

**East Africa Collaborative Ph.D. Program  
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**East Africa Research Papers in Economics and Finance**

**Achieving the Sustainable Development  
Goals in Rwanda: The Role of  
Administrative Data Inclusion**

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## **Preface**

*East Africa Research Papers in Economics and Finance* is a series linked to the collaborative PhD program in Economics and Management among East Africa national universities. The program was initiated and is coordinated by the Jönköping International Business School (JIBS) at Jönköping University, Sweden, with the objective of increasing local capacity in teaching, supervision, research and management of PhD programs at the participating universities. The program is financed by the Swedish International Development Cooperation Agency (SIDA).

*East Africa Research Papers* is intended to serve as an outlet for publishing theoretical, methodological and applied research covering various aspects of the East African economies, especially those related to regional economic integration, national and regional economic development and openness, movement of goods, capital and labor, as well as studies on industry, agriculture, services sector and governance and institutions. In particular, submission of studies analyzing state-of-the-art research in areas of labor, technology, education, health, well-being, transport, energy, resources extraction, population and its movements, tourism, as well as development infrastructure and related issues and discussion of their implications and possible alternative policies are welcome.

The objective is to increase research capacity and quality, to promote research and collaboration in research, to share gained insights into important policy issues and to acquire a balanced viewpoint of economics and financial policymaking which enables us to identify the economic problems accurately and to come up with optimal and effective guidelines for decision makers. Another important aim of the series is to facilitate communication with development cooperation agencies, external research institutes, individual researchers and policymakers in the East Africa region.

Research disseminated through this series may include views on economic policy and development, but the series will not take any institutional policy positions. Thus, any opinions expressed in this series will be those of the author(s) and not necessarily the Research Papers Series.

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# **Achieving the Sustainable Development Goals in Rwanda: The Role of Administrative Data Inclusion**

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## **Abstract**

This study investigates the extent to which decision makers in Rwandan institutions appreciate and use administrative data in their everyday decision making to achieve sustainable development. The study is based on semi-structured interviews with 120 Rwandan establishments by institutional sector selected randomly in Remera sector in Gasabo district in Kigali city. The research reveals that a majority of the decision makers did not understand the need to use statistics in their decision making while others felt overwhelmed by the volume and complexity of the data. Our study finds that there is a strong lack of dissemination or sharing of data by institutions, especially in the private sector, to inform their decisions. The study also finds that the non-use of administrative data for decision making is highly linked to the size of the institution and the level of education of the decision makers.

**Keywords:** Sustainable development goals, decision making, administrative data, Rwanda.

**JEL Classification Codes:** D78; D81; M51; L31; L32;

## 1. Introduction

The sustainable development goals (SDGs), officially known as ‘Transforming our World: the 2030 Agenda for Sustainable Development’ are a comprehensive set of 17 goals, 69 targets and over 300 indicators (United Nations Development Program [UNDP], 2015), which will go above and beyond the remarkable accomplishments of the 16 targets and 48 indicators of the eight millennium development goals (MDGs) to create a sustainable world by 2030 (Lamin, 2015). Formed through extensive worldwide consultations with all segments of society with an emphasis on targeting global challenges the SDGs are a comprehensive development plan to leave no person behind (Dennis, 2015). This will be difficult if not impossible unless strong government systems, in particular strong statistical systems that can measure and incentivize progress across the goals, are put in place (National Institute of Statistics of Rwanda [NISR], 2014). Given the breadth and complexity of the SDG agenda, different types of data will be required with varying levels of coverage (NISR, 2015). In Rwanda, apart from NISR, other ministries and agencies in the national government as well as local government units produce sector and area-specific statistics needed in the planning and monitoring of SDGs. They generate these statistics mainly from administrative-based systems. Ministries and institutions have been compiling and producing statistics from administrative-based systems such as fiscal statistics, financial statistics, tourism statistics, trade statistics, justice, law and order and other governance statistics. However, the record keeping systems are fraught with unreliable and incomplete records, inconsistencies and lack of standard definitions and concepts (NISR, 2014).

The absence of reliable and accurate data, data management systems and skilled statisticians is a serious constraint in policymaking, adequate analyses of development challenges and the monitoring and evaluation (M&E) of interventions (NISR, 2014). It is essential that such gaps be addressed so as to better enable the use of country-generated statistics in calculating global SDG indicators so that they are responsive to the statistical needs of achieving the 2030 agenda and beyond.

Our paper examines the extent to which decision makers in Rwandan institutions use administrative data in decision making and the impact that this will have on monitoring the SDGs from today to 2030. Data dissemination aims to raise the statistics and evidence-based decision-making culture in society (United Nations [UN], 2014). The SDGs have many targets and indicators and pursuing greater social inclusiveness in their monitoring requires the active engagement of many more stakeholders than were required for the MDGs. That is why our research targets decision makers not only in public institutions but also in NGOs, cooperatives and private institutions.

Data driven decision making (DDDM) is characterized by new technologies, new stakeholder partnerships, new platforms for bringing data together and new ways for decision makers, policymakers and citizens to use the data. It provides an important platform for implementing the SDGs and for monitoring the progress made towards their achievement. When integrated and analyzed into broader data use for decision making directed at SDG indicators, it can become an important asset.

Accessing, using and benefiting from data is assumed and expected by an increasing number of the people globally even though these people remain a minority. Here it is not just the data, but the outputs from data analyses that are critical. The SDGs are discussed with the ambitious aim that no one will be left behind. Hence, data use for decision

making will be a powerful toolbox for securing development that is more sustainable, socially inclusive and global.

## **2. Literature Review**

Recent calls for global data to inform sustainable development policymaking are unparalleled. In the document ‘Transforming our world: the 2030 Agenda for Sustainable Development’ Member States underscore the importance of ‘quality, accessible, timely and reliable disaggregated data to help with the measurement of progress and to ensure no one is left behind’ (UN, 2015). Further, Member States recognize the crucial role of ‘increased support for strengthening data collection and capacity building’ and are committed to addressing the gaps in data collection for the targets of the 2030 Agenda, so as to better inform the measurement of progress (UN, 2015). Further, in this document the sustainable development goal 17: ‘Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development’ targets 18 and 19 refer directly to capacity-building linked to data, monitoring and accountability.

