and poverty alleviation.
- Decentralization of management of population programs and projects, and enhancing the role of local authority in this respect.
- Expanding participation in dealing with population issue, especially the role of civil society and the private sector.

- There is an important role of population-related data, information, and research; to enhance planning, implementing, and assessing of population programs. National Population Council (NPC) reflected its interest in this regard by issuing (Atlas of Population Development, Egypt) in 2016. (Ministry of Health and Population, 2016)

Furthermore, National Population Strategy agrees upon specific strategic goals of 2030:

- Enhancing Egyptian quality of life by alleviating population growth rates.
- Restoring Egypt leadership by enhancing its population cognitive, skillful, and behavioral characteristics.
- Redrawing the population map of Egypt by redistributing population across the country.
- Achieving social justice and peace by reducing developmental gaps between geographical areas across the state.

Although the Strategy of Sustainable Development: Egypt Vision 2030 did not specify a separate pillar for population issue, SDS took into account all the aforementioned population issues and challenges in the three socio-economic and environmental dimensions, and in its ten development axes and its programs.

In this regard, the following directives can be observed in the SDS that aims at confronting the population issue:

- Achieving equity in rights and opportunities and enhancing social integration of population by concentrating on reducing the gender gap, woman empowerment, youth entrepreneurship, and facing unemployment.
- Enhancing population characteristics by concentrating on education and basic education in particular, filling the geographical gaps in health, education and decent work, enhancing the social protection network and subsidy and health insurance systems, auspices of the gifted and talented, developing vocational education and training, and generating job opportunities.
- Prioritizing the marginalized groups, especially the poor, women-headed households, the aged, slum residents, homeless children, the handicapped, etc.
- Geographical redistribution of population through a new national strategic perspective and physical plans, enhancing settlement in new development areas, confronting slums issues, and concern for the environment.

4-2 The Structure of Population Data in Egypt - Current Situation and future perspective

With respect to global and Egyptian interest in population issue, its dimensions, repercussions, and its close relation to the fields of sustainable development, it is of great importance to draw the attention to population data, sources and methods of collection, analysis and dissemination, and its role in supporting decision takers and policy makers.

4-2-1. Importance of Population Data:

Population information - as for population size, age & sex distribution, geographical distribution, socioeconomic characteristics, living conditions, and distribution of natural resources - represents very important resources for making, taking, and implementing decisions and policies, and also in developing development strategies in general, and population strategies in particular.

Global, regional, and national conferences, forums and events concerned with population and development - from the ICPD 1994 to the ICPD 2014 and beyond - concentrated on the importance of availability of population data and information to planners, decision takers, and general public; where the General Assembly of the United Nations (with effective participation by Egypt) committed itself to implement ICPD's outcomes as global obligations to be implemented by the member states (UN, 2015).

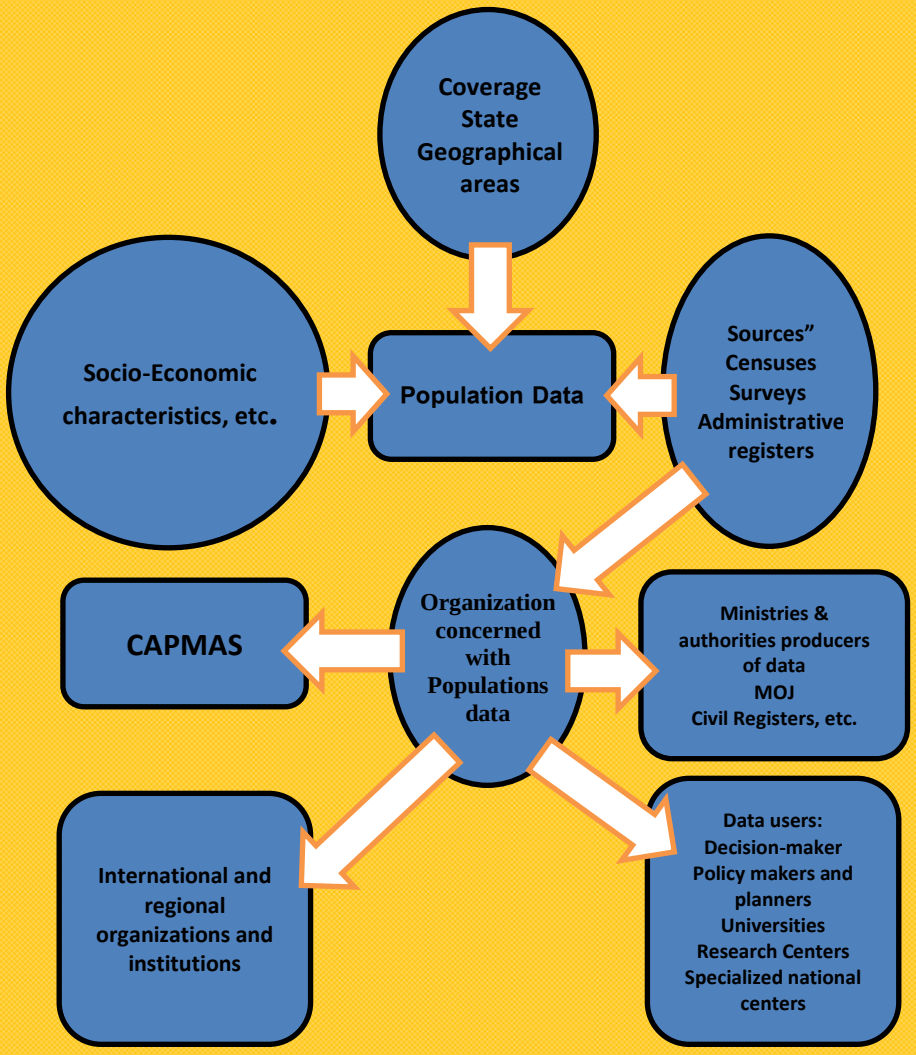
The ICPD (beyond 2014) stressed on some aspects related to the data and information on population, as follows:

- Providing population and development related data and analyses at the highest quality level, and integrating it into the global population and development strategies and processes (including the Strategy of Sustainable Development).
- Enhancing National Statistics Systems (NSS) to provide appropriate data on proper time on population dynamics; development of data collection and analyzing activities; and capacity building of statistical human resources.
- Developing the integration of population dynamics into development planning, and achieving such integration at all levels and all processes of development planning, in addition to paying more concern to vital statistics and civil registration.
- Relating population dynamics to environmental sustainability issues and climate change, in order to enhance the role of data in achieving sustainable development goals.
- Enhancing participation of civil society organizations in statistical and non-statistical activities related to population and development.

4-2-2. Sources of Population Data:

There are many sources of necessary data to study population that reflects population characteristics at any given time. Figure (3-2) presents the most important population data sources in Egypt, which include censuses, surveys, and administrative record.

Figure (4-2) Structure of Population Data in Egypt



In the following, different sources of population data will be presented in some detail, which will include three basic dimensions: coverage, periodicity, and modernity.

a- Population, Housing, and Establishments Census:

Egypt is considered one of the most famous countries along history to be distinguished with conducting population censuses, from the eras of the Pharos to the present time. It is also the first African country to adopt the policy of counting population through census system. Egypt knew the population censuses across ages with different methods and developing goals with time. In the modern era, the first population census was conducted in 1800, during the age of Mohammed Ali. In 1850, another census was conducted, followed by 1882 census. Then, Egypt adopted a periodical system to conduct censuses every ten years. Therefore, the system was

called the decimal system, taking into account that such periodicity was disrupted for some reasons during the last decades.

On January, 21 2017, CAPMAS declared the date of beginning the comprehensive census in Egypt using modern technology, where the buildings and establishment census began in January 2017, while the population census began in Mars, 28 2017.

The population and buildings census includes the following:

- Census of buildings: It concentrates on the process of collecting data on the number of buildings, their characteristics, connection to public utilities, components of housing places and units, and their residents in the country in a specified time-period.
- Census of establishments: It concentrates on counting all economic establishments, the geographical distribution, types of activities, number of workers distributed by sex. Later, this framework is to be used to conduct the economic census and economic sample surveys.
- Population census: It is the process of collecting data concerning a specified time-period for all population resident in the country, registering the demographic, and socio-economic characteristics in the reference time period, in addition to classifying, presenting, analyzing, publishing or disseminating such data.

b- Civil and Administrative Record:

Civil registration systems are defined as: the continuous and permanent, obligatory, and global registration of incidence and characteristics of population related vital events, as stated by a regulation or a decree according to the legal requirements of a specific country. Civil registration is mainly established to create the legal documents stated by law. These records are also the main source of vital statistics.

These records monitor the vital events and statistics such as births, deaths, marriage, and divorce; in addition to the records of education and civil registry. The registration is a continuous process due to its relation to the rights of individuals and the mandatory element. Information and statistics can be obtained for different time-periods (day/week/month/year). Type of registration in such record is related to the goal of their establishment, the agency that administers the records, and responsible for keeping it and the information included.

The following are basic elements related to the systems of civil registration:

- Comprehensive coverage: it is to include all vital events taking place in each geographical area.
- Accuracy and continuity: without pause or time gaps.
- Secrecy: through the legal framework to be used for specific statistical and administrative purposes.

- Regular publishing: taking care of the unified intervals.

c- Demographic Sample Surveys:

Studies of demographic sample surveys represent another important source of population data, where data is obtained from selected samples, and the statistical data error is limited by determining the sample size using scientific methods according to homogeneity or non-homogeneity within the community. In addition, the obtained data is to be tested for validation using scientific statistical methods.

One of the most important advantages of data collection through sample surveys is that it requires fewer numbers of researchers and interviews. In turn, it is less expensive than a complete census. Data on some specific topics can be obtained in detail by sample surveys, which could not be obtained from census data, as it requires more professional researchers and questionnaires designed in a form that facilitates obtaining more accurate data. In addition, sample surveys can be conducted more frequently, and questions may vary by addition or adjustment from time to time according to changes and emerging circumstances. In spite of all these advantages, sample surveys are not to replace complete censuses, but surveys can be used in all census stages.

Moreover, studies of household sample surveys provide better opportunities to obtain data in shorter time and a more suitable way; such as demographic and social characteristics, living conditions of families and individuals, levels of economic and social welfare of families and individuals, activities in which individuals participate, demographic characteristics and cultural factors affecting behavior, and socio-economic change.

Some of the most important population research and sample surveys conducted by CAPMAS during the last few decades are as follows:

Table (4-1) The Most Important Population Research and Sample Surveys Conducted by CAPMAS

Field of Survey	Type of Survey
Censuses Related Surveys	– The ex-post survey of 1986 census, assessment of 1986 census data, and analysis of 1986 census data.
Population Characteristics Related Surveys	– Census of population characteristics in Assiut, Sohag, and Qena governorates, 2003. – Factors affecting the growth of slum areas in greater Cairo 2014, in collaboration with the National Population Council. – Project of demographic profile of population in the Egyptian governorates 1995.
Surveys of Vital Statistics	– Measuring registering shortage of vital events 1974-1975.
Surveys Related to Fertility Issues	– National Fertility Survey 1974-1975, and Egyptian Fertility Survey 1980.

