The research targeted primarily ordinary citizens who are taxpayers and stakeholder/ Tax collectors and the methodology used was a multi-approach sampling technique including purposive, simple random and systematic sampling methodology to collect primary and secondary qualitative and quantitative data. Quantitative techniques included a household survey covering 64 villages 8 cells, 2 sectors and 2 Districts of Gasabo and Bugesera using a closed questionnaire. Interviews were carried out with key stakeholders in Ministry of Finance and Economic Planning (MINECOFIN) Ministry of Local Government (MINALOC), Rwanda Revenue Authority (RRA), Rwanda Association of Local Government Authority (RALGA) and GIZ in the selected two districts, a comprehensive review of policy, laws and regulations, revenue collection reports, financial reports, commissioned survey reports and administrative statistical databases, the data were analysed using Excel and statistical package for social sciences (SPSS).

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THE ROLE OF SMART TECHNOLOGY IN COLLECTING LAND LEASE FEE IN RWANDA.

The Case of Gasabo In Kimironko Sector and Bugesera In Nyamata Sector

BWATETE ARINDA Enock

ABSTRACT

This article presents the findings and recommendation for the research title the role of smart technology in collection of land lease fees in Kimironko and Nyamata sectors from the period 2010 – 2013 and 2014-2017 before and after introduction of the smart technology. The primarily objective of this article is to investigate the role and impact smart technology has brought in the Local Government revenue collection with more specific the Land Lease fees.

The research targeted primarily ordinary citizens who are taxpayers and stakeholder/ Tax collectors and the methodology used was a multi-approach sampling technique including purposive, simple random and systematic sampling methodology to collect primary and secondary qualitative and quantitative data. Quantitative techniques included a household survey covering 64 villages 8 cells, 2 sectors and 2 Districts of Gasabo and Bugesera using a closed questionnaire. Interviews were carried out with key stakeholders in Ministry of Finance and Economic Planning (MINECOFIN) Ministry of Local Government (MINALOC), Rwanda Revenue Authority (RRA), Rwanda Association of Local Government Authority (RALGA) and GIZ in the selected two districts, a comprehensive review of policy, laws and regulations, revenue collection reports, financial reports, commissioned survey reports and administrative statistical databases, the data were analysed using Excel and statistical package for social sciences (SPSS).

The findings show that respondents 70% are male, 30% are female for both Kimironko and Nyamata Sectors**.** The taxpayers and land lease fees collection increased from 2013-2017 by 81% and 81.3% respectively and all respondents acknowledged to comply and pay land lease fees, 56.25% started in the period 2014-2017 compared to 43.75% in 2011-2013 which is attributed by introduction of the smart technology. The findings show on average 57% used IREMBO, 33% RRA system, 7.9% pay to tax collectors and 2.5% use telephones. For paying

Land lease fees on average 58.7% use banks, 36.2% Mobile Money, 3.7% MobiCash and 1.4% Revenue collectors. 97.6% believe that smart technology is supportive in paying and filling and 2.4% say its not. 73.8% agreed that the system notifies them before the time and 26.2% does not notify them, 72.3% agree that the system helps them to compute and 27.7% disagree. For the comparison between previous and current system used to file and pay 88.75% believe it is helpful and 11% disagree. For innovation on average 59.4% believe it improves access to services and land lease fees payment, 32.6% for enhancing transparency in governance, 4.5% increases citizen participation, 1.5% information dissemination and 1.1% for filing and paying land lease fees.

The benefit of the smart technology, majority interviewed indicated that the system has reduced the level of tax evasion, embezzlement of government funds, reduced fraud, and enhanced transparency at different levels, helps to identify the taxpayers wherever they are and at any time and helps to monitor what type of revenue is being collected and detect any possible issues that may arise beforehand, enables revenue payers to avoid unnecessary mistakes and errors and helps to keep accurate data and majority believes that revenues have increased since the introduction of smart technology.

