"**New Data Sources and Methods Including Big Data, AI, and Machine Learning**"

General Authority for Statistics (GaStat), Saudi Arabia

High quality data and statistics are vital for sound policy decision-making in both the private and public sector all over the world. Today's widening use of advanced technological devices in peoples' daily life and the digitalization of the provision of most commercial and government services has led to a new era in the field of statistics. Big companies and research institutions have already dived into the world of social networks to compile data on consumer sentiment, trends, and many other topics. Statistical agencies, responsible for providing "official" statistics usually after a considerable time and efforts spent on various complicated processes, are now facing the challenge of starting to undergo significant changes to utilize new data sources that emerge from the use of new technologies.

"Big Data" is now at the center of discussions on the way forward for statistical agencies as it is essential in their modernization to keep up with the rapidly changing data environment. Big Data can replace the traditional statistical activities as an innovative way in producing official statistics or only provide additional information to support the currently available official statistics. It can also lead to the creation of new indicators by encouraging to venture in places where other sources of data do not exist.

The integration of Big Data as a new data source, either supplementing or substituting for traditional data sources inherits some challenges to be overcome by the statistical agencies. Methodological aspects include defining ways of access to data, statistical concepts, data compilation, processing, and dissemination practices, and methods to ensure a certain level of quality and international comparability. Organizational factors include areas such as update of organizational structure, works on statistical capacity building, establishing partnerships with private and public data sources, and communicating with users.

In order for NSOs to move forward and overcome the challenges posed -and benefit the opportunities that "Big Data" has to offer- in line with the rapid developments in the surrounding environment, especially in databases, computing, and digitalization, there are some important components such as;

1- Adopting national statistical strategies that address plans, strategies, implementation methods, and development mechanisms in the national statistical environment. Governments and international organizations strongly support these strategies to assist countries that do not have a full strategy in this area.

2- Strengthening coordination and partnerships between national statistical agencies and various data sources, whether governmental or private. Big databases are not limited to government agencies; private sector companies, organizations, and other entities may also have databases with a large volume of data that can contribute to the provision of sound, accurate, comprehensive, detailed, and high-quality official statistics.

3- A direct automatic link between the databases of various organizations and those of national statistical agencies, while keeping the confidentiality of data and privacy, for the exchange of data between the national statistical agencies and those organizations, the governmental ones in particular. It is possible to generalize the idea of Government-to-Government (G2G), which is one of the successful tools in this area, to the private sector and other entities having large databases.

4- The need to unify the concepts, definitions, and methodologies of the statistical indicators among all the partners to avoid misunderstanding of the statistics resulting from using different concepts or methodology. GaStat of Saudi Arabia has done a lot of work in this regard with national partners, such as standardization of the definition of small and medium-sized enterprises (SMEs).

5- Ensuring the use of the official international statistical classifications, such as ISIC4, by all partners to facilitate the work in databases and get consistent, comparable, and ready data for statistical purposes. Saudi Arabia has gone a long way with national partners to use those classifications.

6- The importance of developing a road map in which the NSOs uses the big data in the provision of the official data. GaStat of Saudi Arabia has drawn up a map to issue the official data through the big data in several fields such as statistics of transport and statistics of Hajj and Umrah

7- The importance of capacity building for countries in how to use the big data and benefit from it in the provision and dissemination of various official statistics through the exchange of experiences, the provision of a technical experts team to build capacity, and create a team of national experts in this area.

8- The importance of raising statistical awareness among government institutions, private organizations, and individuals to facilitate the integration of big data within the national statistical agency to support official statistics. The United Nations Statistical Division could initiate statistical awareness programs and provide recommendations for national governments to embrace similar national programs for institutions and individuals for facilitating the statistical work among the data producers and enabling easier access to available data.