Field of Survey	Type of Survey
	– Egyptian Survey of Mother and Child Health 1991. – Assessment of Fertility Indicators and Family Planning Practices in Egypt, 1960-1980. – Population Education 2008. – Reasons of High Fertility Levels in the 6th October Governorate (in collaboration with the National Population Council) 2012.
Surveys Related to Health and Mortality Issues	– Health Survey of the Villages of the Project "Improving /Tahseen" 2004/2005; Survey of Loss of Fetuses and Infant Mortality 1978, 1980, and 1982. – National Survey of Maternal Mortality 1992/1993, 2000; and National Survey of Child Mortality 1993 (in collaboration with Ministry of Health). – Survey of Follow-Up and Assessment of the Status of Food Security (in collaboration with the World Food Program) 2015.
Migration related Surveys	– Survey of Internal Migration Differentials 1979; Survey of International Migration (in collaboration with NIDI Netherlands) 1996; the National Survey of International Migration (in collaboration with the International Migration Organization) 2013; and the Follow-Up Survey of Migrant Families 2015.
Surveys related to Employment Issues	– National Survey of Child Labor, in collaboration with National Council for Childhood and Motherhood; and the National Survey of Child Labor in Egypt, in collaboration with ILO 2010. – Survey of Child Labor in the Agricultural Sector 2011; in collaboration with World Food Program.
Other Surveys	– CAPMAS Capacity building in the Field of Demographic Analysis of 1986 Census; Capacity building of Workers in Localities for Demographic Analysis 1994; and the Follow-Up Survey of Young People and Youth, in collaboration with the International Population Council 2013, 2016. – Survey of Economic Cost of Violence against Women 2015; in collaboration with UNFPA and National Council for Women. – Survey of Time-Use; in collaboration with National Council for Women.

Source: Compiled by the Research Team from Multiple Sources of CAPMAS.

The previous Table indicates that there are recent surveys, such as that of the Economic Cost of Violence against Women, and the Survey of Time-Use. However, CAPMAS stopped to produce some surveys such as the National Survey of Child Labor, which stopped in 2010. In addition, some surveys were replaced by the Demographic and Health Survey; conducted by the Ministry of Health.

4-2-3. Most Important Publications of Population Data by CAPMAS:

This part of the Report presents the most important publications by CAPMAS in the field of population, which are:

- The Statistical Yearbook, issued annually in September, the last of which was published in September 2016.

- Population Census, 2006, it is the 13th census, whose results were published in May 2008.
- Demographic Analysis of the Census of 1976 (3 parts).
- Demographic Analysis of the Census of 1986 (3 parts).

- Egypt in Figures: Annual Bulletin.

- Birth Bulletin: It includes estimates of population; and the numbers and the rates of births and natural increase in Egypt; and some population indicators, issued annually in June.

- Death Bulletin: It includes estimates of population; and the numbers and the rates of deaths and natural increase in Egypt; and some population indicators, issued annually in June.

- Marriage Bulletin: It presents some demographic and socio-economic features, includes the crude marriage rate, distribution of marriage contracts by governorate and month, issued annually in June.

- Divorce Bulletin: It includes the crude divorce rate, distribution of divorce certificates by governorate and month, issued annually in June.

- Population Bulletin: “Research and Studies”: A biannual bulletin issued in January and June.

4-3. Developmental Roles of the Population Census of 2017 in Egypt

As indicated earlier, comprehensive population statistics play an important role in forming socio-economic development processes by providing necessary data to planning authorities to prepare comprehensive development plans, programs and initiatives necessary to implement them, in addition to follow-up processes and assessment of implementing the plan.

The Head of CAPMAS stressed on this peculiarity in a seminar entitled **“Public Awareness of the General Census of Population, Housing, and Establishments - Improving the Planning System”**, which was held by INP in 2017, where he referred to the importance and role of censuses in helping those responsible of forming development plans to follow the right way towards socio-economic development; relying on data that reflects the actual population conditions.

In addition, in a press conference on July 15, 2017, Minister of Planning, Follow up and Administrative Reform declared that the Ministry is to prepare data bases for all development fields, and referred to the importance of population census and its major role in this regard. She

also formerly referred to the importance of the population census to form an accurate development plan, where she stressed on the importance of population census for Egypt, indicating that it is impossible to form a sound development plan without accurate data; which will be achieved by the 2017 Population Census.

4-3-1. Censuses and Population Indicators

Population census contributes to providing many data and indicators that relate to the age-sex structure of the population and other population characteristics, which helps decision takers and policy makers to adopt suitable policies to all population groups.

The following show some population indicators that can be calculated using census data:

a. **Population Size**: It also includes their age-sex structure; geographical distribution within the country; the individual income levels to enhance allocation of resources and public services; the number of new entrants into the labor market and their needs of job opportunities.
b. **Expectancy of Life at Birth and Mortality Rates:** It is a hypothetical expectation that represents the maximum expected life of a person in a specific community. It reflects not only the health progress enjoyed by individuals in the country, but also the quality of life enjoyed by such individuals. Thus, this indicator differs according to the level of development among communities.
c. **Infant and Child Mortality Rates:** This indicator also differs among communities, as it is greatly affected by the level of development in health care, and housing conditions as for the availability of pure water and sewerage system, etc.
d. **Families having Safe Water and Sewerage:** United Nations organizations (such as UNDP) focus on the extent to which population benefit from safe water, because unsafe water is among the direct causes of many diseases, especially in developing countries.
e. **Education:** It is a controlling factor in raising the national human capital and level of knowledge, on the one hand, and enhancing sustainable socio-economic and innovative transformation in the community, on the other.
f. **Labor Force and Workers:** These are the individuals belonging to the labor force in the age group (15-64) and contributing physically and mentally to any economic activity related to the production of goods and services.
g. **Unemployment:** It includes individuals in the working age, who did not work at all during the reference period, and they had the desire and ability, and looked for work. The expanded definition of unemployment means the percentage of unemployed individuals to the total active population. This indicator, of course, has its great socio-economic importance.
h. **Income and Spending:** Income relates to the material return obtained by the individual for his work, while spending relates to the individual consumption of different goods and

services. This indicator relates to the different economic conditions and variables, including market conditions and saving.

4-3-2. General Census of Population, Housing, and Establishments, 2017: a Future perspective.

It is of great importance to emphasize that conducting a population census implies investing great efforts and very expensive costs. Preparations for censuses have many professional, organizational, and administrative difficulties. Therefore, new mechanisms - different from those of previous censuses - have been developed to carry out the census of 2017 to use modern technology in data collection stage - which canceled many paper stages - in addition to data entry, performing electronic data analysis, concluding preliminary results, until publishing the final results. The large size of official data provided by the census - in addition to other official statistics - raises many questions about the role of administrative records, and the possibility of transforming them into statistical records.

4-3-2-1. Conditions of Transforming Administrative Records into Statistical Records

There are increasing recommendations by international organizations to maximize utilization of data of Administrative Records already available to the official agencies in any country, where the components of such records constitute the infrastructure for the statistical data-bases. In this regard, the fifth principle of the basic principles of official statistics issued by the UN states that:

Principle 5 – Sources of Official Statistics

“Data for statistical purposes may be drawn from all types of sources, be they statistical surveys or administrative records. Statistical agencies are to choose the source with regard to quality, timeliness, costs and the burden on respondents”.

Also, the meeting report of the Statistical Commission of the ESCWA, the thirty- seventh session 2006, included the following:

‘A mechanism should be established to obtain the most important sources of official statistics for national statistical offices from administrative records, and competent ministries that can provide development indicators, and extraction of gender and geographical area data. In particular, coordination should be carried out with ministries concerned with health, environment, energy, buildings and public works, as well as the development of administrative records for vital statistics, social security and labor”.

Moreover, the first principle of the basic principles of official statistics adopted by the Statistical Commission of the UN, in its special round of 1994, states that:

“Official statistics provide an indispensable element in the information system of a democratic society, serving the Government, the economy and the public with data about the economic, demographic, social and environmental situation. To this end, official statistics that meet the test of practical utility are to be compiled and made available on an impartial basis by official statistical agencies to honor citizens' entitlement to public information.”

The recent developments in the field of computer and information technology increased the importance of Administrative Records in statistical work, and using such records as a means to produce official statistics at a higher level of accuracy and credibility, of which, the most important is the Civil Registry, which is used in most countries, to register the civil and vital statistics, such as births, deaths, marriages, divorces, etc.

Accordingly, the most important determinants and conditions of transforming administrative records into statistical records are as follows:

- **Availability of a supporting legal and legislative framework**, to organize using such data for statistical purposes, and the role of national statistical agencies in this regard, in addition to passing items relating to the detailed definition of data protection. In fact, many countries passed such legislations.
- **Community acceptance and approval**; where these records contain personal data at the individual level, which raises the issues of protecting privacy in the community.
- **Establishing a unified system to determine the natural and legal identity**, where there must be an accurate determination of the basic records to be used in producing such statistics, and use unified systems for identity across different sources, which facilitates linking different records to produce such data.
- **Developing accurate and updated records**, due to treatment with multiple and interlinked systems, such as the social security system and the tax system, etc. Such records are mostly related to systems administered by the state, thus, it will be necessary to establish such records at the country level.
- **Cooperation with all agencies** holding or administering such records, including all governmental agencies or local units, which requires plans for coordination cooperation, and obligation by all concerned agencies.

Thus, CAPMAS should make an effort to develop a census based on the system of administrative records, which directly enhances close cooperation among agencies holding such records and the responsible national statistical agency, i.e., CAPMAS.

Figure (4-3) The Structure of the Records- Based Statistical System.

4-3-2-2 Basic Records that can be used to Provide Census Data at CAPMAS

The system of Administrative Records contains an updated information on individuals residing in the country, on housing and establishments as well, and on companies, businessmen, and self-employed.

The Administrative Records include the following:

a. **Population Information System** (including also data on housing and establishments): It contains basic data of all citizens and non-citizens permanently residing in the country, in addition to data on buildings and projects of building houses.

b. **Real Estate Information System**: It contains register of real estates, areas, and all the rights related. The agencies concerned with such records include: the National Survey Authority, Ministry of Justice, Local Units, and Local Courts.

c. **Business Information System**: It contains basic data on companies and business organizations. The agencies concerned with such activity include; Patent Registration System, Tax Authority, professional associations of businessmen, and CAPMAS.

d. **Other Records**: These include records of taxes, employment, retirement pensions, work applicants, educational certificates, buildings and houses, and students' records, which cover all students in educational institutions following the primary stage. Figure (4-4) indicates the relationship between administrative records and statistical records.

4-3-2-3. Statistical Operations Necessary to Prepare Administrative Records:

Before beginning the processes of organizing administrative records, there are some statistical operations and considerations that should be taken into account as follows:

- **Adjusting data in current administrative records** and treatment of missing data to be compatible with data hold by CAPMAS and the stated statistical requirements.
- **Matching and choosing using a unified number**: For example, all incomes received by an individual can be collected from different records; in addition to selection of population in the age group (15-64).
- **Processes of time reference and creation of goals derived from records**: For example, the creation of the variable of "Households" by gathering the individuals belonging to that household together: husband, wife, and children.
- **Creation of variables derived from the records**: For Example, the total income and type of the household, etc.