The existing challenges Lack of, limited and interrupted network, because some areas are not under network coverage, the system still keeps the name of the taxpayer even when the business has closed down and or relocated and this can mislead the financial reporting, accessing information at the District level is still a problem the registration process is very slow, no full access at District level, to accounting reports of collected fees and lack of knowledge and skills on this smart technology by the District officials and Limited capacities building among staff to use the smart technology.

INTRODUCTION

This article has explored **"The use of smart technology in collecting land lease fee in Rwanda in kimironko and Nyamata sectors"**. The research investigates the role and impact of ICT/smart technology to facilitate revenue administration and management since its introduction in 2014. In existence of the decentralization law No. 29/2005 of 31/12/2005, which gives the mandate Local Government to collect decentralised taxes and fees to date, the most challenging part was to have a tool which can allow Districts to collect their locally generated revenues in an efficient way. The only tool all Districts used in managing the revenue was Excel spreadsheets which could not give accurate information on the taxpayers' database. Hence, taxpayers who have not paid as well as information on how much has been collected in terms of reporting, therefore promoting accountability; could not been established.

CONCEPTUALISING DISTRICT REVENUE AND FEES

To bridge this gap, the Government of Rwanda adopted the Fiscal and Financial Decentralization Policy in 2001, later revised in in 2006, 2010 and 2016 respectively to enable Local Governments (LGs) to collect their own revenues with the objective of increasing the required resources to implement the decentralised responsibilities the central government allocated to them. However, the LGs of Rwanda were still challenged to put in place effective systems for the revenue administration, management, mobilisation of decentralised taxes and fees , and collecting the required revenue to support development and it remains a burden to them. This phenomenon is not peculiar to Rwanda or to Africa, as most developing countries face a similar situation, although in recent years other regions have been more successful in mobilising foreign direct investment than Africa has been. It is in this spirit that the Government of Rwanda, through the Ministry of Finance and Economic Planning (MINECOFIN) in conjunction with the Ministry of Local Government (MINALOC), Rwanda Revenue Authority (RRA) and the LGs themselves attempted to put in place and coordinate appropriate systems to implement these mandates. Various mechanisms were initiated to this end, including the recent introduction of the use of smart technology like online platform IREMBO and the Rwanda Automated Local Government Management System (RALGM) to enable Local Government to use an automated system for the management and administration of LGs own revenues. For the purpose of this article, "**Smart Technology**" is defined as the technological systems or tools such software's or online platform such "IREMBO", "Rwanda

Automated Local Government Management System" (RALGM) and use of Mobile telephone devices that is used for registering, filling and payment of taxes and fees for Local Government.

WHY SMART TECHNOLOGY IN LG REVENUE COLLECTION

In order to reduce the dependency on central government transfers and international grants, the Rwandan LGs was to strengthen their own revenue administration and management by use of automated systems or smart technology. This has been very difficult for LGs as mentioned above due to inefficient resources, tax collection systems and lack of capacity of local administration.

Until 2013 the LGs/Districts were still using Excel as a type of software and had not updated taxpayers' databases to know who had paid and which payments were still outstanding. In addition, District officials lacked capacity building, training and knowledge of the taxation regulatory framework. These challenges resulted in poor enforcement of tax legislation and some fees that were not even collected; hence, the process was not cost effective. Due to the inefficiency of the tax collection process that failed, the cost of the collection process also was often higher than the revenue collected; therefore, the local administration opted to rather not collect these outstanding payments instead.

From a citizen's point of view, in terms of the lack of a voluntary culture of paying revenue, long distances between District offices and banks and long queues at counters also discouraged citizens from paying their taxes.

It is in this context that the use of smart technology was introduced; for example the Rwanda online platform IREMBO and the RALGM to enable LG to use an automated system for the management and administration of LG's own revenues.

This study intends to investigate the use of smart technology in collecting land lease fees in Kimironko and Nyamata sector. The main guiding research question formulated for the purposes of this study will therefore be: **Which systems and mechanisms are in place to improve revenue collection with smart technology and what is the role of smart technology/ICT on district revenue in general and revenue collection in terms of land lease fees in the two sectors of Gasabo and Bugeserea Districts in particular?**

It is a hypothetical point of departure that due to the lack of an appropriate system for database management, registration, collection, recovery and managing high cost collection, with the introduction of the use of smart technology it is believed that revenues will increase and simultaneously cost of collection will be reduced.