The United Nations Statistical Commission was mandated to develop a global indicator framework. The inter-agency and expert group on SDG indicators (IAEG-SDGs) was established to conduct the work necessary for identifying the indicators and ensuring full implementation of related data development programs. In March 2016, at its 47<sup>th</sup> session, the UN Statistical Commission ‘agreed, as a practical starting point, with the proposed global indicator framework’ as developed by IAEG-SDGs. In June 2016, the Economic and Social Council (ECOSOC) took note of the UN Statistical Commission’s report and adopted its decisions including on the global indicator framework. Some of the indicators will require strengthening and on-going capacity building to define standards, developing methodologies and producing the necessary data and statistics for follow up and review. In the Addis Ababa Action Agenda of the third international conference on financing for development held in July 2015, Member States noted the importance of drawing on new data sources to meet user needs. ‘National statistical systems have a central role in generating, disseminating and administering data. They should be supplemented with data and analysis from civil society, academia and the private sector’ (UN, 2015).

The global statistical system is called to take decisive action to transform how data and statistics are produced and disseminated to inform development policy decisions with the vital support of governments and in closer partnerships with stakeholders from academia, civil society, the private sector and the public at large. This will entail concerted and sustained accounting and coordination of existing efforts and the strategic identification of investment for resources in order to significantly address existing gaps in the technical and institutional capacities of national statistical systems so as to improve the coverage, quality and frequency of data and statistics made available through transparent and public access. Accordingly, at its 46<sup>th</sup> session, the United Nations Statistical Commission agreed to establish a high-level Group for Partnership, Coordination and Capacity-Building for the 2030 Agenda (HLG-PCCB), comprising of chief statisticians from 23 national statistical offices representing other countries in their respective regions. HLG-PCCB was tasked to promote national ownership of the 2030 Agenda monitoring system and fostering statistical capacity building, partnerships and coordination. NSOs must coordinate its implementation at the country level. To further ensure national ownership,

HLG-PCCB prepared an action plan which was submitted for endorsement to the UN Statistical Commission at its annual meetings in March 2017 (UN, 2015).

Since 2004, when the Marrakech Action Plan for Statistics was developed, strategic planning has been recognized as a powerful tool for guiding the development of national statistics programs, increasing political and financial support for statistics and ensuring that countries are able to produce the data and statistics needed for monitoring and evaluating their development outcomes. At its third meeting held in New York in January 2016, HLG-PCCB members agreed to develop a proposal for a Global Action Plan for Sustainable Development Data (as a successor of the Busan Action Plan for Statistics from 2011) with the aim of outlining necessary actions to generate quality and timely data on a routine basis to inform sustainable development at the requested level of disaggregation and population coverage including the more vulnerable and hard-to-reach. The plan is also intended to fully account, communicate and coordinate existing efforts and to identify new and strategic ways to efficiently mobilize resources thereby addressing the recommendations of the Secretary-General's Independent Expert and Advisory Group on Data Revolution for Sustainable Development as well as the priorities identified in the Transformative Agenda for Official Statistics.

Increasingly funders of non-profit organizations are seeing DDDM as a way of assessing whether an organization is accomplishing its social mission and effectively targeting its resources (Kaplan, 2001). Such an emphasis, combined with the increasing competition for funding, has increased the use of evidence-based funding in organizations with a social mission which in turn has increased the resources devoted to assessing their performance (Carman and Fredericks, 2008; Davenport, 2006).

Unfortunately, few research studies can be used to guide funders or executives of mission driven organizations who strive to increase use of data in decision making. At least two specific gaps leave unanswered questions about how data processes are coordinated in mission-driven organizations and how processes might be embedded into an organization's culture to systematically integrate data into decision making (Maxwell et al., 2015).

First, little is known about how mission-driven organizations systematically integrate data into their decisions. Studies examining DDDM in non-profits have assessed the types of data that they collect (Carman, 2007; Carman and Fredericks, 2008) or the type of performance management indicators that they use (Carrilio et al., 2003). Such research generally examines one component of DDDM in isolation from other components and processes and from the organization's established culture of taking decisions. LeRoux and Wright (2010) used a broader DDDM framework to examine an organization's reliance on performance and output indicators including customer satisfaction and industry standards; however, their survey was not designed to understand how these individual DDDM components combined or did not combine to form a systematic process for collecting, analyzing and using data to take decisions. Such static measures of DDDM activities are necessary but not sufficient indicators of an organization's use of valid data to make decisions because the measures do not reveal the extent to which organizations have a coordinated process of sequential DDDM activities and a belief that using data over intuition enhances decisions. If funders or non-profit executives want to strengthen the use of evidence in making strategic and operational decisions, they must understand both how static measures of DDDM activities combine or do not combine to

form a process by which DDDM is used and supported in non-profit organizations (Maxwell et al., 2015).

A second potential knowledge gap exists in the accuracy of information about DDDM obtained from a single respondent in an organization which is the basis of most research on DDDM. If stakeholders hold different perceptions about an organization's DDDM activities and use research relying on a single individual in that organization may be inaccurate. Building a body of knowledge about DDDM either within an organization or across non-profits requires information from multiple individuals in an organization (Maxwell et al., 2015).

Alternatively, if stakeholders hold similar perceptions about an organization's use of data in decision making, the current practice of fielding surveys to individuals across organizations might efficiently build a body of knowledge about DDDM in non-profit organizations. Using verifiable data instead of intuition to take decisions can be a valuable business strategy in both for-profit and non-profit organizations. Research on for-profit firms suggests that DDDM increases their performance (LaValle et al., 2010) and their output and productivity by 5 to 6 per cent (Brynjolfsson et al., 2011). Research on non-profit organizations also suggests that DDDM increases the effectiveness of management decisions (LeRoux and Wright, 2010). Effectively using data to take decisions requires at least two key elements. First, the DDDM process must be embedded in an organization such that its staff members value and embrace the use of data over intuition in developing and implementing strategies (Julnes and Holzer, 2001). Such a process enables individuals to take appropriate and timely action (LaValle et al., 2010).

