The Digital Era and Data: Considerations for National Statistical Office (NSOs) in the Digital Data Ecosystem

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Introduction

Technology and digitization of societies are changing various aspects and operational features of everyday life, agencies, and different sectors. With advancements in technology, the generation of data becomes inevitable. Billions of gigabytes of data are generated daily, data that could be easily utilized to monitor development.[1] It is in this context that the National Statistical Office, a professionally independent body responsible for providing official statistics plays a significant role in the production of official statistics. This is due to the fact that the office possesses the widest category of data translated to statistical information that informs the social, economic, political, and cultural position of a country but also informs policy and impact. Harnessing technological advancements for the benefit of NSOs to improve the quality of data and develop better coordination and collaboration in handling statistical information has been at the forefront in the last five years through calls on modernizing the National Statistical System (NSS). Modernization references a model of an evolutionary transition from a pre-modern or traditional to a modern society. [2] Modernizing NSOs amongst other factors, intends to address the impact and importance of NSOs in the development of policies in tracking and measuring the impact of sustainable development goals and national development. This report gives highlights the changing roles and functions of NSOs in the digital era and how digitization has contributed to the changes. It also highlights the challenges, opportunities, and data governance gaps that exist and what can be done to address the gaps.

[1]'Moving from Data Production to Impact: Role of NSOs.' (Open Data Watch, February 2022)<https://opendatawatch.com/blog/moving-from-data-production-to-impact-the-role-of-the-nso/>

[2] 'Managing a Statistical Office in Times of Change.' (UNSTATS) <https://unstats.un.org/capacity-development/thematic-conferences/asia-2020/presentations/Session%203%20-%20Iran.pdf>

Role and Functions of NSOs

The primary function of NSOs is to collect, compile, and release official statistics that are produced in relation to the economy, society, and population. Through this function, they play a significant role in influencing and informing policy through statistics generated.[3] Their roles as a statistical office also extend to, planning, authorizing, coordinating, and supervising all official statistical programs, establishing standards and ensuring the use of best practices and methods in the production and dissemination of statistical information, providing technical advice on statistics to other state entities and, promoting co-ordination among producers, users, and suppliers of official statistics.[4]

The purpose of official statistics is to produce and disseminate authoritative results designed to reliably reflect economically and socially relevant phenomena of a complex and dynamic reality in a given country.[5] These results have to be available to all users, i.e. they have to be public. The function of these results is in a variety of uses for monitoring developments in a country and its parts, so as to provide basic information for decision-making, evaluations, and assessments at all levels, but notably by governments, and for serving as important elements for accountability of public bodies based on achievements.[6]

These statistics go as far as influencing the implementation of the 2030 Agenda for Sustainable Development. Effective planning, follow-up, and review of the implementation of the 2030 SDGs requires the collection, processing, analysis, and dissemination of an unprecedented amount of data and statistics at local, national, regional, and global levels and by multiple stakeholders which calls for enhanced capacity building to support national plans to implement the sustainable development goals.[7] NSOs, therefore, play a vital role in the production of official statistics to see to the implementation of the sustainable development goals.

A key component of the functioning of NSOs is the National Statistical System(NSS). The NSS is an ensemble of statistical organizations and units within a country that jointly collect, process, and disseminate official statistics on behalf of the national

[3]How Should a Modern National System of Official Statistics Look?(UNCE) <https://unece.org/DAM/stats/documents/applyprinciples.e.pdf>

[4]How Should a Modern National System of Official Statistics Look?(UNECE) <https://unece.org/DAM/stats/documents/applyprinciples.e.pdf>

[5]How Should a Modern National System of Official Statistics Look?(UNECE) <https://unece.org/DAM/stats/documents/applyprinciples.e.pdf>

[6]How Should a Modern National System of Official Statistics Look?(UNECE) <https://unece.org/DAM/stats/documents/applyprinciples.e.pdf>