RESEARCH OBJECTIVES

The general objective of the research is to investigate the role and impact smart technology has brought in the Local Government revenue collection with more specific the Land Lease fees in Kimironko and Nyamata sectors.

Research objectives

This study intends to achieve the following specific objectives:

- To determine the influence of smart technology use in the administration and management of LG or District revenues.
- To find out if smart technology is a solution to address the existing challenges experienced Local Government in tax collection.
- To determine whether the use of ICT mechanisms improved revenue collection in terms of land lease fees in the Gasabo and Bugesera Districts.

RESEARCH QUESTIONS

Researchers are generally prompted to ask certain questions that may help them answer and provide possible solutions to the research problem under investigation. The research questions to be addressed by this study are:

- What is the influence of smart technology on LG/District revenues?
- What difference does smart technology brought to address the existing challenges experienced in tax collection?
- What extent has smart technology mechanisms improved revenue collection in two sectors (Kimironko and Nyamata)?

SCOPE OF THE STUDY

The research was carried out in two Districts of Rwanda: Gasabo an urban District of the City of Kigali and ranked number one in local revenue collection; and Bugesera, a rural District of the Eastern Province ranked number one and as number four behind Kicukiro, Nyarugenge and

Gasabo in revenue collection in general. The study was carried out in two sectors, four cells and eight villages in each cell were selected as a focus when collecting data due to the length and nature of a the article.

SIGNIFICANCE OF THE STUDY

This study attempts to inform policymakers at central level of governance and local authorities to determine whether smart technology has brought any positive change to develop smart cities.

The study also aims to inform development planners and policymakers in developing countries about the concept, context and strategies to utilize smart technology or ICT in LG revenue administration and management. It also aims to contribute to the body of knowledge in terms of the processes of formulating appropriate policies to increase the Rwanda LG revenues for their financial sustainability.

LITERATURE REVIEW

This chapter is given to provide a contextual analysis of the topic under study in terms of specified research objectives, the researcher conducted an extensive literature review after the data collection process. “The literature review offers a synthesis of what has already been written on the topic, it helps to identify certain gaps and provides guidelines to fill these omissions” (Creswell 2009: 25). The literature review shares the “results of related studies and contextualises the study’s reasoning, as well as to what extent the conceptual framework contributes to the…larger, ongoing dialogue in the literature” (Creswell 2009: 25).

In recent years a number of developing countries have been undergoing political decentralisation, with central governments devolving to local governments the responsibilities of delivering local public services and developing key infrastructure that requires large financial resources (Roberto De Vera and Yun Hwan Kim 2003: 7). However, it seems as if the, “deterioration of the fiscal health in many countries, the mismatch between the delegated responsibilities and revenue-generating authority, the resultant continued heavy reliance on central government transfers, and lack of political will to develop an external financing strategy to tap long-term private resources” (Roberto De Vera and Yun Hwan Kim 2003: 6) is a major problem in many developing counties.

The application of ICT in city government has become more widespread and sophisticated. Technological advancement in society is applied in various forms and systems as a means of improving services rendered by local governments to communities. The emergence of the so-called 'networked society' has given rise to networked cities and governance associated with ICT (Townsend 2013:12).

THEORETICAL FRAMEWORK

Rapid global urbanisation suggests that each time a city expands, advances in information technology (IT) need to follow suit to keep abreast of ever-expanding complexities. As a result, urban planning praxis and addressing 'wicked' problems associated with urbanisation also need to keep pace. ICT-linked urban planning and infrastructure initiatives have given rise to the notion of 'smart' or 'intelligent' cities (see Santinha and Anselmo de Catro 2010; Townsend 2013; De Obeso-Orendain, Lopez-Neri, Dominiquez and Gutierrez-Garcia 2014).