Figure (4-4) The Relationship between Administrative Records and Statistical Records

It is of great importance to refer to that creation of a new integrated register does not necessarily imply using a very new administrative register. According to the international experiences in this respect, there must be intensive prior operations on the administrative data, with emphasis on the importance of using many administrative sources. In other words, accessing the administrative records is very important, but production of statistics cannot be achieved without passing through mechanisms and conditions of the national statistical system administered by CAPMAS.

4-3-2-4. Securing Quality of Data

Quality of data is secured through some steps as follows:

- Communicating with holders of administrative records by CAPMAS.
- Inspecting data obtained by CAPMAS.
- Inspecting and analyzing the volume and causes of missed values, incompatibility, or inconsistency, and reporting them.
- Assessing the quality of data of individuals and variables.
- Keeping and maintaining the Administrative–Based Census records.

It is noteworthy that there are four differences between administrative records and statistical records as follows:

- The purpose of creating the register,
- The rules related to the individual objective,
- Methodology applied in case of having errors in both records, and
- How to treat the administrative data for statistical purposes.

The best international practices in this regard indicate how to build the structure of the administrative-based census system by adopting the following two conditions:

a. Preparing a clear conceptual framework for all used terms and unifying statistics and information systems related terms.
b. Determining the natural groups within each register: Such as individuals and households, where there are relationships among these groups. Such relations are very important for the statistical and administrative purposes. So, there should be linkages within one of the two systems. Figure (3-5) shows the relation between the basic records and other records, in addition to the linkages used.

4-3-2-5. Steps of Building the Automatic System based on Records.

The steps of building an automatic system based on administrative records include the following: Developing applications using the basic register, developing applications using administrative sources, one application for each register, and developing advanced applications by integrating data extracted from different statistical records.

There should be a framework to include the variables as one of the important pillars in establishing a statistical record, as follows:

a. **Defining the variables included in the register**; as the variable is the character that can be measured for the identity or the unit on which data is collected. Variables can be divided as follows:

   - **Main internal variables**: That are collected from administrative records or the census, and included in the register.
   - **Derived internal variables**: These are created using a number of variables within the register.
   - **Main external variables**: These are entered into the register using another register within the system.
   - **Derived external variables**: These variables are created using a number of other variables from another register in the system.

b. **Forming Concepts for Variables**: This concept should contain a definition of the identity on which data is collected, the related variables, and the point or period of time reference. Also, this definition is to include how to measure variables and the bench mark. This applies to all variables derived from the basic register or any other register.

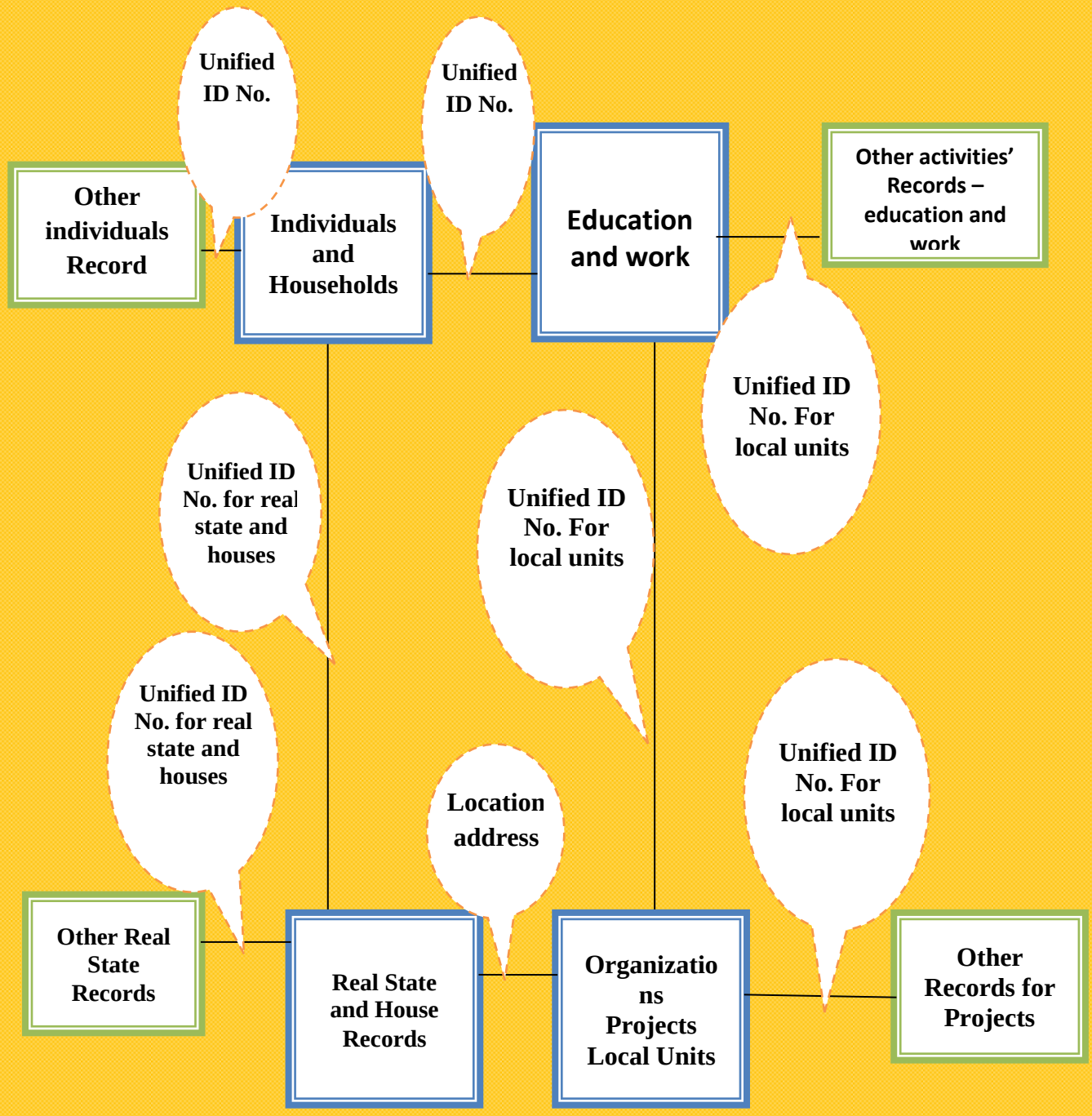
c. **Unification of Variables in the Records**: These variables are used to produce many statistics.

d. **Creating the Variables of the Register**: The required variables are obtained from different sources, taking into account that records will be a part of the system that will produce the required outputs.

e. Creation of Derived Variables Using Models: There are four types of variables as follows:

   - Variables derived by dividing into groups according to values or groups.
   - Statistical variables derived by operating some calculation process or logical operations using many variables within the administrative records from the data matrix.
   - Variables derived by linking a variable from another register related to a type of other entities in the basic register related to the targeted entity.
   - Variables derived by compiling the variable from another register. For example, household income is compiled by adding the values of the variable for all members of the household.

Figure (4-5) Basic and Other Records and their Inter Linkages



Source: Wallgren, Anders and Britt (2007) "Register-Based Statistics: Administrative Data for Statistical Purposes". Sweden: Statistics Sweden-Wiley Series.

Significant variable can be obtained using a number of variables derived from administrative records. It is, however, important to differentiate between the previous four types of variables, even when using statistical symbols, to establish a reliable unified concept in handling such variables.

In addition, there is another important classification, which should be taken into account when dealing with the variables, where it is better to classify variables as follows:

a. **Variables from different sources**: There are variables from the main or local register, while others are brought from different sources. Also, there is a primary variable and a derived variable.

b. **Variables with different functions in the system**: There are six types of variables that must be differentiated according to their functions or roles in the registration system as follows: definition variable, communication or contact variable, reference variable, time reference variable, technical variables, and actual statistical variables.

c. **Variables used to perform the process of conformity**: When the processes of conformity between two records are performed, three new entities emerge: First, the conforming entities between the two records. Second, data is not conforming in the first register. Third, data is not conforming in the second register. The aforementioned results should be registered and kept accurately. Also, when the conformity process is performed for three entities, new seven entities emerge.

4-3-3. Advantages of Administrative-Based Censuses Compared to Traditional Census:

There are many measures to determine the advantages of adopting the methodology of the administrative-based census, where the UN published a booklet entitled "Using Administrative and Secondary Sources for Official Statistics: Guide of Principles and Practices", where it indicates the following advantages of using administrative records:

- **Low cost**: In many cases, access to administrative data is free, especially when data is of government or public source.
- **Reduce the burden of response rate**: Using data from administrative sources limits the burden of response to questionnaires of population censuses and sample surveys, where the burden to response represents the basic obstacle in collecting data through questionnaires in many countries, including Egypt.
- **Periodicity of the procedure**: Reducing costs and burdens is related to another advantage of using administrative sources, that it allows the production of data repeatedly without the burdens of response or cost.

- **Inclusiveness**: Administrative sources mostly completely cover the targeted part of the population; decrease or cancel the survey errors and non-response rate; and provide more accurate and detailed estimates of data elements.
- **Concurrency and Modernity**: Using administrative sources may affect the timing of statistical output due to the ability to access the most needed and updated data on time, while censuses and sample surveys consume longer time to benefit from their outputs.
- **Improve the government image before the public opinion**: Exchanging data among government circles may improve the image of government before the public opinion; reduce the costs of collecting data; and reallocation of resources to other service sectors related to the life and interests of individuals, such as education, health, or housing.