Second, it requires a coordinated process of sequential DDDM activities in which an organization collects, analyzes and uses data. Each stage is important. If data is not collected, organizations cannot analyze information to draw conclusions. If data is not analyzed consistently and correctly, staff members might use it to draw incorrect conclusions. Finally, if the results of the data analysis are not incorporated fully into decision making, the monies spent on collection and analysis is for naught (Maxwell et al., 2015). Until recently, relatively few non-profits had an incentive to adopt a DDDM strategy (Nonprofit Technology Network, 2012), in contrast to both for-profit firms and public sector organizations. However, the tide is shifting as some funders are now providing financial incentives or technical assistance for institutionalizing DDDM in the non-profits that they assist. This requirement is based on the belief that in order to position the social sector for impact and innovation beyond the limits of any one funder's engagement, DDDM must be developed and institutionalized at the organization level (Maxwell et al., 2015).

## **2.1. What are the 17 Sustainable Development Goals?**

The SDGs cover a wide range of issues. They include traditional MDG areas such as poverty, hunger, health, education and gender inequality and also cover new topics such as energy, infrastructure, economic growth and employment, inequality, cities, sustainable consumption and production, climate change, forests, oceans and peace and security (CAFOD, 2015).

The 17 SDGs are:

- Goal 1: End poverty in all its forms everywhere
- Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3: Ensure healthy lives and promote well-being for all at all ages
- Goal 4: Ensure inclusive and quality education for all and promote lifelong learning
- Goal 5: Achieve gender equality and empower all women and girls
- Goal 6: Ensure access to water and sanitation for all
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8: Promote inclusive and sustainable economic growth, employment and decent
- Goal 9: Build resilient infrastructure, promote sustainable industrialization and foster innovation
- Goal 10: Reduce inequalities within and among countries
- Goal 11: Make cities inclusive, safe, resilient and sustainable
- Goal 12: Ensure sustainable consumption and production patterns
- Goal 13: Take urgent action to combat climate change and its impacts
- Goal 14: Conserve and sustainably use the oceans, seas and marine
- Goal 15: Sustainably manage forests, combat desertification, halt and reverse land degradation, halting biodiversity loss
- Goal 16: Promote just, peaceful and inclusive societies
- Goal 17: Strengthen the means of implementation and revitalizing the global partnership for sustainable development, on finance, technology, capacity-building, trade and systemic issues

Lessons have been learned and the SDGs attempt to address the root causes of poverty, inequalities within and between countries, climate change and environmental degradation and peace and justice along with other important issues. Since 2011 the international community has been discussing what should follow from the MDGs in a process that includes governments, academicians, the private sector and civil society. The SDGs have more ability to respond to the experiences and priorities of the people on the ground.

While the MDGs focused mainly on poverty in developing countries, the SDGs are applicable to every country. This ambitious agenda moves beyond the MDGs by addressing the root causes of poverty and calling for all to take action for sustainable development. To understand how people's lives are changing, better information is needed on progress in the goals and targets. When data is broken down along the lines of age, gender, location and disability, it can give a more accurate picture of who is benefiting and who is being excluded.

New technology can create exciting opportunities to improve data but open, accessible data and data literacy for all is a key for the success of the SDGs.

## **2.2. SDGs domestication in Rwanda**

Rwanda is among the very few countries worldwide that have embarked on the process of SDGs domestication. Through collaboration with development partners, the country has started assessing how to domesticate the SDGs' targets in national development and poverty reduction strategies such as Vision 2020, the Economic Poverty Reduction Strategy (EDPRS) and the Sector Strategic Plans (SSPs) and the District Development Plans (DDPs) at the local government level. This domestication process goes beyond an

assessment of whether the SDGs' targets are reflected in national development strategies and also involves their integration in the sense of implementation towards reaching the 2030 development goals (Bizoza, 2016). To judge whether SDGs will be achievable will depend on a number of considerations. With reference to the MDGs, the country has made enormous progress especially in areas of poverty reduction (from 60.4 per cent in 2000 to 39.1 per cent in 2014-15), net enrolment (from 72.6 per cent to 96.8 per cent), food security, reduction of under-5 mortality (from 196 in 2000 to 32 in 2015), gender promotion and environment and natural resource management (MINECOFIN, 2016).

From the lessons learned so far from the MDGs, Rwanda needs to continue eradicating poverty, addressing issues related to child malnutrition, promoting sustained and inclusive economic growth, youth productivity and employment and quality education that is customized to the challenges of development and employment. Social protection programs still need to feature among priorities due to their double sided effects – ensuring equity in wealth distribution and creating more jobs through public investments such as feeder roads in rural areas. Further, efforts should be made for improving the private sector's productivity in areas with greater multiplier effects in terms of wealth creation and poverty reduction. Climate change adaptation and resilience that is especially adapted to small scale farmers will also need adequate consideration because this remains one of the main impending factors in agricultural development. Since governance is a key in this process, ensuring inter-institutional coordination through existing mechanisms such as sector working groups is still an issue in achieving the SDGs. In addition, Rwanda's economy needs diversified products for diversified markets especially those that may substitute imports. This sounds classic but industrialization remains significant in sustaining Rwanda's different ventures for its economic and structural transformation to address some of the structural challenges faced by the country such as unemployment and heavy dependence on imports. If ICT has been able to revolutionize some of the sectors and has promoted efficiency in service delivery (such as in the banking sector) then deciding on what industrialization Rwanda needs and implementing it should continue to feature on the development agenda.

The role of administrative data needs to be updated to respond to the needs of policy and emerging challenges calling for more technology innovations. It is clear that the implementation of SDGs will need more and efficient coordination mechanisms customized to local institutional arrangements, generation of data required to inform the monitoring and evaluation frameworks that are flexible for reporting purposes, clear division of labor between and within sectors and capacity development in various areas to uptake this very dynamic development pathway of the world.

### **2.3 Administrative and Statistical Data**

In our study, the distinction between administrative and statistical data for producing official statistics is rooted in the primary purpose of acquisition of data: administrative data is collected primarily for non-statistical purposes and adopted for producing statistics while statistical data is collected for preparing statistics and is in general not available for any other purpose (Nordbotten, 2008). Administrative data may be drawn from internal systems or supplied by external organizations. Administrative data sources are often used to manage the day-to-day operations within an organization or to deliver a service. Statisticians across the government's statistical system use administrative data

for producing official statistics. There are good reasons to base statistics on administrative data sources: data often provides a readily available, rich source of information without placing any significant burden on data suppliers. However, they are also susceptible to data quality issues.