[7]Global Action Plan for Sustainable Development Data.' (UNSTATS) https://unstats.un.org/sdgs/hlg/cape-town-global-action-plan/

government.[8] There is a wide range of statistical capacity among countries, with individual countries setting their own national priorities. NSOs are at the center of the NSS being complimented by scientific data communities, civil society and citizen-based organizations, official statistics data communities, and private sector big data communities. This system feeds into statistical information that guides, investments, planning and production, dissemination, literacy, and use value this information then primarily guides, academic research and business decisions, development goals monitoring and use, and public policy formulation. The hierarchy of the NSS guides data production and the use and impact of data.[9]

NSOs in the Digital Era

There is an increased demand for data in terms of quantity, scope, quality, and disaggregation. This increase in data demand exceeds what traditional National Statistical Systems can provide, necessitating the need to modernize and transform National Statistical Systems into broad data ecosystems that span the entire data value chain. This is further characterized by the need for enhanced data governance, transformational leadership, and the acquisition of new knowledge, capabilities, and strategic skills, including data science, Artificial Intelligence (AI), and Machine Learning (ML) for the continent to actualize the new "data ecosystems".[10]

The digitalization of our societies has led to the production and use of data in different ways. For NSOs, in terms of collecting statistical data, digitization and the use of tech has introduced new data sources that both compete with and complement official statistics. The internet and social media are the primary new data sources. Data collected through these sources has expanded the scope to generate new and timely evidence for analysis and statistics that can be of benefit to policymakers and citizens. They also open a new range for statistics in areas where the collection of robust data was previously prohibitive. This ties to a country's digital scope/capabilities, internet reach, digital literacy, and overall technological capacity. The new data sources have created the ability to receive data on various aspects of life, social, economic political, and cultural. This evolution has also raised expectations on what statistical data should look like in the digital era. The expectations are marked by four main characteristics based on the kind of data NSOs collect and process[11]

- **Minimum time to market**: Gathering and receiving official statistics often takes time, and stakeholders are now less agreeable to accepting delays in receiving official statistics. Real-time statistics are more relevant in attuning to the current situation as opposed to statistics that are likely to be outdated / overtaken by events. The need for real-time information in a digitalized society carries on to statistics.
- **Granularity:** the expectation is that data is granular more so statistical data, as it carries a broad array of subject matters e.g. the question of how a specific community is doing is locally relevant data on this would carry social, economic, and environmental subject matters. These are indicators that are highly relevant not only for policy but for the development of various initiatives.
- **Trusted Data Quality:** NSOs are now confronted with an overwhelming increase in data supply. The expectation is that NSOs should be able to make sense of the data/ any contradictory information dropped by social media networks, the media, or other new sources. NSOs would add value to the data by bringing statistical expertise, ethical standards, findability, and openness which contribute to building trust. This is especially important in the digital era where fake news is a concept that must be grappled with.
- A new wide range of data services and products: the new services and products are likely to cut across NSOs' traditional boundaries on data sharing, NSOs must now consider sharing data sets, sharing algorithmic knowledge and codes, and engaging with different data users.

The 2021 commemoration of African Statistics Day highlighted the importance of Modernizing National Statistical systems through sustainable data to drive social economic and structural transformation as such National Statistical Systems (NSS) on the continent must transform and modernize to be better equipped to provide data and statistics, supporting development on a regional and national level in Africa.

The African Union Institute for Statistics(STATAFRIC) also noted the importance of strengthening the development of statistics through digitization to drive the continental implementation of Agenda 2063. Agenda 2063 is Africa's development blueprint by

[8]'National Statistical Systems (NSS) Definition.' (OECD Statistics) https://stats.oecd.org/glossary/detail.asp?ID=1726

[9]S. Badiee, J. Jütting, D. Appel, T. Klein, E. Swanson, 'The Role of National Statistical Systems in Data Revolution.' <https://www.oecd-ilibrary.org/sites/dcr-2017-8-en/index.html?itemId=/content/component/dcr-2017-8-en>

[10]'Modernizing Statistical Systems' (African Union , November 2021) <https://au.int/fr/node/41201>