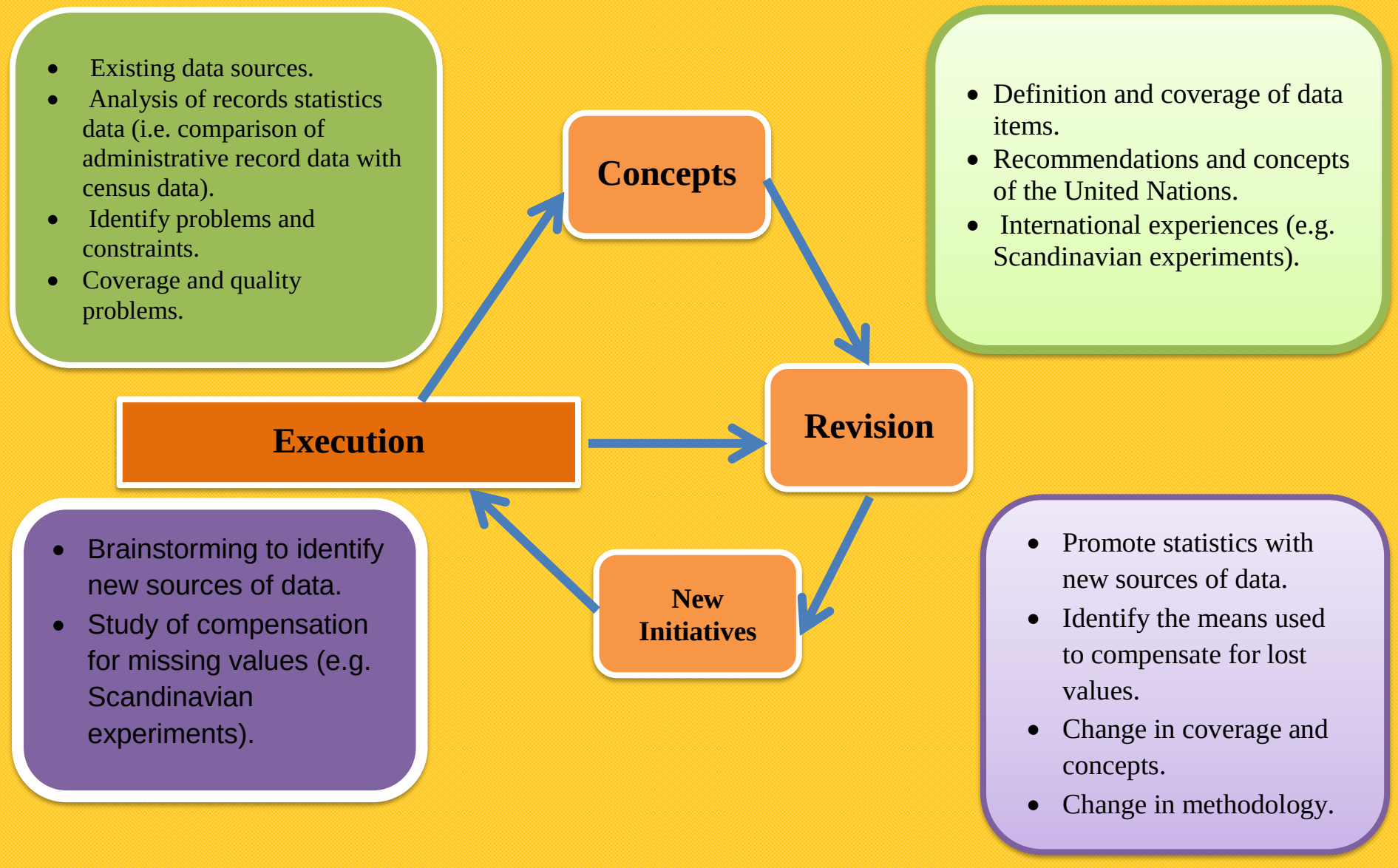
In the following, Table (4-2) shows the most important advantages of the administrative-based census compared with the traditional census, and Figure (3-6) shows a presentation of the methodology of developing the administrative-based census.

Table 4-2 Characteristics of the Traditional Census versus the Administrative-Based Census

Item	Traditional Census	Administrative-Based Census
Costs of Data Collection	– Costs related directly to field work (Costs of training, collectors of data, transport, materials and services used to collect data). – Costs not related to field work (Costs of processing, analyzing; and publishing results and reports.	– No costs related directly to field work. – Costs not related to field counting (Costs of processing, analyzing; and publishing results and reports.
Individual Counting	– Collecting detailed information of each individual (sometimes individual data is obtained from Other source)	– Collecting detailed information of characteristics of each individual from its original source, with the possibility of checking validity of such information from another source
Coverage in a Specified Location Area	– Methodology of the One Questionnaire: Where one form of the census questionnaire to count all individuals included in the census in a specific region. – Methodology of the two Questionnaires: The short questionnaire (quick count) counts all individuals in the specified region. As for the detailed questionnaire (sample), there are persons not included in counting, but represented in the final results	– Counting includes all individuals belonging to a specified region, who are registered in the administrative records. – The central population record is filled with all characteristics from sub-records.

Item	Traditional Census	Administrative-Based Census
	of the census, where data is collected concurrently with the short questionnaire.	
Concurrency	– Census data is related to a specific point of time. So, in case of collecting data on a previous reference period (the previous week, for example), this period is expressed relative to the count moment (for example, it is called "the week preceding the count moment".	– Data is extracted from administrative records according to the individual status at the moment stated for count, on the condition that administrative records are updated at the time of extracting the census data.
Periodicity of Conducting Censuses	– In principle, census is conducted every ten years at least.	– It is according to the needs of decision taking: yearly, every five years, or every ten years.
Efficiency of Results	– Data may lack accuracy and need statistical processing. This relates to respondents who refuse to respond, hide, or forget information, etc.	– Data collected from administrative records enjoy some relative advantages as for accuracy and credibility, because it comes from the source, i.e., the individual.
Responding Burden	– There is a burden to fill the questionnaire, even in the presence of a counter or a researcher.	– It absolutely gets rid of the responding burden on respondents.
Rate of Non-Response	– There is always a degree of non-response and rejection on the part on respondents.	– It absolutely gets rid of the non-response rate (equals zero).
Forming a Positive Public Opinion	– There is discomfort as for exchanging personal data with researchers, as they are foreigners.	– It enhances the positive image of government before citizens by reallocating resources for the sake of citizens and enhances the efficiency of government administration.

Figure (4-6). Methodology of Developing Statistics Based on Administrative-Based Census.



In the light of the aforementioned, the revision of many related sources, many interviews, revision of the roles of CAPMAS locally and globally in the framework of Data Revolution, the required new methodologies and developed systems for population data, the following experiences can be concluded as follows:

- There are common features as for the population issue - globally and locally - with negative impacts on sustainable development, especially the gap and irrelevance of the relationship between population growth and available resources, that impose many pressures on all fields of human life and activity; negative pressures on public services and utilities; many socio-economic and environmental problems, that negatively affect the ability of different developing countries - including Egypt - to achieve the targeted SDGs.
- There are many aspects of population challenges in Egypt, such as the continuous annual growth in the number of population; the imbalanced spatial distribution - where population is concentrated on only 7.7% of the total state area, the negative reflections on population characteristics as for dependency ratios, illiteracy and education; the increasing number of households under poverty line; the retreating woman status in general and the low level of female employment in particular; and the negative reflections of population growth on per capita share of public services, environmental conditions, and quality of life.
- There are many approaches to face population challenges and the role of data and information systems, such as integrating the population component into development policies and plans, concentration on poverty and marginalized groups in the society, geographical redistribution of the population, expanding community participation in dealing with population issue, and paying more attention to data-bases and population information systems.
- There is a long history of interest in population data to enhance development, which began from the age of the Pharaohs to the present time, where the analyses of the 2017 census are currently being conducted by CAPMAS using modern technologies in preparing and conducting the census for the first time.
- Importance of population data to enhance sustainable development, where data plays a controlling role in formulating socio-economic and environmental sustainable development by providing accurate data to planners, decision takers, and policy makers to prepare development plans with different time frames, forming programs and initiatives necessary for implementation, supporting activities of assessment, follow-up, and impact evaluation.
- There are many sources and outputs of population data in Egypt, which include population censuses, demographic sample surveys, and administrative records. Also, there are many statistical outputs by CAPMAS, such as annual statistical yearbooks, bulletins of births, deaths, marriage, and divorce, in addition to the results of population and housing censuses.
- Approaches of developing population censuses into administrative-based censuses, as a result of developments in the field of computing in general, and in the field of computing and

mechanization of administrative records in the statistical work to achieve more accuracy and credibility, especially in civil registration.

- Basic conditions of success of transforming population censuses into administrative-based censuses are mainly the specific and suitable legislations; community acceptance due to taking care of secrecy and protection of privacy for some data; developing computing systems for administrative records and data; and mutual cooperation between the national statistics agency (CAPMAS) and other agencies holding organized records in the country.

CHAPTER FIVE

Challenges of Developing the Data Ecosystem in Egypt

In forming the challenges faced, the Report depends on the results of the four previous chapters, which presented more explicit or implicit message as for the challenges facing the Data Ecosystem in Egypt. In addition, the presentation depends on the reports of assessment of the national statistics system in which CAPMAS participated with important related global and regional agencies, such as PARIS21, AFDB, ECA, and ESCWA.

The presentation also depends on the results of interviews with officials inside and outside CAPMAS.

5-1. Challenges related to strategic planning and policies and the relation to sustainable development:

a. **Absence of strategic guidance and planning of CAPMAS work**, where work is performed on an annual or medium-term basis, which limits the capacities and prospects of development according to a long-term vision.
b. **Absence of an Egyptian national strategy for statistics** as is the case in most developed, emerging, and developing countries, including African and Arab countries. Recent global reports (Paris21, 2017) refer to shortage of such strategies in Egypt, which is also referred to by the Assessment Committee of CAPMAS Work (Bahjat, 2015).
c. **Absence of a national strategy for Big Data,** especially in the light of the developments related to Data Revolution and the attitude of countries and economic blocks to adopt such type of strategies.
d. Presence of gaps in concepts and data among agencies concerned with sustainable development, especially Ministry of Planning, Ministry of Investment and International Cooperation, and CAPMAS, as for mechanisms, indicators, and conclusions of monitoring and evaluating SDS and the related development plans.

5-2. Challenges related to empowerment and governance of Data Ecosystem: human, legislative, financial, institutional, organizational, ethical, and cultural challenges; in addition to follow up and assessment of the system, as follows:

a. Challenges related to the legislative framework of statistical work, which include:

- Obsolescence of the legislative framework of CAPMAS work, which dates back to 1964 as stated in the Report, which is unsuitable for the modern statistical systems, incompatible with the global leap of Data Revolution, which affects all national statistical systems all over the world.

- Lateness of preparing and passing the new statistics law: In spite of the many efforts to develop a new law for statistical work, in collaboration with global and regional specialized agencies, it has not become effective yet.

b. Challenges related to organizational and legislative frameworks of data community in Egypt, including:

- Delay of passing the Freedom of Information Act and other acts related to electronic crimes, protection and secrecy of personal data and information, and electronic mass media.

- Delay of revision and development of Intellectual Property Law, which is considered one of the legislative requirements for SDS.

- Absence of legislative or procedural arrangements to organize uses and partnerships with new and emerging data communities, such as: mobile phones data, social media data, etc.

b. The problem of statistical human resources, which has many aspects as follows:

- Experience draining at CAPMAS, where about 70% of labor force is over 50 years old, which imposes the threat of depleting human statistical experiences within few years.

- Shortage of technical and human resources and capacities at data sources, which negatively affects providing data and indicators at the planned and agreed upon timings.

- Shortage of statistician abilities to treat with data bases, including abilities to enter, analyze, and treat with outputs according to required quality measures.

c. Challenges related to statistical concepts, methods, and systems, including:

- Gaps in controlling and unifying statistical concepts and definitions, and methods of calculating measures among related agencies and parties in the framework of the national statistical system.

- Challenges of production, regularity, coverage, or details of some statistics, including those related to sustainable development, such as climate change, national accounts, vocational training, tourism, education quality, governance, aged population, handicapped and migrants, administrative registers, etc.

- Gaps in periodicity and timing of publishing some data, especially those related to population censuses that are carried out ten years apart.

- Challenges of statistical samples in some household surveys, and challenges of coordination with the Ministry of Planning as for national accounts.

d. Institutional challenges, especially with other concerned agencies and parties:

- Problems in mechanisms and methods of identifying user's needs, especially in the absence of effective work programs to provide statistics and data to the actual and real users.