Common data quality concerns with administrative data include incomplete data, incorrect data formats and mistyped data. There can also be variations in recording practices between suppliers who contribute to an administrative data source. Some of these issues arise because the data is not usually collected with statistical purposes in mind. There have also been some high profile cases where statistics based on administrative data have been found to be affected by intentional misreporting of the underlying data. Any of these problems not only affects the usefulness of the resulting statistics but can also lead to mistrust in the statistics and adverse publicity; in the high profile cases there have been parliamentary inquiries and a de-designation (National Statistician's Office, 2014).

### **2.3.1 Early use of Administrative Data**

It is difficult to state when official statistics were first produced and used, but it was probably when rulers of communities wanted to compare their power with that of their enemies.

According to Statistics Canada (2009), enumeration of different resources was regularly carried out in Babylon. About 4,000–5,000 years ago, Egyptian pharaohs also carried out censuses for tax collection and to determine fitness for military and labor services as well as for surveying progress in construction work. It was quite common in many countries to enumerate the male population within certain age brackets in order to provide the rulers with statistics about their potential power and records for recruiting soldiers to their legions. These statistics have in more recent times been utilized retrospectively to estimate the total populations and their age distributions.

Recording land properties was a usual means for rulers to determine the taxation of their populations. Based on statistics from these records, heads of countries could evaluate their potential income and wealth and keep control by means of the collection process. Trade in commodities passing frontiers was another early source for collecting taxes. This is when the first international trade statistics appeared.

The first formal offices for official statistics were established in the 18th century. They were frequently named 'Table Offices' reflecting the fact that their purpose was to summarize administrative micro-data into tables of macro-data and not to collect the data themselves (Koren, 1914). At that time, demographic records, tax data, public accounting data, health data, social data, medical data and school data were aggregated to separate types of statistics to describe the prosperity in a country.

International cooperation on official statistics was initiated in the middle of the 19th century. Some countries established national statistical bureaus which were responsible for all official statistics, while other countries chose to organize statistical departments within several ministries. In both cases, the statistics prepared were mainly based on administrative data, later to be supplemented by data collected solely for statistical purposes such as population censuses and statistical sample surveys. Typical of the

official statistics up to the Second World War was that the collection of data and production of statistics on different matters was to a large extent carried out independently (Sundgren, 2004, 2010). This made integration of the statistical results difficult. After the Second World War, the need for creating comprehensive and consistent descriptions of the economic, demographic and social aspects of countries increased. In particular the national accounts system became an important vehicle for organizing economic statistics into a conceptually consistent system (Vanoli, 2005). However, because of the diversified nature of the data on which the different parts of the national accounts were prepared, the compilation of national accounts became a very complex operation. Hence, the intention of developing a similar system of social and demographic accounts was never realized.

### **2.3.2 Current Use of Administrative Data**

Few industries, if any, can present a faster technological development than the electronic computers and communication industries during the last 50 years. Online data storage capacity, processing speed and communication facilities have increased far more than anybody anticipated a few decades ago. From being an expensive and huge tool for a small group of mainly academic users, IT technology is approaching one billion users, ranging in applications from advanced research to everyday email and message exchanges.

In parallel to the technological development, statisticians have continuously refined their computer processing methods to take advantage of these new possibilities. Advances have been made in a number of fields, from organization of statistical production in general to methods for online data collection and communication, data storage and retrieval, data editing and imputation, parameter estimation and predictions, on-demand access for users and so on. Architectures for organizing computer facilities to suit the requirements of individual NSI are available from single computers to advanced multi-computer clusters (Nordbotten, 2008).

Some methods and implementation of the use of administrative data in statistical production in accordance with the 50-year old ideas and principles have been refined and have become accepted as register-based statistics also outside the Nordic countries (Houbiers 2004; Longva et al., 1998; Statistics Denmark 1995; Statistics Finland 2004; UNECE 2007; Wallgren and Wallgren 2007).

An important issue is organizing the stored data for effective retrieval when requested. Since the 1960s, the development of modern database management systems has made significant progress from which the NSIs have benefitted. Recently, an outline of a structured data storage scheme for a process-oriented statistical production was presented indicating another step towards the realization of 50-year old dreams (Lundell, 2009). Administrative data has proved to be very useful for adjusting and improving collection frames of statistical censuses and sample surveys by using available additional information about the objects (Nordbotten, 2008).

Use of administrative data as compared to statistical data in a statistical application requires more attention since the administrative source has not usually tailored its collection in accordance with statistical concepts, standards and requirements. Data from administrative sources may therefore need statistical pre-processing to solve intricate

conceptual and matching problems before it can be used. The pre-processed data is typically organized by NSIs in statistical base registers for subsequent statistical processing (Nordbotten, 2008).

### **3. Methodology**

Our research adopted a descriptive research design. This design was preferred for its fact finding and exploratory features in establishing the truth. We used a quantitative technique since the expected information from the field involved factual elements that were to be presented using descriptive statistics. The target population comprised of decision makers from private institutions, public institutions, NGOs and cooperatives based in the Remera sector, Gasabo district in Kigali city. They comprised of 12,378 individuals among the 154,236 (Establishment Census, 2014) for the whole country. A stratified random sampling technique was used to select the research size. A sample size of 118 was selected from the target population, considering 5 per cent as the significance level and 10 per cent as the margin error.

The research instrument used was a questionnaire. The field survey was conducted in respective institutions; 118 structured questionnaires were distributed to the various institutions and information on administrative data use for decision making was obtained. Secondary data for this study was gathered from existing published works, that is, current data use in decision making journals and books, UN Rwanda reports and the World Bank reports. However, secondary data was not used in the analysis but was used in the introduction and literature review sections of the study.

The questionnaires were checked for completeness and consistency of information at the end of every field data collection day before storage. An analysis was done using the statistical package for social science (SPSS). The data was tabulated by making logical interpretations, conclusions and recommendations. Descriptive statistics (frequency analysis) were computed for presenting and analyzing the data. Data was presented in the form of frequency distribution tables, graphs and pie charts that facilitated a description and explanation of the study's findings (see Table 1).