[11]How Should a Modern National System of Official Statistics Look?(UNECE) <https://unece.org/DAM/stats/documents/applyprinciples.e.pdf>

the African Union to achieve inclusive and sustainable socio-economic development over a 50-year period.[12] Digitization would drastically reduce processing and data analysis periods after censuses and surveys, fully computerize administrative data sources, make use of new data transmission techniques and address data gaps by combining traditional sources with new data sources and the allocation of adequate financial and human resources for the production of quality statistics which would build on the continental database with data produced by National Statistical Institutes of African countries.[13] Data uptake involves connecting with data users and reprocessing data for new insights, incentivizing them by reducing the time-cost of data use, encouraging the perception of data value, influencing or promoting data use culture, and encouraging data use for decision-making. It has been noted that in recent years, NSOs, have been overwhelmed by requests for data, statistical services, and information from their respective national governments and local and international private entities .[14] This is a further justification for modernization through digitization by adopting new technologies and new data sources to maximize efficiency, so as to provide the data and statistics that are necessary to support sustainable development[15]

Policymaking relies critically on data for monitoring and measuring progress not only for national development but also towards measuring progress towards the Sustainable Development Goals. NSOs, therefore, play a critical role in the creation of subnational, national, and regional statistical systems which can generate trustworthy data that the governments, the private sector, and citizens in need. Digitalization and enhanced governance and coordination between stakeholders offer unique possibilities to achieve this.[16]

Changes and Challenges

NSOs no longer have the monopoly of tools and methodologies monopoly on tools and methodologies that collect, process, analyze, and disseminate data and information. They now have to deal with other data officers within government agencies along with the rapid deployment of data scientists within the government. They also have to consider the rise of private entities providing new sources of data and the rate at which they meet the demand for statistics at a faster rate. NSOs are no longer the go-to source for fast and reliable statistical information that could be used to influence policy. As a reliable source for many years providing critical benchmarks for measuring socioeconomic changes, statistical offices are facing challenges in maintaining and regaining their relevance amidst the rise of alternative data providers. National statistical offices can only respond to the challenges by embracing the changes brought about by the digital era through digitization and modernization of the office. [17] A majority of countries now have more than one producer of official statistics at the national level. This however varies from country to country depending on the degree of centralization. In some countries, notably those that have a federal structure, producers of official statistics exist at regional or even municipal levels.[18] NSOs must therefore consider collective cooperation with private statistical offices and other governmental statistical bodies embracing new methods through digitization that would enable them to catch up to the digital era and maximize their roles in providing timely, accurate, and reliable statistical information.

Leveraging technology through digitization has more benefits than disadvantages, especially for NSOs, this does not however imply that the adoption and implementation of new technologies do not come with challenges specific to the operation of NSOs. Modernization of NSOs and ultimately the NSS comes with its set of challenges, some of which include,

- Difficulty in understanding and leveraging new technologies such as AI and Big data
- Lack of specialized knowledge, skills, and understanding in navigating adopted technologies.
- Understanding the place of traditional roles of NSOs in the digital era and not knowing how to balance the traditional and the new.
- Lack of proper regulations and policies with clear directives to guide NSOs in the digitization process.
- privacy issues that come with digitization
- Having to deal with a newer concept of open data.
- The rise of private entities, digitization is universal, private entities are considered more reliable due to their ability to quickly leverage new technologies and modernize their systems and processes whereas NSOs seem to take much longer in modernizing their systems.

[12]'Second Continental Report on The Implementation of Agenda 2063.' (African Union) <https://au.int/en/documents/20220210/second-continental-report-implementation-agenda-2063>

[13]Doreen Apollos, 'Modernizing statistical systems must pay attention to "data value chain" (African Union, November 2021)<https://au.int/sw/node/41201>

[14]'Modernizing Statistical Systems' (African Union , November 2021) <https://au.int/fr/node/41201>

[15] 'Modernizing National Statistical Systems to Provide Data and Statistics to Support Sustainable Peace and Development in Africa.' (UNECA) < <https://archive.uneca.org/sites/default/files/uploaded-documents/ACS/ASD2020/asd_2020_-_media_advisory_en.pdf>