- Increasing numbers and types of parties and data communities related to the national statistical system, such as government agencies, public authorities, private business sectors, different occupational organizations, the civil society with its different spectrum, citizen groups, etc. Such increase imposes restructuring of CAPMAS as an organizer of the statistical work in Egypt.

- Stopping or retreating statistical production of data by some agencies in the country, which widens the gaps of data as for some fields, activities, or sectors in the country.

- Obsolescence of data systems at many agencies, and the continuous dependence on the paper systems of registers, rather than the organized data-bases.

e. Challenges related to measures of sustainable development, such as:

- The need to integrate new sources to fill the gap in data required, including sample surveys.

- Shortage of technical support to integrate some indicators into the used tools to collect data.

- Shortage of specialized technical support to use models and statistical estimates to calculate projections or forecasting some indicators of sustainable development.

f. Organizational challenges within CAPMAS and the related units, such as:

- Problems related to efficiency of statistical units within different agencies, including shortage of cadres, coordination and integration between such units and CAPMAS, gaps between statistical activities, etc.

- Problems of coordination and cooperation at the local level: among regional statistical units and many related parties at the governorate level.

g. Challenges related to finance of statistical work, including:

- Shortage of governmental finance, which negatively affects performing vital statistical activities.

- Shortage of finance of the business sector due to weakness of communication channels with the private sector as one of the important data communities in many international experiences, especially in the light of the Data Revolution and multiplicity of data communities, especially the private sector with its companies, organizations, unions and syndicates.

5-3. Technological challenges: Infrastructure and platforms, Data Revolution, Open, Big, and Administrative Data, geographical information, innovations in data analysis and computing:

- Slow expansion of using modern technological tools, applications, and systems, including Big Data, GIS, Cloud Computing, etc.

- Problems related to handling Big Data, such as:

  - Absence of a procedural or legislative framework to organize handling Big Data, the roles of different players, and data communities in this field.

  - Shortage of the culture of modern handling methods, where traditional programs have no value in handling huge data sizes anymore.

  - Challenges related to administrative registers/data, including;

- Incomplete or incomprehensive administrative records, which makes it difficult to transform into statistical registers.

- Shortage of a unified number for economic establishments, which cannot be given to any other establishment, even after closure or end of activity. Such a number is to be the only number for the establishment to treat with all sources.

- Shortage of mechanization of all administrative sources, which can facilitate the linkages between CAPMAS and different administrative sources.

- Shortage of unified classifications that can be used by administrative sources, which can facilitate data exchange among different agencies and CAPMAS.

- Challenges related to expanding the role of Cloud Computing in the national statistical system, including:

  - Shortage of finance necessary for the related hardware, software, and technological infrastructure.

- Continuous development of human resources through training inside and outside the country.
- Challenges related to coordination and integration among data centers, especially in the governmental sector, which hinders efforts of building and spreading public clouding services.

5-4. Challenges related to forms and types of relationships and partnerships, coordination, and integration at global, regional, and local levels:

- Shortage of coordination and partnership with planning agencies, especially Ministry of Planning, that is responsible of implementing and assessment of sustainable development strategy and plans in Egypt.

- Shortage of coordination and partnership with Ministry of Investment and International Cooperation, that became a vital actor as for implementation of SDGs in Egypt, as indicated by the Report.

- Shortage of coordination and partnership with Ministry of Communications and Information Technology - MCIT, although the Ministry is responsible of many projects of digital transformation and building and developing data-bases in different fields.

- Gaps related to follow up of the related global and regional developments, and forming and publishing periodical systematic stock of global and regional experiences and lessons learned to develop statistical work and data systems in Egypt.

CHAPTER SIX

Building and Developing Capacities of Data-Ecosystem in Egypt to Enhance Sustainable Development in the Context of Data Revolution - Future Look

Different chapters of the Report, including Chapter Five on the challenges, produced a set of important experiences that can be considered as starting points for the future stage in which the role of National Statistical System –NSS and agency can be supported to enhance different fields of development in the country, and enhance state efforts to carry out sustainable development strategies and plans. In this regard, it is necessarily possible to benefit from new rules and directives related to data revolution and data ecosystem to enhance sustainable development, especially those of Cape Town Action Plan on Sustainable Development Data (HLG-PCCB, 2017).

6-1. Legislative Development of National Statistical System and Activity in the Light of Related Local, Regional, and Global Developments

It is of great importance to develop a national statistical system within system governance efforts according to global experiences and standards. In this regard, the Report presents the following suggestions:

a) **Passing a new legislation for statistics** that takes into account some, or all, of the following considerations:

- **Compatibility with regional and global trends** and attitudes as for concepts, measures, methodologies, calculating methods, and statistical system governance to enhance sustainable development.
- **Building effective governance in dealing with Key issues and mechanisms such as:** data collection, producing data and statistics, publishing statistics, quality, reliability, and secrecy of data and statistics.
- **Building effective relations, roles, and partnerships in the framework of national statistical and data ecosystem** to support decision takers on the one hand, and the average citizen on the other, to prevent role intervention or contradiction, or increasing costs.

b) Passing complementary legislations, special laws, ministerial decrees, or codes of conduct for some statistical issues of special interest, such as:

- Big Data
- Administrative data and records

- Open Data
- Satellite and Aerial data
- Cell phone records
- Geographical spatial systems, and GIS
- Financial transactions records

c) **Complementing legislations related to controlling and organizing information** society in Egypt, especially:

- Freedom of Information Act
- Electronic Crimes Law
- Privacy and Personal Data Protection Act
- Developing intellectual property protection laws

6-2. Mechanisms of Planning and Policies, and Providing Data Necessary to Support Sustainable Development Strategy

Cape Town Action Plan on Sustainable Development Data (2017) - in addition to Morocco Action Plan for Statistics - concentrates on importance of strategic planning role in developing statistical systems and activities, and national data ecosystems. Accordingly, and in the light of reviewing statistical challenges in Egypt, the Report presents the following suggestions:

a) **Forming a national strategy for statistics in Egypt**, to consider the following aspects**:**

- **Compatibility with, and enhancing of, sustainable development strategy,** development plans and programs in Egypt, and national strategy of anti-corruption.
- **Determining roles of official statistical agency and other concerned agencies** related to formal statistical activity in the country, so as to secure meeting sustainable development needs of data and statistical support.

b) **Translating national statistical strategy into practical and applicable policies, objectives, and work programs** - according to available resources - that are related to strategies, policies, and programs of sustainable development.

c) **Enhancing communication among planners, public policy makers, and national statistical agency,** to identify common needs of partners and deepen the planner understanding of the role of data and statistics in sustainable development.

d) **Enhancing CAPMAS role in dealing with some critical development issues,** such as population issue, and other governing issues directly related to sustainable development, such as:

- Climate change and environmental deterioration
- Poverty and social justice
- Informal sector
- Urban growth and expansion
- Gender statistics
- Disability statistics
- Child labor
- Modern national accounting systems
- Environmental economic accounts

e) **Enhancing and developing roles of Sustainable Development Unit at CAPMAS** to enhance its role in supporting sustainable development and statistical system of the country, on one hand, fill gaps and build capacities related to some data and indicators, on the other.

f) **Studying outsourcing of some statistical activities and services** in the light of regional and global experiences that are suitable for the Egyptian conditions.

g) **Adopting policies to enhance CAPMAS role at regional and global levels -** including Arab and African levels, and south/south - in addition to enhancing its participation and roles at the international level as for statistics and sustainable development issues alike.

6-3. Improving Governance and Empowering Data Ecosystem: Supporting Procedures and Environments, Monitoring, Evaluation, and Conclusion of Continuous Improvement Experiences:

a) **Developing statistical awareness and cultures** of new data and statistics in the community, to pave the way for all (institutions and individuals) to create values, opportunities, and rational effective decisions based on understanding the value and role of new data in developing economies, institutions, individuals, and communities as well.

b) **Training to develop professional statistical human resources** at all levels, not only in the government sector, but also in business sectors, educational systems, NGOs, especially with variety of data communities in the light of data revolution.

c) **Redefining data communities to enhance comprehensive and sustainable development** in the light of continuous statistical learning and experiences of different countries. Table (6-1) presents a suggested framework for sources and goals of sustainable development.

d) Presence of many new perspectives for statistical research and studies, such as:

- Studying defining features of data-based economy in Egypt.
- Role of data and statistics in enhancing digital and information communities and economies.
- Role of data and statistics in creating new business opportunities, small and unspecialized entrepreneur opportunities, NGOs, and different data communities across the country.

e) Developing statistical tools and methodologies, including developing traditional surveys, household surveys, social surveys; methods of collecting, analyzing, and publishing data.

f) Developing population censuses into administrative data/registers censuses through the following suggestions:

- Presenting a clear conceptual framework for all terms used, and unifying statistical and information system terms.
- Determining natural groups within each register, such as individuals and households, due to presence of relations within such groups that are important for both administrative and statistical purposes.

Table 6-1 Suggested Framework for Data Sources and Tools Related to Sustainable Development Goals

Statistical Sources and Tools	Indication & Statement
Censuses	Regular registration of data of all community individuals in the country.
Household Surveys	A sample of randomly selected households to provide data on demographic and socio-economic characteristics.
Agricultural Survey	Surveys of fields and individuals working in related institutions, including data on crop yields, economic variables, and influential environmental data.
Geographical Spatial Data/Infrastructure and Storage Places	Specific data and information on sites (including inputs of other data sources mentioned above) spatial photography, including storage places and basic geographic data layers.
Civil Registration and Vital Statistics	Including all vital data such as birth, marriage, divorce, adoption, and death.
Administrative Data	Information basically collected for administrative purposes, such as social care, taxes, educational system registers, etc.
Economic Statistics	Measures of financial and economic performance, including labor force, employment, imports and exports, and other industrial activities.
Environmental Data	Continuous monitoring through ground stations, satellite photography of a group of environmental variables, including biological diversity, air quality, water resources, forests, change in land use, etc.

Source: Khashabah, et.al. (2016) cited in: - The SDSN and Open Data Watch Ahead (2015) "Data for Development: An action Plan to Finance the Data Revolution for Sustainable Development."

g) **Looking for non-traditional alternatives to finance statistical work,** such as:

- **Statistical projects with data communities in business sector** in collaboration with professional organizations of the private sector, such as Federation of Chambers of Commerce, Federation of Industries, and investors associations in industrial cities, etc.
- **Joint statistical projects with data communities** in civil society.
- **Joint statistical projects with universities**, research centers, and other entities of scientific community.

h) **Re-governance of roles of regional statistical departments** in the light of new interests in local development through the following approaches:

- Forming mechanisms of integration and coordination with Information and Decision Support Centers in different governorates (this can be achieved through joint projects of data and statistics).
- Intensifying human capacity building programs at regional statistical branches and administrations according to development requirements in statistical and data systems in the world.

i) **Developing systems and capacities of estimating expected demand for data and statistics in the society** to prepare proactive arrangements and mobilize resources to meet expected demand for data and statistics in different development fields and sectors in the country.