According to De Obeso-Orendain et al. (2014), cities of the future need to have 'latent intelligence in their DNA' to be smart. Cities can be regarded as the "nexus of socio-cultural, technical and economic gravitas" (De Obeso-Orendain et al. 2014), and obtain adaptive capacities to optimally utilise technology for the "systemic smarts to operate and govern cities" (De Obeso-Orendain et al. 2014).

Urban governance of the future should make provision for 'civic-cyber' interactions and urban ICT praxis. This includes urban digital networks, the use of facial and spatial recognition systems, fixed and mobile technologies and the ever-expanding 'internet of things' (Townsend 2013:3). Crang and Graham (2007:789) describe this phenomenon as 'sentient' cities. According to the authors, "It is a world where we not only think of cities, but cities think of us, where the environment reflexively monitors our behaviour". The data generated in this 'informational entanglement' "raises serious transparency, privacy, surveillance and public sphere contestations as ubiquitous informational overlays [that] interpenetrate urban spaces" (Nissenbaum and Varnelis 2012:30). Smart cities must cater for 'smart people' (also referred to as 'atomised' citizenship) who require the most recent 24/7 technologies to do business, stay connected, socialise and live (Van der Waldt 2015:89).

A ‘smart citizenship’ approach is mainly about an engaged community and active partnerships between citizens and local governments. It is also about a civic-cyber dialogue regarding local ICT needs (Townsend 2013). Such needs may include open access, open-source software, adequate bandwidth and ‘net neutrality’. Local business would also require adequate internet connectivity to facilitate business transactions.

Importantly, people with no access to internet technology should not be excluded from certain services rendered by the districts. Smart citizenship is a call for focusing on ‘citizen science’, which refers to the use of local knowledge systems and traditions (Paulos, Honicky and Hooker 2008), ‘civic intelligence’ (Schuler 2001), and the notion of ‘sharing cities’ (Agyman and McLean 2014). The common thread in these concepts is that technology should help bolster communities’ prosperity and general welfare.

To understand the concept of a ‘smart city’, it is crucial to detach the word ‘smart’ from ‘city’. In marketing language, the word smart is centred on a user perspective. This is mainly because of the need to appeal to a broader base of community members. Notably, ‘smart’ is a more user-friendly term than ‘intelligent, which has a more elitist association (Van der Waldt 2015:90).

A smart city is required to adapt to user needs and to provide customised interfaces. In the urban planning field, smart growth is viewed as a normative claim and ideological dimension. In essence, being smarter entails strategic directions where governments and public agencies devise new policies, strategies and programmes to target sustainable development, sound economic growth and a better quality of life for citizens (Center on Governance 2003: Internet Source). This further implies that they associate smart with achieving policy success in their jurisdictions. Therefore, the combination of the concepts ‘smart’ and ‘city’ consists of numerous definitions that are mainly focused on the use of smart computing technologies for well-erected infrastructures within the city, community participation and access to information necessary to ensure smart citizens and the dissemination of viable information.

For the purposes of this research, a smart city enables and encourages its citizens to become active, participative members of the community. After buying-in to this approach, citizens can actively provide feedback on the quality of services, the state of roads and the built environment. Moreover, citizens are more likely to adopt a more sustainable and healthy lifestyle, volunteer for social activities or support minority groups. Citizens need employment and smart cities are often attractive locations to live, work and visit (Department of Business, Innovation and Skills 2013 in Van der Waldt 2015:97).

The concept of a 'smart city' is dynamic, implying that there is no absolute definition. Rather, it is a process, or a series of steps, whereby cities become more advanced, livable and resilient, hence the ability to respond quicker to new challenges. Therefore, a smart city should enable every citizen to engage in the full spectrum of public and private services on offer, in a manner that suits their needs. Smart cities merge areas such as social capital, hard infrastructure including community institutions, local skills and digital technologies; in order to enforce sustainable economic development and provide an attractive environment for everybody (Department of Business, Innovation and Skills 2013 in Van der Waldt 2015:98).