[16]African Statistics Day: Statistical systems for sustainable development and peace https://paris21.org/news-center/news/african-statistics-day-statistical-systems-sustainable-development-and-peace

[17]'Who Cares about National Statistical Office?'<https://www.linkedin.com/pulse/who-cares-national-statistical-offices-paul-cheung>

[18]How Should a Modern National System of Official Statistics Look.' (UNECE) https://unece.org/DAM/stats/documents/applyprinciples.e.pdf

The Kenya National Bureau of Statistics

The Kenya National Bureau of Statistics (KNBS) was established by the Statistics Act of 2006. It is established as a Semi-Autonomous Government Agency incorporated under the Ministry of State for Planning, National Development, and Vision 2030.[19] Its core mandate is the collection, compilation, analysis, publication, and dissemination of statistical information for public use, with an additional role of coordinating, monitoring, and supervising the National Statistical System (NSS).[20] The NSS is the ensemble of statistical organizations and units within a country that jointly collect, process, and disseminate official statistics on behalf of the national government.[21] Among the roles the statistical office has, it is responsible for ensuring required data is made easily available and easily understood to aid in tracking and visualization of progress toward the vision 2030 national development goals. Modernization of the office and the NSS through digitization is relevant in meeting the expectations of the office.[22]

KNBS is in the process of finalizing the Kenya Strategy for the Development of Statistics (KSDS), which will provide a strategy for developing statistical capacity across the entire NSS, including county governments. The KSDS outlines four strategic focuses i.e. Effective National Statistical System, Improvement of Data quality, Development/Strengthening of Infrastructure for Statistics Production, and Statistical Advocacy. Under the Fourth Schedule of the Constitution, both the national and county governments have a role to play in generating statistics for planning purposes. In particular, the national government has the responsibility of producing and managing statistics on the population, the economy, and society at the national level. At this stage of constitutional implementation, and with the devolution of service provision to the county level, the KNBS role, therefore, extends to providing technical advice in the provision of quality statistics.[23]

Governance statistics are fundamental in ensuring that the relationship between the state and its people is inclusive, transparent, and accountable. It contributes to the measurement and realization of human rights. In addition, it helps in identifying groups and sub-groups in the population that is most affected by the dysfunctions of governance systems, with a view of putting in place appropriately targeted policies. The statistics also contribute to preventing and managing conflict, when used as early warning systems; and can as well help to build peace, by periodically informing on state-society relations, which lie at the center of sustainable peace. On the other hand, socioeconomic statistics are essential to understanding the welfare of citizens and are therefore useful in planning and in policy design. Further, statistics also help to capture the impact of digitization and globalization on production, consumption, employment, investment, and financial flows.

The need to digitize the office and system derives from data mobilization with the aim of improving the timeliness and reducing the cost of statistical production to meet the increasing demand of relevant stakeholders. To actualize this the KNBS highlights plans to enhance the use of mobile data for social change and explore the harnessing of Big Data and other non-traditional data sources for official statistics, which is expected to facilitate the efficient use of resources in statistical production and also embrace the use of modern methodologies for statistical production. One of the key strategies that the Bureau is employing is the modernization of data collection methods. This is partly achieved by leveraging on enhanced use of Computer Assisted Personal Interviewing (CAPI) techniques, which enable faster release of the results. An example of this is the 2019 Kenya Population and Housing Census which was conducted using CAPI techniques resulting in a significant improvement in the timeliness of dissemination of the census results. In addition, KNBS has also adopted the use of Computer Assisted Telephone Interviews (CATI) in the wake of the Covid-19 pandemic.[24] The office is in collaboration with other institutions on exploring the use of alternative sources and techniques for the production of official statistics. [25]

The KNBS also upholds the constitutional right to access information[26] held by the state by putting in place a data dissemination policy and measures to guide citizens and other stakeholders on how to access information. Some of the measures put in place include dissemination platforms that have been set up to accommodate all types of data users which also includes access to other data and information such as, geospatial data. Information accessed by the public is always anonymized to maintain confidentiality.[27]