6-4. Utilizing New and Emerging Data Communities for Community Development

a) **Studying forms of utilizing social media data** to enhance development fields, such as public opinion surveys, applications of raising awareness, marketing community thoughts, identifying and marketing public services.

b) **Concluding partnerships between CAPMAS and communications companies** to carry out applications that depend on mobile phones records to enhance some vital sectors such as tourism and travel, health and population statistics, in the light of international experiences.

c) **Activating role of civil society data in sustainable development** through:

- Classifying civil society data-bases to relate some of them to different social issues - such as women, children, and disability issues - in addition to some professional organizations such as Federation of Industries and chambers of commerce.

- Relating civil society data-bases to national data-bases, especially at CAPMAS, to enhance coordination efforts, on one hand, and direct resources to the needy social categories according to reliable data, on the other.

d) Completing projects of geospatial data to enhance national planning process through new partnerships and projects between Ministry of Planning, CAPMAS, National Remote Sensing and Space Sciences Authority, and Egyptian General Survey Authority.

6-5. Developing Infrastructure and Technological Solutions to Produce, Distribute, and Publish Data Internally and Externally

a) Studying establishment of specialized institutes and centers for data similar to regional and global experiences, such as:

- Establishing specialized organizational unit for Big and Open Data (institute or center) affiliated to CAPMAS. It can be established in collaboration with universities, CAPMAS, INP - or any other local agency - with global, Arab, and African partnerships.

- Establishing organizational unit for cloud computing (institute or center) affiliated to CAPMAS to develop and enhance statistical activities technologically, in collaboration with universities, research centers, and Ministry of CIT.

- Integrating administrative data and registers into work programs and applications of the national statistical system.

b) Developing joint programs and projects between CAPMAS and Ministry of CIT in the following fields:

- **Enhancing infrastructure and technological** computing capacities to process and analyze Big Data and different digital projects.

- **Using modern computing applications,** such as cloud computing, to enhance national data and statistical system.

- **Developing specialized electronic portals and gates** to publish and exchange data, and enhance digital transformation in the community, such as the Egyptian Government Open Data Platform, health and education platforms, climate change platform, etc.

- **Organizing uses of phones and postal records** and other important data sources by the Ministry to enhance national capacity to produce and handle data to enhance development.

c) **Encouraging invention and innovative solutions to enhance national data and statistics system** through the following:

- Communicating and networking with all national data communities, and encouraging them to present solutions and initiatives to create better opportunities to use data in improving life quality in all fields in Egypt.
- Allocating national prizes to inventors and innovators in the field of handling and administering data - to be granted to individuals, agencies, or institutions - in collaboration with Egyptian universities.

6-6. Enhancing and diversifying partnerships and cooperation - internally and externally - to enhance sustainable development in Egypt

a) **Forming continuous joint work-teams between CAPMAS and Ministry of Planning** to be interested in the following:

- Issues of continuous development of indicators and data sources related to SDGs and SDS.
- Integrating policies and programs related to Big Data, Open Data, and Administrative Data into annual and medium-term development plans.
- Utilizing and coordinating related current and continuous programs and projects, especially the project of completing and relating national data bases (National Project of Integrated Data System).

b) **Signing a joint collaboration protocol** between CAPMAS and Ministry of Investment and International Cooperation to coordinate, exchange, and integrate experiences related to sustainable development issues inside and outside the country.

c) **Preparing a joint work program with Information and Decision Support Center** as for establishment of (Egyptian Open Data Portal) to enhance planners and decision takers, enhance trust between citizens and government agencies, enhance transparency and accountability in community, and improve efficiency of performing and delivering public services.

d) **Developing programs and partnerships** with different universities and scientific research centers to enhance developing new data and statistical systems, and utilize capacities of regional universities in developing statistical branches in different governorates.

e) **Signing a cooperation protocol,** and forming joint work teams among CAPMAS and some government agencies, to develop new data projects and administrative registers in the country. For example, joint projects with tax agencies assume high priority.

f) **Diversifying partnerships**, providing necessary finance and technical support with foreign concerned agencies, especially in rapidly changing and developing fields, such as Big Data, Open Data, Satellite Data, and Social Media Data.

6-7. Developing Mechanisms and Systems of Statistical Monitoring and Evaluation

a) **Developing integrated systems of monitoring, evaluating, and measuring impact of national statistical system,** according to international measures in this regard, to indicate the developmental impact (cost - benefit) of developing data and statistics systems and projects in different development fields to all concerned parties in the country.

b) **Relating indicators of evaluating the statistical system to contribution to enhancing sustainable development plans and programs,** by collaboration between CAPMAS and Ministry of Planning.

CONCLUSION

The main objective of this Report is to present a vision for the Data Ecosystem within the framework of the national statistics system to enhance achievement of the SDSs-2030. The six chapters of the Report are utilized to achieve this objective by presenting introductions, conceptual frameworks, experiences related to contents and results of Data Revolution, and its role in developing the Data Ecosystems and sustainable development in different countries. The Data Ecosystem in Egypt - administered by CAPMAS in the framework of the national statistics system; its work mechanisms, basic outputs; its statistical relations to sustainable development issues; its different parties inside and outside the country, at the global and regional levels - has been analyzed. Light is also shed on new data communities in Egypt, such as: social media, civil society, aerial and satellite data, etc. Also analyzed is the population component in the Data Ecosystem as for the major role of population in achieving sustainable development. The Report presents many ideas about developing population censuses through administrative data and records.

The Report summarizes the most important challenges facing the Data Ecosystem in the framework of the national statistics system in the light of the analyses presented by the Report to the System. In the light of such systems, and the global and regional experiences presented above, the Report presents an integrated vision as for developing the Data Ecosystem in the framework of the official national statistics system. It mainly concentrates on presenting a national strategy for statistics in Egypt, and adopting comprehensive and parallel legislative, institutional, and organizational developments. Moreover, the vision concentrates on establishing and developing the statistical capacities and tools technologically using applications of Data Revolution, such as Big Data, Open Data, Administrative Data, Cloud Computing, etc., to enhance statistical work in Egypt. The Report also dealt with mechanisms of the best utilization of new and emerging data communities in Egypt to enhance development in different fields. The vision also emphasizes the importance of adopting modern systems and methods for performance assessment, and evaluation of the impact of statistical work and development activities in Egypt.

Appendix (1)

Periodical Statistics Published by CAPMAS

Type of Statistics	Title of Statistics	Periodicity
Vital Statistics	Bulletin of Marriage and Divorce	Annual
	Bulletin of Births and Deaths	Annual
Labor & Wages Statistics	Labor Force Survey	Quarterly/Annual
	Bulletin of Employed Persons (government-public/public business)	Annual
	Bulletin of Employment, Wages, and Working Hours	Annual
	Bulletin of Foreigners who Work in (government-public/public business) Sectors	Annual
	Bulletin of Foreigners who Work in (Investment-Private) Sectors	Annual
	Bulletin of Egyptians who get Approval for Immigration Abroad and ho have Another Nationality	Annual
	Bulletin of Work Permissions Issued for Egyptians who work Abroad	Annual
	Bulletin of Labor Injuries Statistics	Annual
Health Statistics	Bulletin of Health Services Statistics	Annual
	Bulletin of Medical First Aid	Annual
	Bulletin of Citizens Treatment at State Expense	Annual
Tourism Statistics	Bulletin of Tourism Statistics	Monthly/Annual
	Bulletin of Hotels Activity and Tourism Villages (Public Sector/Private & Governmental Sectors)	Annual
Storage Statistics	Bulletin of Inventory of Others Establishments: Public, Business, Private Sectors. (Shawn - Stores -Refrigerators - Silos)	Annual
Education Statistics	Annual Bulletin of Education in training Institutions (Schools, Institutes, Training Centers in (Private, Governmental) Sectors	Annual
	Annual Bulletin of Delegates abroad in Scientific Missions	Annual
	Bulletin of Pre-university Education	Annual
	Annual Bulletin of Enrolled and Teaching Staff	Annual
	Annual Bulletin of Graduates & Scientific Degrees	Annual
	Bulletin of Patents and Trademarks	Annual
Social Services Statistics	Bulletin of Social Services Statistics	Annual
Cultural Services Statistics	Bulletin of Cultural Services Statistics:	Annual
	Bulletin of Sports Activity in Sports Establishments	Annual
Construction statistics	Building & Construction (Public/public business Sectors)	Annual
	Building & Construction (Private Sector)	Annual
Transport Statistics	Bulletin of Post Services	Annual

Type of Statistics	Title of Statistics	Periodicity
	Bulletin of Public Transport for Passengers Inside & Outside Cities	Annual
	Bulletin of Transport of Goods & Passengers in Nile River Transport Sector	Annual
	Bulletin of Air Transport	Annual
	Bulletin of Licensed Vehicles in 30/6	Semi-Annual
	Bulletin of Licensed Vehicles in 31/12	Annual
Communication Statistics:	Bulletin of Wire & Wireless Communication	Annual
Environment Statistics:	Annual Report of Environment Statistics	Annual
Public Utilities & Housing Statistics:	Bulletin of Public utilities Services Related to cities Councils in Governorates	Annual
	Bulletin of Drinking Water and Sewerage	Annual
	Bulletin of Trains & Cars Accidents	Semi-Annual
	Bulletin of Transportation of Petroleum Products	Annual
	Bulletin of Roads and Bridges by Type Until 30/6	Every 2 Years
Trade Statistics	Bulletin of Foreign Trade Data	Monthly/Annual
	Bulletin of Trade Among Egypt & International Communities	Annual
	Bulletin of Wholesale & Retail Trade (Public/Business Sectors)	Annual
	Bulletin of Wholesale & Retail Trade for Private Sector	Annual
	Bulletin of Insolvency Judgments and Protest Cases	Annual
Financial Statistics	Bulletin of Economic Statistics and Indicators for Economic Authorities	Annual
	Bulletin of Financial Statistics and Indicators for Economic Authorities	Annual
	Bulletin of Deposits & Credits	Annual
	Bulletin of Foreign Monetary Receipts & Payments	Annual
	Bulletin of Individual Savings for Main Saving Vessels	Annual
	Bulletin of Financial Statistics and Indicators for Investment Sector Companies	Annual
	Bulletin of Financial Statistics & Indicators for Public /Public business Companies	Annual
	Bulletin of Economic Statistics & Indicators for Public /Public business Companies	Annual
	Bulletin of Economic Statistics & Indicators for Investment Sector Companies	Annual
	Bulletin of Economic Statistics &Indicators for organized private sector enterprises	
	Bulletin of Financial Statistics &Indicators for organized private sector enterprises	Annual