Insert Table 1 about here

### **4. Data analysis and interpretation**

#### **4.1 The profile of the respondents and the response rate**

The sample for this research was a stratified sample totaling 120. This sample was divided into four strata, with one of these strata sub-divided into three more strata or groups. The data was collected in the Remera sector, in Gasabo district in Kigali city. This location was selected for its record as the highest emplacement of institutions in Rwanda.

As shown in Table 2, there were 13 non-responses which accounted for 10.8 per cent of the sample population. These non-responses were mainly due to the reluctance of some of the respondents to share information.

Insert Table 2 about here

Since all the institutional sectors had the same questionnaire, Table 3 gives the responses of cooperatives, NGOs and public institutions who were reached for the study.

Insert Table 3 about here

#### **4.2 A brief profile of the respondents**

Figure 1 shows that a majority of the respondents were either owners themselves or were representatives of the owners. This ensured that the collected information could be trusted since the respondents were in a position to answer the questions truthfully.

Insert Figure 1 about here

#### **4.3. Education Levels**

Figure 2 shows that a majority of the respondents had either completed or attended university in their lifetimes. This shows a satisfying level of education in Rwandan private, public and non-governmental institutions.

Insert Figure 2 about here

#### **4.4. Respondents' Gender**

Figure 3 shows that there was an equal share of men and women (50 per cent each) among the respondents regardless of the institution's size or sector.

Insert Figure 3 about here

#### **4.5 Use of Statistics in the decision making process**

The decision makers were asked to answer with 'Yes or No' on whether they used administrative data in decision making for the developing their institutions. Figure 4 shows that a majority of them said 'No.' This response was however highly dependent on the institution's size and its sector (whether public, NGO, cooperative or private) as 61 per cent of the respondents who did not use administrative data in their decision making process were then requested to choose among a few probable reasons and the main reason(s) why they did not use administrative data in their decision making processes; 75 per cent answered that they did not see the need for using statistics (Figure 5).

Insert Figure 4 about here

Insert Figure 5 about here

Figure 6 shows that only 13.33 per cent of the respondents who produced administrative data shared or disseminated their data outside their own institution in any form. Among those who disseminated data, 25 per cent responded that it was in a magazine while 15 per cent of the respondents disseminated it in the form of regular reports.

Insert Figure 6 about here

#### **4.6. The underlying relationships among the variables**

We investigated the relationships between the following independent variables: the institutional sector (public, private, NGO or cooperative), education level, the number of employees (or the size of the institution) and the dissemination of data against the dependent variable of data use in decision making.

Table 4 shows that there was a very strong relationship between the lack of use of statistics for decision making and the private institutional sector.

Insert Table 4 about here

It is apparent from Table 5 that the higher the education level, the more the institutions used statistics in decision making. However, drawing conclusions from the education level might need to be done carefully as only the respondents' education levels were recorded and not the average years of study in each institution. However, since most institutions had less than three people in their teams we decided to use this variable.

Insert Table 5 about here

As can be seen from Table 6 the use of statistics depended on the size of the institution. The larger the institution, the greater the use of statistics in the decision making process.

Insert Table 6 about here

#### **5. Conclusion and recommendations**

Not much research has been done on statistical use by the general population, especially on the use of statistics as a managerial tool for measuring and monitoring development in Rwanda. Most of the studies either focus on the use of official statistics by professionals or focus on studying the short lifespans of SMEs in Rwanda and usually conclude that they lack finances and managerial skills among other things.

Our research focused on the grossly neglected tool of statistics for development in any institutional sector and examined the underlying main causes of the lack of use of statistics to measure and monitor the UN's SDGs and Rwanda's aspirations for 2050. Our main findings include: a majority of the decision makers in the sample population did not use statistics to inform their decision making. This confirms the recent assessment made by the National Institute of Statistics of Rwanda (NISR, 2014). This pattern got stronger when the size of the institution (measured using the number of employees) was smaller and the education levels of the respondents were lower.

The main reason advanced by the respondents as to why they did not use statistics to inform their decision making process was that they saw no need to use statistics in their activities. The study also found that those who used statistics in running their businesses found them extremely useful and indispensable while those who did not use statistics to inform their decisions did not see any need for their use.

There is a strong lack of dissemination/sharing by institutions, especially in the private sector, which use statistics to inform others about their decisions. The main reason advanced for this was that they did not feel comfortable sharing information that they found sensitive and which they felt the competition could use against them.

In light of these findings, this paper recommends that the government should develop and implement educational programs to increase data literacy and empower institutions and individuals to use statistics effectively in their decision making processes to promote the development of a technological infrastructure for better data dissemination. There is also a need for developing effective communication and data dissemination strategies and guidelines for a public and private dialogue oriented at policymakers, legislators, the media, the general public and the economy. Further, the use of e-learning platforms to share knowledge between producers and users of statistics should also be enhanced.

More research should be done on the subject of administrative data production and use for decision making in Rwanda preferably using a much larger sample population since our research used information from only one respondent in an institution and thus it might not be reliable.

Institutions' owners or managers should also adopt statistics as a decision making tool and also use ICT.

## References

- Bizoza A. (2016), *Where Rwanda needs to focus on in the new course of Sustainable Development Goals by 2030?* Chronic Poverty Advisory Network Accessed on August 10, 2017 at: <http://www.chronicpoverty.org/blog/2016/3/3/sdgs-series-1-where-rwanda-needs-to-focus-on-in-the-new-course-of-sustainable-development-goals-by-2030>
- Brynjolfsson, E., L.M. Hitt, and H.H. Kim (2011), *Strength in numbers: How does data-driven decision making affect firm performance?* Available at: <http://dx.doi.org/10.2139/ssrn.1819486>
- CAFOD (2015). The Catholic development agency for England and Wales action towards 2030. Accessed on August 10, 2017 at [http://www.together2030.org/wp-content/uploads/2016/01/cafod\\_sdg\\_single.pdf](http://www.together2030.org/wp-content/uploads/2016/01/cafod_sdg_single.pdf)
- Carman, J.G. (2007), Evaluation practice among community-based organizations: Research into the reality. *American Journal of Evaluation*, 28(1): 60–75.
- Carman, J. G. and K. A. Fredericks (2008), Nonprofits and evaluation: Empirical evidence from the field. *New Directions for Evaluation*, 119: 51–71.
- Carrilio, T.E, T. Packard, and J.D. Clapp (2003), Nothing in—nothing out: Barriers to the use of performance data in social service programs. *Administration in Social Work*, 27(4): 61–75.
- Davenport T.H. (2006), Competing on analytics. *Harvard Business Review*, 84(1): 98–107.
- Dennis, H. (2015), *Leave No One Behind from goals to implementation*. Available at: <http://www.christianaid.org.uk>
- Houbiers, M. (2004), Towards a Social Statistical Database and Unified Estimates at Statistics Netherlands. *Journal of Official Statistics*, 20: 55–75.