Scholars usually distinguish between 'smart cities' and 'smart citizenship' (Van der Waldt 2015). Smart cities are generally regarded as top-down, commercially driven, with a low degree of civic-cyber engagement agenda, whereas smart citizenship is seen as a more bottom-up, high degree of civic-cyber engagement in a community-driven ICT agenda. These distinctions serve to highlight comparisons across five distinct dimensions or modalities, namely governance, civic participation, infrastructure, civic space and urban livability (Picot and Wernick 2007:668).

From the above, it is clear that there are numerous definitions of a smart city that uses smart informatics and ICT for urban governance. Townsend (2013:12) asserts that a smart city is "a place where information technology is combined with infrastructure, architecture and everyday objects to address social, economic and environmental problems". This highlights the notion that the application of ICT in city government has become more widespread and sophisticated. The technological enhancement in society is applied in different forms and systems as a means

of improving services LGs provide to societies. The rise of a networked society opened a platform for the establishment of ICT-related networked governance and cities.

In order for a city to be referred to as a smart city, it must rely on smart computing technologies, which are applied to critical infrastructure components and services. Smart computing refers to a new generation of integrated software, hardware and network technologies that provide IT systems with real-time awareness of the world. For the dissemination of information, smart computing provides advanced analytics to assist people in making more intelligent decisions to optimise business processes and organisations (Washburn, Sindhu, Balaouras, Dines, Hayes and Nelson 2010: 88).

In essence, ICT in government is increasingly becoming more widespread and sophisticated. Technological advancements are applied in various forms to help improve LGs' service delivery. The rise of a networked society has led to networked cities and smart citizens who have to adapt to ICT-related networked governance. Smart citizens are well informed and well equipped to use government's service delivery focused ICT mechanisms. This includes urban digital networks, the use of spatial and facial recognition systems, fixed and mobile technologies and the internet (Picot and Wernick. 2007: 668).

Data generated in informational entanglement raises serious transparency, privacy, surveillance and public sphere contestations as ubiquitous informational overlays interpenetrate urban spaces. Smart citizenship is about an engaged community and active partnerships between citizens and local governments, as well as civic-cyber dialogues regarding local ICT needs such as open access, open-source software, adequate bandwidth and net neutrality (Washburn et al. 2010: 88). Smart citizenship refers to an approach used by smart cities to call for engaged, active and critically reflective civic-cyber debates and deeper discourses among a diversity of citizens. It is essential for civic-cyber dialogue and debates to address ICT praxis in relation to local needs. Furthermore, questions relating to technological control, trajectories and choices, as well as ICT uptake, deployment and designs by citizens should be considered.

Townsend (2013:69) argues that without the building blocks of open ICT infrastructure and platforms for smart citizens including open access, open source software and net neutrality, the construction of a smart city and its social economy will be highly unlikely. Therefore, it is important for smart citizenship to include engineers, system scientists and coders. Sadoway (2013:110) suggests that civic activists, local associations and longstanding community groups should be involved, as they make up the civic cyber space.

Smart citizenship must aim to draw lessons from urban planning traditions that emphasise deep and meaningful civic engagement or community control in questions related to local urban planning and design (Friedman 2010:163). Importantly, smart citizenship promotes respect for traditional knowledge systems and calls for focusing on citizen science and civic intelligence by considering community informatics approaches. Therefore, smart citizenship fosters the use of technology as a tool that serves individuals and communities for design and deployment, as well as for setting local civic and infrastructural priorities (Agyeman and McLean 2014:55).

CONCEPTUALISATION OF SMART TECHNOLOGY

The notion of e-governance is a prominent feature in the construction of smart cities and smart citizenship. The application of e-governance models is significant due to their impact on government administrations in general and management applications in particular. Advocates of e-governance argue that only 'online' governments will be able to survive future demands placed on their administrations. According to the United Nations Development Program (UNDP) (2009), the following three strands to ICT interoperability underpin e-governance applications in countries and cities:

- **Technological interoperability:** This includes both ICT hardware and software issues. The hardware mainly concerns connectivity and protocols, while software pertains to a common syntax for data and standards for messaging (United Nations Development Program (UNDP) 2009).