The Statistics Act 2019

The Statistics Act is the core legislation that established the Kenya National Bureau of Statistics as the principal agency of the government responsible for collecting, analyzing, and

[19]History of KNBS - Kenya National Bureau of Statistics, https://www.knbs.or.ke/history-of-knbs/
[20]KNBS Mandate - Kenya National Bureau of Statistics, https://www.knbs.or.ke/knbs-mandate/
[21]https://stats.oecd.org/glossary/detail.asp?ID=1726
[22]History of Kenya National Bureau of Statistics. <https://www.knbs.or.ke/history-of-knbs/>
[23]History of Kenya National Bureau of Statistics. <https://www.knbs.or.ke/history-of-knbs/>
[24]KNBS, https://www.knbs.or.ke/african-statistics-day-celebrations/
[25]History of Kenya National Bureau of Statistics. <https://www.knbs.or.ke/history-of-knbs/>
[26]Article 35
[27] History of Kenya National Bureau of Statistics. <https://www.knbs.or.ke/history-of-knbs/>

disseminating statistical data in Kenya, as well as the official custodian of statistical information. [28] The Act also provides for the type of statistical information that may be collected, analyzed, and published, the information includes but is not limited to, population, births and deaths, immigration and emigration, gender, food security, health, information, and communication but to mention a few.[29] Management of the office is vested in the board of directors who form the governing structure. The board consists of the chairman appointed by the president, members from the ministries responsible for statistics and finance respectively, representatives from the private sector, non - governmental organizations, research institutions, public universities, and the National Council for population and development. [30] The functions of the board include but are not limited to, the formulation and implementation of policies pertaining to the office. [31]

The Act further establishes 8 fundamental principles of official statistics that must be adhered to by the NSO in conducting its duties and responsibilities, particularly in collecting, processing, analyzing, and disseminating statistical information. These principles relate to [32]

- Honoring citizens' entitlement to public information through availing official statistics on an impartial basis
- Retaining the trust of the office and official statistics by applying strict professional considerations such as scientific principles and professional ethos on methods and procedures for the collection, processing, storage and presentation of statistical data.
- Facilitating correct data interpretation by presenting information in accordance with the scientific standards on sources, methods, and procedures of statistics
- The duty to comment on erroneous interpretation and misuse of statistical information
- Choosing their sources in consideration of quality, timeliness, cost, and burden to their respondents
- Consistency and efficiency through co-operation with other national statistical agencies
- The promotion of efficiency of the National Statistical System at all official levels through applying international concepts, classifications and methods.

These principles, though long founded, establish a foundation for good data governance in the office even with the adoption of new technologies. The principles serve to ensure the mitigation of any risks to data that may arise as a result of adopting new technologies and the creation of a good data management culture.

Statistics Act on Data Protection and Privacy.

Personal data falls under the classification of statistical information identified in the Statistics Act. It refers to any information relating to an identified or identifiable natural person.[33] Statistical information that falls within the category of personal data may include information on births and deaths, immigration and emigration, gender, population, and health. Where statistical information classified above holds unique identifiers of personal information that would likely link the information to a specific individual, the rules and regulations on data protection in particular the Data Protection Act will apply to facilitate the protection of the rights of the individuals whose data has been collected.

The Statistics Act came into force prior to the Data Protection Act (DPA), by definition, the KNBS would be categorized as a data controller as defined under the DPA. A data controller is defined as a natural or legal person, public authority, agency, or other body that, alone or jointly with others, determines the purpose and means of the processing of personal data.[34] The KNBS is a government agency that collects data which may include personal data and it determines how and for what purpose the data shall be processed. As a result, the KNBS is bound to the principles and obligations of personal data protection which include,[35]

- The processing of personal data in accordance with the right to privacy
- Lawfulness, fairness, and transparency in the processing of personal data
- Legitimacy is the purpose for which the data is collected and shall not be processed in a manner that is incompatible with the purpose of collection.
- Purpose limitation: a collection of data that is adequate, relevant, and limited to what is necessary in relation to the purposes for which it is processed.
- Collection of personal data only where a valid explanation is provided whenever information relating to family or private affairs is required;
- Accuracy and, where necessary, kept up to date with every reasonable step being taken to ensure that any inaccurate personal data is erased or rectified without delay.