- Julnes, P.D. and M. Holzer (2001), Promoting the utilization of performance measures in Public organizations: An empirical study of factors affecting adoption and implementation. *Public Administration Review*, 61: 693–708.
- Kaplan, R.S. (2001), Strategic performance measurement and management in nonprofit organizations. *Nonprofit Management and Leadership*, 11: 353–370.
- Koren, J. (1914), *The History of Statistics, Their Development in Many Countries. Book I: Historical and Commemorative Addresses*. New York: Macmillan.
- Lamin, M. (2015), *The Sustainable Development Goals (SDGs) Agenda: Making the Twenty-First Century The Century of Humanity – What Has Been Achieved One Year Down the Road?* Available at: <http://www.rw.one.un.org>
- LaValle, S., E. Lesser, R. Shockley, M.S Hopkins, and N. Kruschwitz (2010), Big data, analytics and the path from insights to value. *MIT Sloan Management Review*, 52(2): 21-31.
- LeRoux, K. and N.S. Wright (2010), Does performance measurement improve strategic decision making? Findings from a national survey of nonprofit social service agencies. *Nonprofit and Voluntary Sector Quarterly*, 39: 571–587.
- Longva, S., I. Thomsen, and P.I. Severeide (1998), Reducing Costs of Censuses in Norway through Use of Administrative Registers. *International Statistical Review*, 66(2): 223–234.
- Lundell, L.G. (2009), Strukturerade datalager for effektivare produktion. Unpublished paper. Statistiska Centrbyrå<sup>n</sup>, U/ARK. Stockholm (in Swedish).
- Maxwell, N., D. Rotz, A. Dunn, L. Rosenberg, and J. Berman (2015), *The structure and operations of social enterprises in REDF's social innovation fund portfolio: Interim report*.
- NISR (2014), *National Strategy for the Development of Statistics (NSDS 2009-2014)*. National Institute of Statistics of Rwanda, Kigali, Rwanda: Government of Rwanda.
- Nonprofit Technology Network (2012), *The state of nonprofit data*. Accessed on August 10, 2017 at <https://www.nten.org/article/the-2012-state-of-nonprofit-data-report/>
- Nordbotten, S. (2008), The Use of Administrative Data in Official Statistics – Past, Present, and Future –With Special Reference to the Nordic Countries. Official Statistics in Honour of Daniel Thorburn, pp. 205–223.
- National Statistician's Office (2014), *Using Administrative Data: Good Practice Guidance for Statisticians*. National Statistician's Office, Sweden.
- Sustainable Development Solutions Network (2013), *An Action Agenda for Sustainable Development*. Accessed on August 10, 2017 at <http://unsdsn.org/resources/publications/an-action-agenda-for-sustainable-development/>
- Statistics Canada (2009), *History of the Census, Ottawa*. Available at: <http://www.statcan.gc.ca/edu/power-pouvoir/ch2/history-histoire/5214912-eng.htm>

- Statistics Denmark (1995), *Statistics on Persons in Denmark – A Register-based Statistical System*. Luxemburg: Eurostat.
- Statistics Finland (2004), *Use of Registers and Administrative Data Sources for Statistical Purposes – Best Practices in Statistics Finland*. Helsinki.
- Sundgren, B. (2004), *Statistical Systems: Some Fundamentals*. Statistiska Centralbyran Stockholm. Available at: <http://sites.google.com/site/bosundgrenknowledgebase>
- Sundgren, B. (2010), The System Approach to Official Statistics. Official Statistics in Honour of Daniel Thorburn, pp. 225–260.
- UNECE (2007), *Register-based Statistics in the Nordic Countries. Review of Best Practices with Focus on Population and Social Statistics*. United Nations Economic Commission for Europe. Available at: [http://www.unece.org/stats/Publications/Register\\_based\\_statistics\\_in\\_Nordic\\_countries.pdf](http://www.unece.org/stats/Publications/Register_based_statistics_in_Nordic_countries.pdf)
- UNDP (2015), *Integrate SDGs in development plans for effective implementation, urges one UN*. Launch of the SDGs during the Social Good Summit at UR Huye Campus, 28 September 2015.
- UN (2014), *Prototype Global Sustainable Development Report*. New York: United Nations Department of Economic and Social Affairs.
- United Nations, (2015), *Transforming our World: The 2030 Agenda for Sustainable Development*. Available at: <https://sustainabledevelopment.un.org/post2015/transformingourworld/publication>.
- Vanoli, A. (2005), *History of National Accounting*. Amsterdam: IOS Press.
- Wallgren, A. and B. Wallgren (2007), *Register-based Statistics: Administrative Data for Statistical Purposes*. Hoboken, NJ: Wiley Series in Survey Methodology.