- **Semantic interoperability:** This implies that, despite divergences in the ICT structure, organisation and content of the exchanged data, the intended meaning is conveyed correctly, the information is acquired correctly and the expected actions are understood and undertaken (United Nations Development Program (UNDP) 2009).

- **Organisational interoperability:** For an effective and far-reaching cooperation between two (or more) organisations, organisational ICT interoperability also needs to be addressed. The latter means that the two (or more) cooperating organisations are able to perform a cooperative task by exchanging information and services through ICTs (United Nations Development Program (UNDP) 2009).

According to Misuraca (2007:98), these strands are interdependent. For instance, the user-interface and the interaction methods (for LG officials and citizens as end-users) require solutions that cut across the three strands. Gurstein (2000:1) further suggests that the use of ICT in government can be a useful tool to address the imbalance of power, and to promote civic intelligence, between government, private sector and the community.

Having access to government information fosters this 'intelligence' and enables participation in government decision-making processes. In this regard, Goldkuhl (2007:1) points to the growing notion that citizens are 'customers' of government services and that ICT applications must facilitate this customer orientation. Ho (2002 in Van der Waldt 2015:69) also points out that ICT applications facilitate government's transition from a traditional bureaucratic model, to an e-governance paradigm that propagates transparency, participation and access to government information. As such, this paradigm emphasises a customer-oriented approach and stimulates inter-organisational collaboration and coordination. Several cities have started transformational projects called 'smart city initiatives' to serve citizens and improve their quality of life (Giffinger, Fertner, Kramar, Kalasek, Pichler-Milanovic and Meijers 2007:45). Notably, these projects include multiple stakeholders.

Several cities have felt an increased need for better governance to manage these projects and initiatives. In general, (public) governance has been defined "as regimes of laws, administrative rules, judicial rulings, and practices that constrain, prescribe and enable government activity,

where such activity is broadly defined as the production and delivery of publicly supported goods and services" (Lynn, Heinrich and Hill 2000:235). Hence, governance involves the implementation of processes with constituents who exchange information according to rules and standards in order to achieve goals and objectives. Scholl, Barzilai-Nahon, Ahn, Olga and Barbara (2009:32) studied challenges associated with e-government projects, and found that stakeholders' relations is one of the crucial factors to determine success or failure of such projects.

Stakeholder relations refer to four main issues: the ability to cooperate among stakeholders, support of leadership, structure of alliances and working under different jurisdictions (Scholl et al. 2009:35). Several cities have benefited from the emergence of ICTs that improve their governance. This ICT-based governance is known as smart governance. In the broadest sense of the word, it represents a collection of technologies, people, policies, practices, resources, social norms and information that interact to support city governance activities.

According to Forrester, smart governance is the core of smart cities and their initiatives (in Belissent 2011:56). Thus, it represents an important challenge for smart city initiatives. Not much literature on smart cities addresses governance-related issues. According to Mooij (2003:43), strong leadership plays a key role in good governance. In a similar vein, Lam (2005 in Van der Waldt 2015:170) emphasises the presence of a 'champion' who collaborates with all stakeholders as an essential factor for good governance. Odendaal (2003:570) states that smart governance depends on the implementation of a smart governance infrastructure that should be accountable, responsive and transparent. Notably, this infrastructure helps support collaboration, data exchange, service integration and communication.

ICT applications involve new ways of information dissemination that focuses on empowering citizens and developing the local economy. Torres, Pina and Accrete (2005:584) highlight the advantages of applying ICT in local government by reiterating that it has brought about a total 'reinventing' orientation. The emergence of networks where citizens, governments and the private sector form a web of relations is mainly driven by this 'reinvention'.