Type of Statistics	Title of Statistics	Periodicity
	Bulletin of Economic Statistics & Indicators for Banks & Insurance Companies	Annual
	Bulletin of Financial Statistics, Indicators for Banks, Insurance Companies and brokerage	Annual
	Bulletin of the Final Account for State by Government Functional Classification	Annual
	Bulletin of Public Budget by Government Functional classification	Annual
Prices & Indices Statistics	Bulletin of Consumer Price Indices	Monthly
	Bulletin of Producers Price Indices	2 Months
	Bulletin of Average Prices of Most Important Construction Stuff (Retail)	Monthly
	Bulletin of Average Consumer Prices of Most Important Food Commodities	Monthly
	Bulletin of Prices of Industrial Materials and Products	Annual
	Bulletin of Prices of Food Materials, Products and Services	Annual
Industry Statistics	Manufacturing Production Index	Annual
	Bulletin of Industrial Production Statistics (Public-Business-Private Sectors)	Monthly/Quarterly
	Bulletin of Industrial Production Statistics of Establishments (Public/business Sector)	Annual
	Bulletin of Industrial Production Statistics of Establishments (Private Sector)	Annual
	Industrial Commodities Production (Private Sector)	Annual
	Bulletin of Industrial Commodity Production (Public/Business Sectors)	Annual
	Bulletin of Actual Production, Idle Capacity, Inventory of Full Production at Level of Industrial Activity (Public /Business Sectors)	Annual
	Bulletin of Actual Production, Idle Capacity and Inventory of Full Production at Level of Industrial Activity (Investment & Private sector)	Annual
	Bulletin of Development of Movement of Production of Foreign Trade and the Most Important Industrial Goods available for Consumption	Annual
Energy Statistics	Bulletin of Electricity and Energy Statistics	Annual
Agricultural Statistics	Bulletin of Crops Areas & Plant Production	Annual
	Bulletin of Income Estimates from Agricultural Sector	Annual
	Bulletin of Fish Production	Annual
	Bulletin of Livestock	Annual
	Bulletin of Irrigation & Water Resources	Annual

Type of Statistics	Title of Statistics	Periodicity
	Bulletin of Co-operative Activity in the Agricultural Sector	Annual
	Bulletin of Land Reclamation	Annual
	Bulletin of Cotton	Quarterly
	Bulletin of Cotton Hair	Annual
	Bulletin of the Agricultural Indices	
	Bulletin of Mechanical Agricultural Machines	2 Years
	Bulletin of Movement of Production, foreign trade & agricultural commodities available for consumption	Annual
	Bulletin of Animal Diseases	Annual
	Bulletin of The reins & ownership Agricultural	5 Years
National Accounts	Bulletin of Supply and Usage Tables:	2 Years
	Bulletin of Inputs and Outputs Tables	2 Years

Appendix (2)

Participation of CAPMAS Related to Data Ecosystem and Sustainable Development Globally and Regionally, 2017

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
1	**Training Course**	Indicators of Prices of Housing Real Estates	8-12 January 2017	Kuwait	IMF-CEF
2	**Forum & Workshop**	The First international Data Forum of the United Nations & Workshop on the Project of Integrating Global and Regional Initiatives Related to Data & Statistics into National Development Plans to Enhance Implementing SDGs-2030	15-18 January 2017 & 19-20 January 2017	Cape Town, South Africa	UNSD + ECA
3	**Meeting**	The Second Meeting of A Specialists Team of Tax and Statistics Administrates to Study the Possibility of Preparing a statistical System for Trade Exchanges	20 January 2017	Tunisia	Ministry of Trade & Industry
4	**Meeting**	Expert Meeting for Monitoring Progress Achieved Towards Implementing SDGs Related to energy in the Arab region	24-25 January 2017	Beirut, Lebanon	ESCWA
5	**Work Visit**	High-Level Work Visit to Coordinate and Review future Activities of the Project of Technical Cooperation Related to developing Statistical Quality at CAPMAS	28 January - 5 February 2017	Tokyo, Japan	JICA
6	**Workshop**	Workshop of the Program of International Comparisons (ICP) (Africa 2017)	30 January - 3 February 2017	Lusaka, Zambia	COMESA
7	**Meeting**	Meeting of the Regional Forum of Operation Torino 2016 for Eastern and Southern Mediterranean countries	15-16 February 2017	Rabat, Morocco	ETF
8	**Training Course**	Training Course in the Field of Renewable Energy Statistics	20-22 February 2017	Abu-Dhabi, UAE	IRENA & ESCWA

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
9	**Training Program**	Design of Labor Sample Surveys for Official Statistics	1-3 Mars 2017	Lisbon, Portugal	EU
10	**Meeting**	Meeting of the 48th session of the UNSC	3-10 Mars 2017	New York, USA	UN
11	**Workshop**	Workshop of Using Mobile Technology in Data Collection	7-9 Mars 2017	Yaoundé, Cameroon	ECA
12	**Meeting**	Meeting of the 48th session of the UNSC	7-9 Mars 2017	New York	UNSD
13	**Training Course**	Solidarity (Takaful) Insurance	12-14 Mars 2017	Abu-Dhabi, UAE	AMF
14	**Training Course**	Training Course on Enhancing Collection and Analysis of Labor Market Needs and Expectations of Need of Foreign Labor	12-15 Mars 2017	Germany	IOM
15	**Meeting**	The Third Meeting of the Arab Work Team Concerned with Environmental Indicators and Sustainable Development	13-15 Mars 2017	Amman, Jordan	League of Arab States
16					
17	**Workshop**	Issues of Collecting Data of National Accounts	13-16 Mars 2017	Amman, Jordan	METAC-IMF
18	**Conference**	New Technologies in Statistics, NTTS, 2017	13-17 Mars 2017	Brussels, Belgium	EU
19	**Meeting**	The Regional Meeting of Disability Measurement and Statistics Enhancing SDGs, and the global 2020 Program for Population and Housing Censuses	14-17 Mars 2017	Muscat, Oman	UN
20	**Workshop**	Workshop of Tools of Producing Attractive Content of Sustainable Development Data and Indicators: “Numbers Tell a Story”	15-16 Mars 2017	Amman, Jordan	UNDP
21	**Forum**	The First Statistical Forum of GCC: Enhancing Statistical Partnerships to Support Economic Policies and Sustainable Development in GCC	20-22 Mars 2017	Riyadh, KSA	GAS, KSA
22	**Meeting**	The Exceptional Meeting of CoDG on the Strategy of Data Harmonization In Africa	20-21 Mars 2017	Dakar, Senegal	AU

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
23	**Meeting & Workshop**	The Meeting of PNCs of the MEDSTAT Program & Workshop on Relations with Data Users	21 Mars 2017 22-23 Mars 2017	Athens, Greece	EU
24	**Regional Conference**	The Second Regional Conference of ISI: Enhancing Statistics - Developing Human Life	22-24 Mars 2017	Bali, Indonesia	ISI
25	**Workshop**	Workshop in the Field of Statistics of Foreign Trade in Commodities	28-30 Mars 2018	Brussels, Belgium	EU - MEDSTAT 4
26	**Workshop**	Workshop of Developing and Producing Indicators of Transport and Energy performance	28-31 Mars 2017	Brussels, Belgium	EU - MEDSTAT 4
27	**Meeting**	The Fifth Meeting of IAEG - SDGs	28-31 Mars 2017	Ottawa, Canada	UN
28	**Training Course**	Training Course on GIS	4-6 April 2017	Rome, Italy	MEDSTAT 4
29	**Meeting**	The Annual Meeting of PARIS21	5-6 April 2017	Paris, France	OECD
30	**Meeting**	The Meeting of the 12th Round of ESCWA- SC & Workshop of Implementing SDGs in ESCWA Countries	4-6 April 2017	Beirut, Lebanon	ESCWA
31	**Workshop**	The 15th Training Workshop of (JODI)	11-13 April 2017	Tunisia	IFE
32	**Workshop**	The Regional Workshop on Statistics of Business Registers and Business Surveys	11-12 April 2017	Athens, Greece	EU - MEDSTAT 4
33	**Workshop**	Workshop on Improving Disability Statistics in Arab Countries	17-20 April 2017	Casablanca, Morocco	ESCWA
34	**Diploma**	High Applied Diploma in Statistical and Spatial Analysis of EPHE, Sorbonne University	24 April - 6 May 2017	Paris, France	CEDEJ - EPHE
35	**Meeting**	The Second Meeting of Experts Team Concerned with Statistics of Refugees and Internally Displaced Persons (IDPs)	25-27 April 2017	Oslo, Norway	UNHCR
36	**Meeting**	Attending Graduation Ceremony of the Fourth Graduates Batch of Scholars of High Diploma in	3-6 May 2017	Paris, France	CEDEJ - EPHE

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
		Statistical Analysis of EPHE, Sorbonne University			
37	**Workshop**	African Regional Workshop of 2017: SDGs6	2-5 May 2017	Accra, Ghana	UN-W
38	**Meeting**	The Meeting of Designing National Strategies of Developing Business Registers Statistics	3-4 May 2017	Amman, Jordan	EU
39	**Meeting**	The Meeting of the Arab Department of Experts of Geographical Names	9-11 May 2017	Riyadh, KSA	National Committee for Geographical Names
40	**Training Program**	Training Program on Analysis of Statistics and Monitoring of Indicators to Enhance Policies of Comprehensive Development	10 May - 7 July 2017	Japan	JICA
41	**Training Course**	Training Course to Reform Fuel Subsidies	7-11 May 2017	Kuwait	IMF-CEF
42	**Conference**	Conference of GIS for a Sustainable World	9-11 May 2017	Geneva, Switzerland	UNITR
43	**Workshop**	Regional Workshop on National Accounts and Developing Infrastructure for Economic Statistics within the Framework of SDGs	15-18 May 2017	Amman, Jordan	AITRS
44	**Meeting**	The Sixth Meeting or the Euro - Mediterranean Forum of Statisticians	16-17 May 2017	Malta	MEDSTAT4 & EU
45	**Training Program**	Introductory Training Program on the Introduction of "Quality Management in Statistical Agencies"	22-24 May 2017	Athens, Greece	MEDSTAT4 & EU
46	**Workshop**	Training Workshop on Indices of Trading Volume: The ESCWA Project to Enhance Statistical Capacities of Member States to Produce and Publish Short-Term Economic Indicators to Achieve Sustainable growth	22-24 May 2017	Muscat, Oman	ESCWA
47	**Workshop**	Workshop on Using Programs of TAIEX	23 May 2017	Vienna, Austria	EU

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
48	**Workshop**	Workshop to Build Capacities of Labor Statistics	29 May - 3 June 2017	Dar El-Salam Tanzania	COMESA
49	**Workshop**	UN Regional Workshop of the Global Program 2020 for Population and Housing Censuses - International Standards and Modern Technology	29 May - 1 June 2017	Dar El-Salam Tanzania	UNSD
50	**Workshop**	Regional Workshop for Collecting Tourism Accounts Data & The Sixth International Conference of ITO	19-23 June 2017	Manila, Philippines	UN
51	**Workshop**	Workshop of TOT on Using Administrative Data in Agricultural Statistics	19-23 June 2017	Lusaka, Zambia	ECA
52	**Meeting**	Meeting of Expert Group to Improve Migration Data in the Framework of SDGs 2030	20-22 June 2017	USA	UN
53	**Training Course**	Teaching a Training Course in the Field of Energy Statistics	2-4 July 2017	Sudan	SESRIC
54	**Training Program**	Training Program on Migration of Labor Force	3-14 July 2017	Turin, Italy	ILO
55	**Training Program**	The Summer School of Multi-Dimensional Poverty - Measurement and Analysis, in Collaboration with OPHI & SESRIC	3-15 July 2017	Morocco	SESRIC
56	**Workshop**	Workshop on the General Methodology of Statistical Work in its Fifth Form	9-14 July 2017	Marrakech, Morocco	AITRS
57	**Workshop**	The Regional Workshop on Informal Labor Statistics	10-12 July 2017	Paris, France	EU
58	**Workshop**	Workshop of Developing Financial Statistics	12-13 July 2017	Ankara, Turkey	SESRIC
59	**Workshop**	The Regional Workshop on the Model Directory of the Program of HIMS-MED	13-15 July 2017	Marrakech, Morocco	EU
60	**Workshop**	Short-Term Courses & Attending the Conference of ISI in its 61st Round of 2017	13-21 July 2017	Marrakech, Morocco	Statistics Directorate, Morocco