Table 1: The overall sample population

Institutional sectors	No. of questionnaires derived		Per cent
Private	Total:113		96%
	Micro (1-3 employees)	106	
	Small (4-30 employees)	7	
	Medium and Large (31+ employees)	1	
Public		1	1%
NGOs		2	2%
Cooperatives		1	1%
Total		120	100%

Table 2: Response rates with respect to the institutional sector

	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid 0	12	10.0	10.0	10.0
NGOs	2	1.7	1.7	11.7
Private	102	86.7	86.7	98.3
Public	1	.8	.8	99.2
Cooperative	1	.8	.8	100.0
Total	120	100.0	100.0	

Table 3: Response rates with respect to the number of employees (size of institution)

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	small (1-3 employees)	78	65.0	73.6	73.6
	Medium(4-30 employees)	24	20.0	22.6	96.2
	Large (31+)	4	3.3	3.8	100.0
	Total	106	88.3	100.0	
Missing	0	12	10.0		
	System	2	1.7		
	Total	14	11.7		
Total		120	100.0		

Table 4: Relationship between the use of statistics in an institution and the institutional sector

		Do you Use Administrative Data for Decision Making?		Total
		No	Yes	
Institution Type	NGOs	0	2	2
	Private	61	42	103
	Public	0	1	1
	Cooperative	0	1	1
Total		61	46	107

Table 5: Relationship between the use of administrative data in an institution and the respondent's educational level

		Do you Use Administrative Data for Decision Making in your Institution?		Total
		No	Yes	
Education level	Primary education level	4	0	4
	O level	8	0	8
	A level	24	13	37
	University	23	25	48
	Master's degree	1	5	6
Total		60	43	103

Table 6: Relationship between the use of administrative data in an institution and the number of employees (or size of the institution)

		Do you Use Administrative Data for Decision Making in your Institution?		Total
		No	Yes	
Number of employees	small (1-3 employees)	58	20	78
	Medium (4-30 employees)	2	22	24
	Large (31+)	0	4	4
Total		60	46	106