[28]Section 4, Statistics Act
[29]Schedule 1 - This schedule provides an extensive list of 46 items that fall under the category of statistical information that the KNBS is mandated to collect, analyse and disseminate.
[30]Section 5
[31]Section 6
[32]Schedule 4
[33]Data Protection Act 2019
[34]Section 2, DPA.
[35]Section 25, DPA

- Storage limitation i.e. ensuring personal data is kept in a form that identifies the data subjects for no longer than is necessary for the purposes for which it was collected and
- Data transfer ensures personal data is not transferred outside Kenya unless there is proof of adequate data protection safeguards or consent from the data subject.

The DPA was established to protect the right to privacy as provided for, under Article 31 of the Constitution. The right to privacy is a fundamental right, however, it is not an absolute right - there are limitations to the right i.e. circumstances where the right to privacy can be overruled and or taken away. The Statistics Act is one of the legal frameworks that make provision for the limitation of the right to privacy. Section 20 of the Statistics Act provides for mandatory access to records or documents that may be required to derive information in furtherance of gaining data for statistical information or where in the opinion of the Director-General the reports or documents would aid in the completion or correction of information already obtained. Access to the records or documents will be given to the Director-General who will obtain the required information.

Section 21 also limits the right to privacy in situations where an authorized officer may enter and inspect any land, building, vehicle, or vessel where persons are employed, other than a dwelling-house, for the purposes of collecting statistical information, and in either case may make such inquiries.

Regardless of the limitations to the right to privacy, the collectors are still bound by the principles of data protection. It is however important to note that the Statistics Act states that, where a conflict arises between the provisions of the Act and any other Act with respect to the collection analysis and dissemination of official statistics the provisions of the Act prevail.[36] The provision as drafted completely jeopardizes the right to privacy in some circumstances, even where the limitations highlighted do not apply. This would also make it difficult to manage and or mitigate the risks associated with digitization, especially where the office adopts technologies related to the collection, analyzing, and processing of statistical information which in some respects would include personal data.

Privacy and confidentiality are the cornerstones of data protection, although the Statistics Act provides for limitations of the right to privacy in some respects it provides for the right through ensuring confidentiality and privacy. This is reflected through Section 11, which provides for the oath to secrecy where every person employed by the Board under the provisions of the Act shall be required to take an oath of secrecy before a Magistrate, Commissioner for Oaths, or the Director-General, before commencing the duties. Further, the Act restricts on disclosure of information by prohibiting the publication or disclosure of any duties of the office of individual returns, any answers given to questions, reports, abstracts, or documents containing particulars comprised of answers that would identify any persons undertaking for the purpose of collecting statistical information. The exception to the provision is only given where prior written consent of the person making the return or giving the answer is given. [37]

There are no guidelines or regulations on Data protection that specifically apply to NSOs. The Data Protection Act serves as the guiding legislation where the processing of statistical data is noted as one of the lawful reasons for the processing of personal data.[38] However, the application of the Act to NSOs may in some instances be overruled by the provisions of the Statistics Act which must be clarified and made clear. Nonetheless, NSOs are still guided by their principles of professional ethics and their practice of confidentiality and disclosure of information. As NSOs join the digital era and embrace a more modernized version of the entities it will be necessary to ensure that legislation and supporting policies are harmonized to avoid conflicting provisions.

Developing Data Governance Structures for NSOs in the Digital Era.