No.	Type of Activity	Title of Activity	Time	Place	Organizing Agency
61	**Workshop**	The 14th Workshop (IPUMS) on Partial data of Population Censuses (In the Framework of the 61st Session of ISI + The Conference of ISI)	16-21 July 2017	Marrakech, Morocco	Minnesota University - IPUM
62	**Conference**	The Conference of ISI in its 61st Round	16-21 July 2017	Marrakech, Morocco	Statistics Directorate, Morocco
63	**Meeting**	The Regional Forum for Enhancing National Capacities and Following Up the Results of the International Population Conference Based on the SDGs	18-19 July 2017	Amman, Jordan	UNFPA
64	**Workshop**	Workshop of Administering Water Indicator in Sustainable development SDGs	18-21 July 2017	Rome	FAO

REFERENCES

- Abdel-Aziz, Hussein (2017) General Census of Population, Housing, and Establishments, Egypt, 2017. Cairo: CAPMAS.
- Abdel-Fattah, Yosr. (2015) The Register-Census: Some International Experiences in Using Administrative Registers as an Alternative to the Traditional Census. Unpublished Report
- Achikbache, Bahjat (2015) The National Statistical System: Egypt-Assessment Mission PARIS21, AFDP, UN-ECA, UN-ESCWA.
- Al-Mashat, Ali (2017) Space Technology and Capacity Building", Doha: Arab Scientific Community Organization (www.arsco.org).
- Al-Megharble, Nehal (2017) Decentralization and Role of Local Development. Workshop on Planning and Local Development Administration). Cairo: INP.
- Awad, Neveen (2017) "Administrative Registers", Unpublished Technical Memo. Cairo: CAPMAS.
- CAPMAS (2015) The Most Important Indicators of the Comprehensive Survey of the Characteristics of the Egyptian Rural Areas. Cairo: CAPMAS.
- _____ (2016) Directory of the Administrative Units of the Governorates. Ref. No. 80-11321, Cairo: CAPMAS.
- _____ (2016) Draft of the Status Quo of Indicators of SDGs 2030. Second Issue of the Follow Up Report, Cairo: CAPMAS.
- _____ (2017) "Directory of Publications and Services, 2017", Issue No. 13, Cairo: CAPMAS.
- _____ (2017) The First National Statistical Report of SDGs in Egypt. Cairo: CAPMAS (Unpublished).
- _____ (2017) "Tables of the Most Important Characteristics and Indicators of General Census of Population, Housing, and Establishments, 2017", Cairo: CAPMAS (Unpublished).
- Connelly, Roxanne et. al. (2016) The role of administrative data in the big data revolution in social science research (Social Science Research, No.59).
- ECA et al. (2016) The Africa Data Revolution Report – Highlighting developments in Africa data ecosystems. Addis Ababa: ECA.
- El-Deeb, Khaled Hamed (2016) "Using Bid Data in Official Statistics", in" "Workshop of the Data Ecosystem of Sustainable Development", Cairo: CAPMAS.
- F. Salem (2017) Social Media and the Internet of Things - Towards Data-Driven Policymaking in the Arab World: Potential, Limits and Concerns. Dubai: Mohammed Bin Rashid Al Maktoum Global Initiatives.
- General Authority of Information (2015) "Your Portal to Egypt: Population", (www.sis.gov).
- Ghana Statistical Services (2017) Data production for SDGs indicators in Ghana. Accra: Ghana Statistical Services.

- _____ (2017) Ghana's Data for Sustainable Development Road Map Forum. Accra: Ghana Statistical Services.
- Giza Governorate (2016) "Population and the Most Important Population Activities", 8th Edition, Egypt: Giza Governorate.
- Glenn, Gerome C. and Florescu, Elizabeth (2016) The 2015/16 State of the Future. Washington: The Millennium Project.
- Global Partnership for Sustainable Development Data (2016) The state of development data funding 2016.
- Government of Ghana (2016) Ghana improves data collection for effective decision making. (www.ghana.gov.gh)
- Jae, Ko. (2017) S. Korea to lunch a public big data center within 2017. (www.pulsenews.co.kr).
- Khashaba, M. Magid; et al (2016) Fields and Determinants of the Role of Human Resources in Enhancing Sustainability in the Arab Banking and Financial Institutions. A Working Paper Presented to the: First Arab Meeting of Human Resources in the Arab Banking and Financial Institutions. Cairo.
- _____ (2016) Towards an Integrated Framework to Measure and Study the Impact of SDGs Beyond 2015 on Sustainable Development Conditions in Egypt, During the Period 2016-2030. Cairo: INP (Series of Planning and Development Series, no. 65).
- Ministry of Communication and Information Technology (2014) .Strategy of Cloud Computing in the Sector of Communication and Information Technology. Cairo: The Ministry.
- _____ (2015-2017) Summary Report on Indicators of CIT. Cairo: (Issues: Sept. 2015, Sept. 2016, and Sept. 2015). Cairo: The Ministry.
- Ministry of Development Planning and Statistics (2016) "The Doha Declaration of Data Revolution in the Arab Region", Doha: The Arab Forum for Statistical Capacities of Data Revolution. Cairo: The Ministry.
- Ministry of Health - National Population Council (2016) "Atlas of Population Development - Egypt", Cairo: National Population Council. Cairo: The Ministry.
- Ministry of Higher Education and Scientific Research - National Commission on Remote Sensing and Space Sciences (NCRSS) (2017) Digital Portal for Spatial Data and Information to Support Decision-Taking. Initiative of the Commission. Cairo: The Ministry.
- Ministry of International Cooperation-MIC (2016) Arab Republic of Egypt-National Review Sustainable Development Goals. Egypt: MIC. Cairo: The Ministry.
- Ministry of Investment and International Cooperation-MIIC (2017) "Investment towards Sustainable Development - Finance of Sustainable Development Goals: Second National Revision", Cairo: The Ministry.
- Ministry of Planning (2016) "The Action Plan of Following Up the Implementation of SDSs-2030, Cairo: Ministry of Planning. Cairo: The Ministry.
- Ministry of Planning, Follow-up and Administrative Reform (2016) "The Most Important Features of Sustainable Development Plan for the Fiscal Year 2016-2017: The First Year of the SDSs 2030". Cairo: The Ministry.

- _____ (2017) “A Press Conference for the Minister of Planning”, Cairo: INP.
- _____ (2017) Scientific Seminar on Projects of Spatial Numbering - Planet Labs. Cairo: INP.
- Ministry of Social Solidarity (2016) Report of Ministry of Social Solidarity: Protection - Care - Development: from Sept. 2015 to Dec. 2016. Cairo: The Ministry.
- Ministry of State for Population (2015) “National Strategy of Population, 2015-2030”, Cairo: National Population Council. Cairo: The Ministry.
- OECD (2015) A Road Map for a Country-Led Data Revolution – Paris21. France: OECD.
- Open Data Institute-ODI (2015) Open Data Roadmap for the UK. London: ODI.
- Open Data Watch (2016) Data for Development - An Action Plan. (www.opendatawatch.com).
- PARIS21 (2017) National Strategy for the Development of Statistics – Progress Report 2017. Paris: PARIS21.
- PARIS21 et. al. (2015) Data for Development - A needs assessment for SDG monitoring and statistical capacity development.
- Republic Presidency (2017) .World Youth Forum” (Session of Role of Civil Society in Achieving SDGs. Sharm Al-Sheikh.
- Republic Presidency (2017) The Fourth Periodical Conference for Youth”, (Session of the National Project of Integrated Information System). Alexandria: Alexandria Library.
- The SDSN and Open Data Watch (2015) Data for Development- An Action Plan to Finance the Data Revolution for Sustainable Development. New York: SDSN.
- UN (2015) “The International Conference of Population and Development Beyond 2014: Implementing the Agenda of Population and Development”, New York: The ad-hoc/Special Session of the General Assembly of the United Nations, No. 29, to Follow Up the Implementation of the International Conference of Population and Development Beyond 2014.
- UN (2017) Sustainable Development Goals Report 2017.New York: UN.
- _____ (2017) “Report of the SDGs- 2017”, New York: UN.
- _____ (2017) World Population Prospects- The 2017 revision: Key findings and advance table. New York: UN.
- UN-Data Revolution Group (2014) A world that Counts-Mobilizing: The Data Revolution for Sustainable Development. New York: IEAG.
- Egyptian Feminist Union-EFU (2017). Bulletin of the Union. Cairo: EFU.
- United Nations Statistics Division- UNSD (2015) Discussion Paper on Using Quantification to Operationalize the SDGs and Criteria for Indicator Selection. New York: UNSD.
- UNSC (2017) “Report of the Agencies Sponsoring the Initiative of Exchanging Statistical and Descriptive Data”, New York: UN.
- _____ (2017) “Report of the High-Level Team of Partnerships, Coordination, and Building Capacities in the Field of Statistics to Monitor SDGs 2030”, New York: UN.
- _____ (2017) “Report of the International Working Team Concerned with Using Big Data for Official Statistical Purposes”, New York: UN.

– Wallgren, Anders and Wallgren, Britt, (2014) "Register-based Statistics: Statistical Methods for Administrative Data, 2nd Edition, Statistics Sweden.

Internet Websites

– CAPMAS, www.capmas.gov.eg
– Economic Commission for Africa, www.uneca.org
– First Statistical Gulf Forum, www.stats.gov.sa
– Ministry of Planning, www.mop.eg.com
– Open Data Watch, www.opendatawatch.com
– PARIS21, www.paris21.org
– Statistical Center of GCC, www.gccstat.org
– Statistical Commission of Organization of the Islamic Conference, www.oicstatcom.org
– United Nations Forum of Data, www.undataforum.org
– UNSC, www.unstats.un.org.
– www.uneca.org

Interviews

– Director of the “General Directorate of Census Programs”, and Head of the “Team of Big Data”, (Information Technology Sector), CAPMAS.
– General Director at the “Regional Branches Sector” - Officer of Administrative Unit Report.
– General Director of Statistics, General Office of Giza Governorate, Egypt.
– Head of the “Regional Branches Sector”, CAPMAS.
– Officer of Administrative Data (General Directorate of Research), CAPMAS.
– Officer of Cloud Computing (Information Technology Sector), CAPMAS.
– Team of the “Unit of Sustainable Development”, CAPMAS.