Figure 1. Respondent's position in the institution

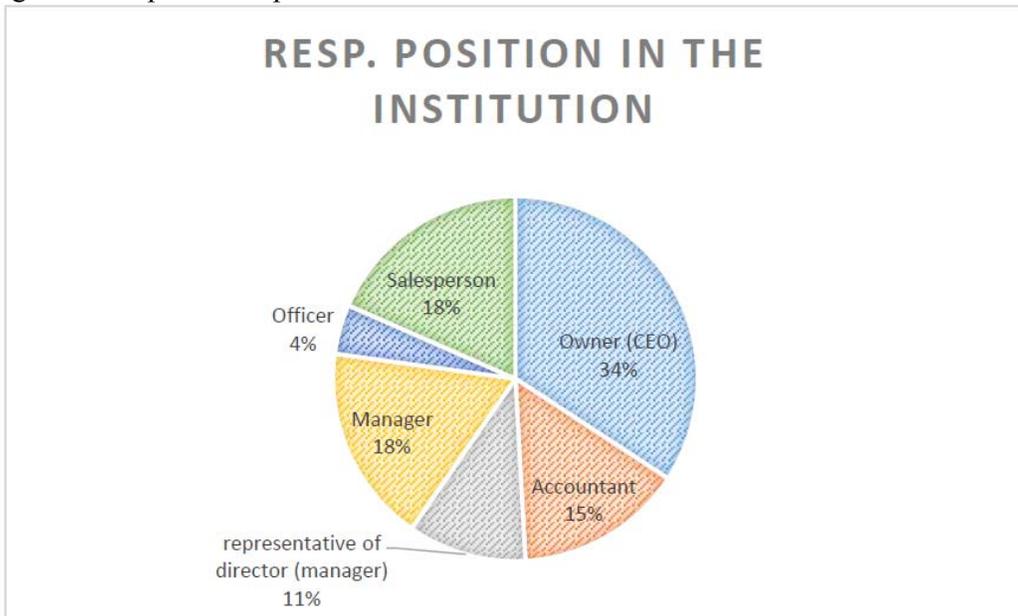


Figure 2. Education levels of respondents

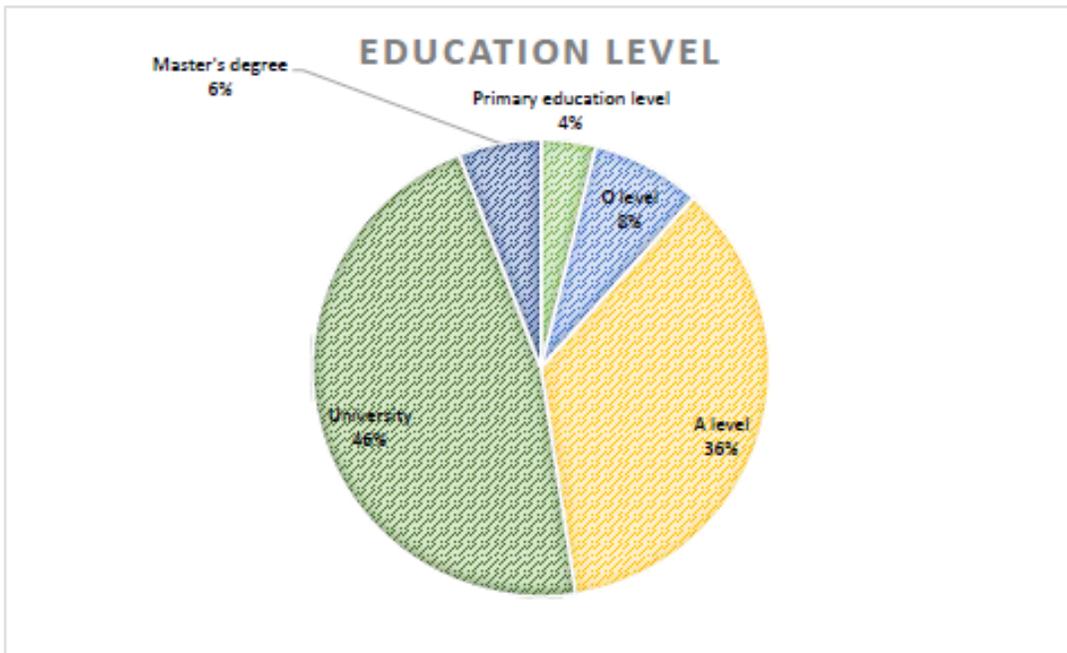


Figure 3. Gender of the respondents

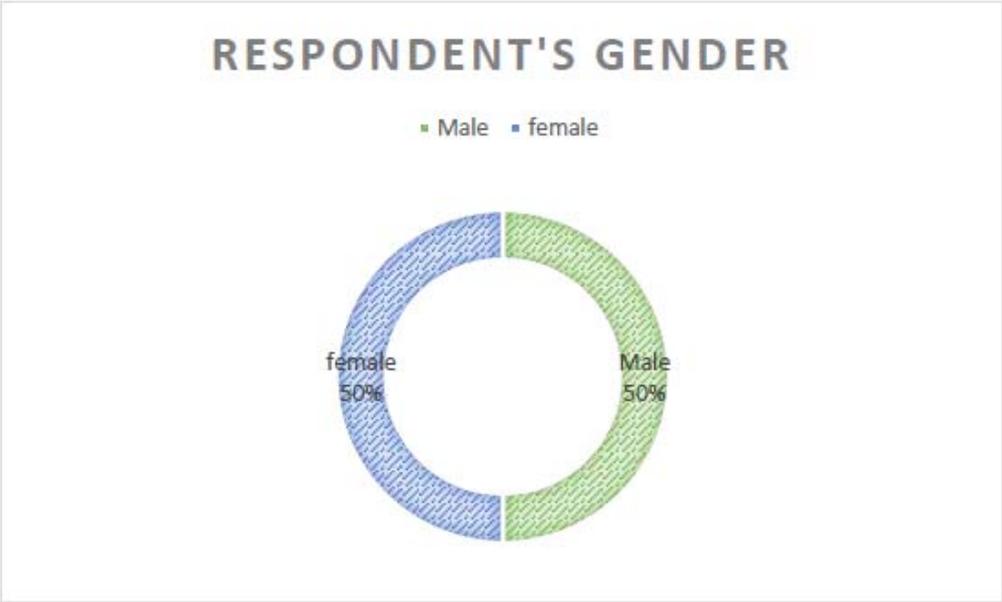


Figure 4. The use of statistics in decision making in different institutions

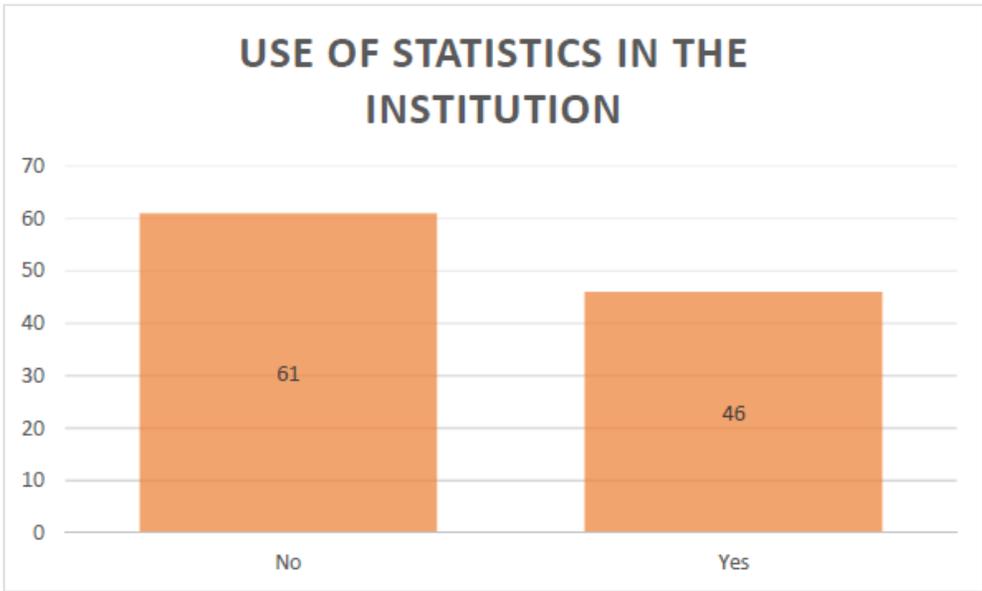


Figure 5. Reasons why data not used in the decision making process

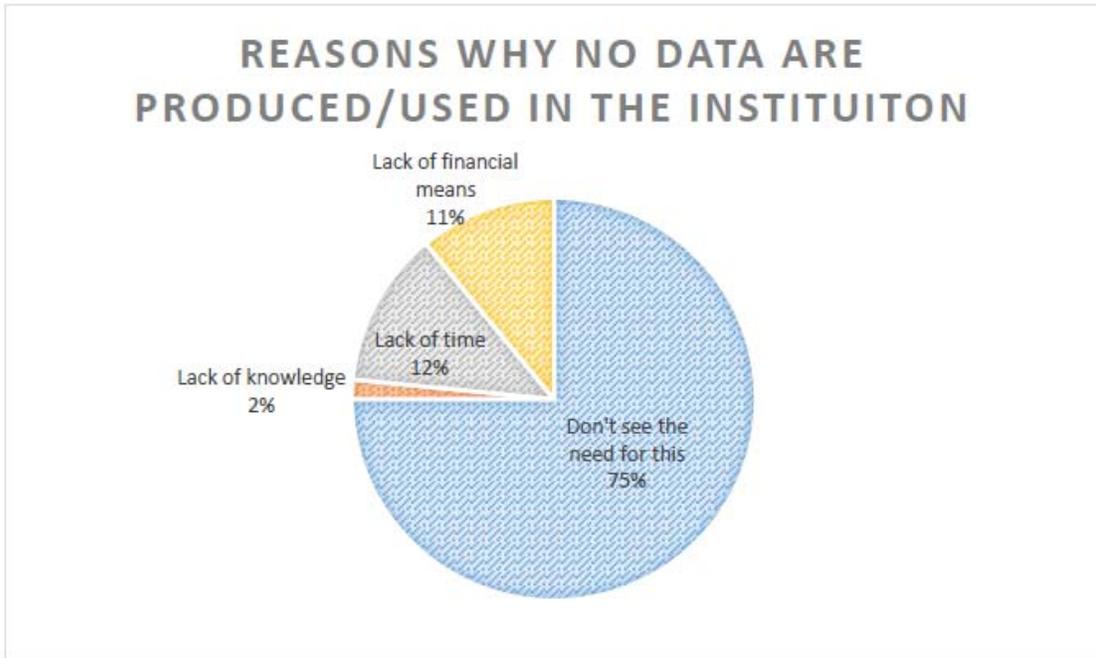


Figure 6. Data dissemination/sharing by the institutions