Data governance is a data management function to ensure the quality, integrity, security, and usability of the data collected by an organization. The purpose of data governance for NSOs is to ensure that data is easily accessible to all users in a reliable way, providing the most value while adhering to the relevant standards and regulations.[39] Digitization will help NSOs develop and strengthen statistical systems, this is charactarised by, addressing the demand for statistical data through improving data production which demonstrates the value of such data, the availability of resources to adopt and implement new technologies, the existence of laws and regulations and the establishment of governance structures. [40] A data governance framework is significant for NSOs as it highlights,

[36]Section 30.

[37]Section 22

[38]Section 30(viii), DPA

[39]Juan Munoz, 'Statistical Data Governance Framework to Achieve Data Interoperability.' (UNECE) https://unece.org/sites/default/files/2021-11/HLG2021_D1_Statistical%20Data%20Governance%20Framework%20to%20Achieve%20Data%20Interoperability.pdf

[40]Shaida Badiee, Johannes Jütting, Deirdre Appel, Thilo Klein, Eric Swanson, 'The Role of National Statistical Systems in Data Revolution.' https://www.oecd-ilibrary.org/sites/dcr-2017-8-en/index.html?itemId=/content/component/dcr-2017-8-en

- **Completeness of scope**. This addresses all aspects of coordination, production, and use of data particularly in areas of national development and sustainable development, as well as policy influence. It is the necessary step to modernize and strengthen statistical systems and address short, medium, and long-term actions, with a particular focus on building the infrastructure and the capacity needed to support statistical requirements.
- **Accountability.** The modern production of statistics requires comprehensive interaction among data providers, producers, and users. Therefore, trust among data providers, producers, and users of statistics is key for the effective functioning of the statistical systems in full adherence with the UN Fundamental Principles of Official Statistics. national statistical systems are therefore identified under the leadership of National Statistical Offices.
- **Cooperation.** This recognizes the crucial role of cooperation among countries, regional organizations, and other international organizations and stakeholders in supporting countries' plans and efforts in capacity building. It recognizes the expertise and abilities of these key stakeholders as essential resources for progress and modernization through digitization. Indeed, they have a crucial role in capacity-building exercises and in carrying out statistical capacity-building efforts in their areas of work. [41]

Recommendations and Conclusions

NSOs play a critical role in navigating national statistical systems as well as the collection, processing, and dissemination of statistical information. They validate existing official statistics which are used to produce and disseminate authoritative results designed to reliably reflect economically and socially relevant phenomena of a complex and dynamic reality of the country. These results must then be made publicly available. The premise of the research establishes a clear need for digitization, which is more commonly referenced as the modernization of statistical systems charactarised by the adoption and use of new technologies and new data sources. It brings out how best NSOs can maintain their relevance in the digital era while noting existing challenges. These challenges, for the most part, are generic to the digitization processes and can be addressed on the technical, organizational, and legislative levels. The recommendations presented below provide solutions to some of the highlighted challenges in consideration of the positioning of the Kenyan Official Statistical office - KNBS.

- Revision of statistical laws and regulations, specifically, revising the Statistics Act to reflect the adoption of new technologies, the establishment of an internal data governance structure, and data protection policy.
- Establishing a data governance body inside the statistical office to agree on conceptual decisions on data management that conform to the principles of good data governance in addition to the already existing principles set out in the Act.
- Revising internal policies to accommodate the use of innovative data collection methods and creating parameters for the use of new data sources which would address any existing data gaps.
- Developing institution-specific guidelines to provide for privacy and ethics reviews of and data ensuring privacy and security on a technical and organizational level.
- Conducting Data Protection Impact Assessments where collection and processing of statistical information include personal data.
- Collaborative partnerships with private entities to maintain beneficial relationships, especially with private data providers. In line with this collaborative effort with the stakeholders within the National statistical system who are the main producers of official statistics.
- Recruitment and retention of appropriate staff, offering opportunities for training to ensure familiarity with new technologies and innovative ways to improve data collection, processing, and dissemination
- Through the Office of the Data Commissioner, to have capacity building and developing regulations and or guidelines to guide the statistical office on data protection having established their role as a data controller.

[41] Global Action Plan for Sustainable Development Data.' (UNSTATS) https://unstats.un.org/sdgs/hlg/cape-town-global-action-plan/

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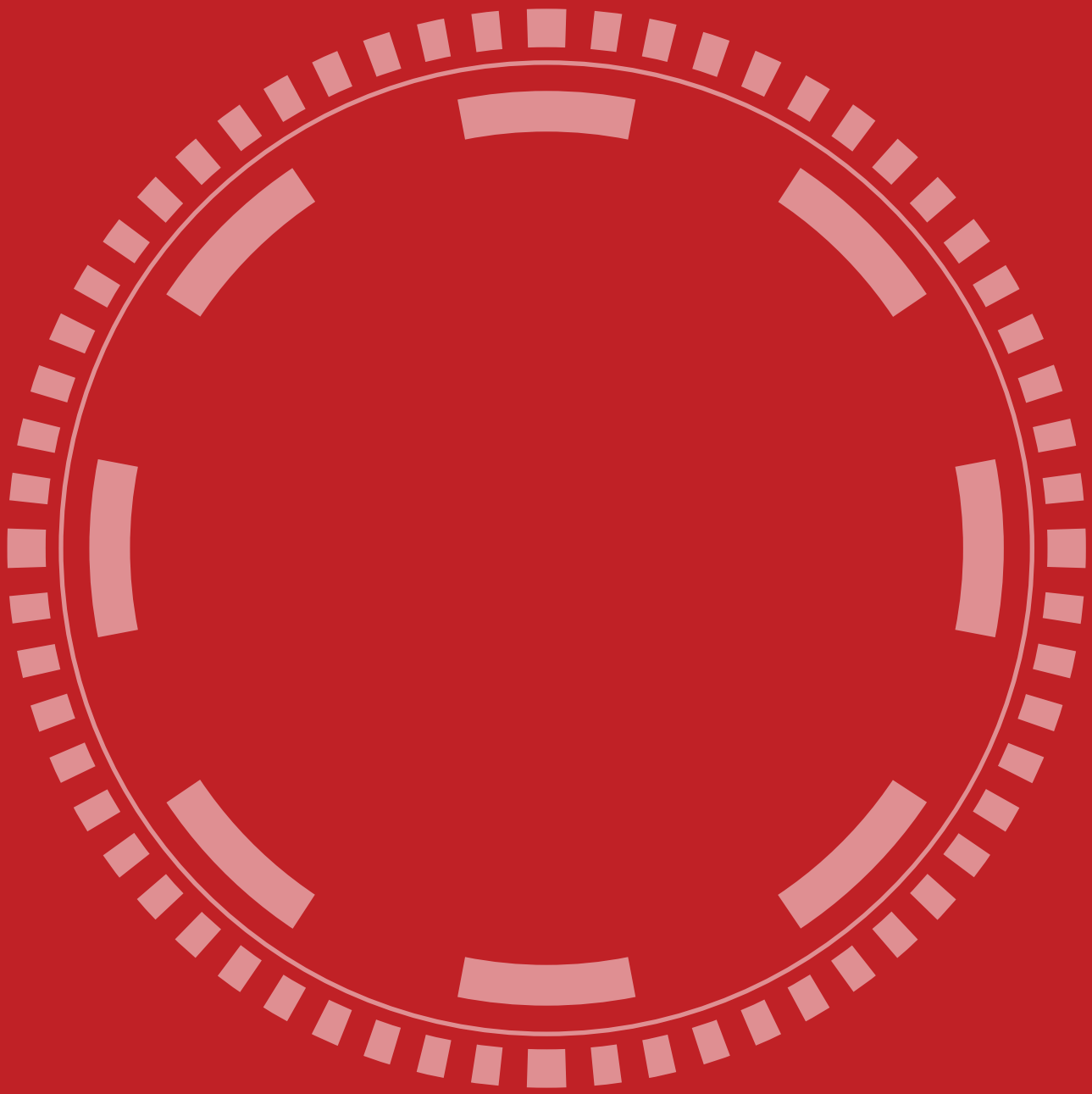

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