According to Westholm (2005:99), service delivery via the internet has become a comfortable means for customers to interact with government. The quality of these services is largely based on the level of integration and access to ICT. Schoeman (2007 in Van der Waldt 2015:123) justifies the advantages of ICT applications in government by stressing that the information systems implemented in government are designed to support service delivery to the broadest spectrum of customers. Furthermore, Schoeman (2007 in Van der Waldt 2015:124) believes that ICT applications in governments have introduced an interactive mechanism for public administrations to enhance the rationality of public policy and the efficiency of administration. In this regard, Chadwick (2011:1) argues that contemporary ICT facilitates public policymaking as decision-makers find it easier to absorb the norms and practices of contemporary democracies.

ICT speeds up the flow of information and decision-making. ICT facilities that are commonly at citizen's disposal include computers, telecommunication facilities and banking tools. The role of ICT in organisations is multifarious, as it has the capacity to improve communication, which is an all-important aspect of society. In fact, human beings have always used communication in both public and private life to inform, learn, define concepts and viewpoints, deliberate and reach agreements.

ICTs are a powerful tool, both because of their inherent characteristics and the mounting empirical evidence that suggest they can, in fact, contribute a great deal to development goals. They can play a beneficial role on a micro- and national level by enhancing the effectiveness and reach of development interventions, supporting good governance and lowering the costs of service delivery. Moreover, targeted ICT interventions have the potential to play an even more substantial role in accelerating a sustainable dynamic of socio-economic development in developing countries (Khan 2003:55).

It should be clear from the outset that ICTs are not a panacea for the developing world's problems. Socio-economic development relies on many factors that should be addressed through an overall development strategy. These include political stability, macro-economic governance, transparency and accountability of national and local administrations, the rule of law, physical infrastructure (clean water and energy), as well as basic literacy. As such ICTs should not be seen as a substitute (Misuraca 2007:66).

However, the integration of ICTs into overall national development strategies can help facilitate implementation, expand scope and coverage and increase the results for most of these factors. Development goals cannot be achieved by government efforts alone. The involvement of civil society and the private sector is crucial, and ICTs can help stakeholders to be aware of important discussions, provide a platform to exchange information and communicate among each other.

BENEFITS OF SMART TECHNOLOGY

There are many benefits associated with ICT applications. These benefits, as highlighted below, are directly responsible for improving the quality of governance in a country:

- **Transparency:** In manual systems, various delays may occur in administrative processes. However, through ICT applications work can be monitored electronically, which contributes to greater transparency in government. ICT cuts across all aspects, components and processes in business. Therefore, it is not only an operational enabler for a district, but also an important strategic asset that can be leveraged to create opportunities and to gain competitive advantage (Misuraca 2007:66).

- **Accountability:** The use of ICT in a district is essential, as it contributes to accountability and better service delivery. As such, ICTs can be used for filing and record keeping, which can lead to greater efficiency accountability. This is important as the server is able to pin-point the date on which the information was stored on the system, and by whom through the use of usernames that are required to log in to the system (Bhatnagar 2012:12).

- **Efficiency:** Using a manual method may often lead to mistakes, which results in time being wasted. However, the use of ICT minimises mistakes as information can be corrected timeously, and services can be rendered effectively and cost-efficiently. Efficiency increases competitiveness, which allows for the timely delivery of products, leading to satisfied consumers/ clients. The use of ICT also increases and ensures efficiency as district officials can be monitored and can easily interact with the citizens (Bhatnagar 2012:12).

- **Responsiveness:** This is a significant aspect of ICT. Districts are at the forefront of service delivery, as they are required to respond to the public's needs in a timely fashion. Without an effective ICT system in place, officials will find it difficult to respond to every citizen with a query, comment or suggestion. Therefore, the application of an ICT system and tools will help lighten district managers' workload and improve output (Bhatnagar 2012:12).

- **Equity and inclusiveness:** This ensures that every service provided through ICT applications is inclusive and no group, race or class of clients or stakeholders is excluded. This promotes democracy within a country and ensures the full representation of every race and gender (Bhatnagar 2012:12).

- **Participation:** This is probably one of the most pivotal aspects of ICT in local governance. ICT enables all role-players to participate in governance, gives government the opportunity to provide real-time feedback and gives the public a platform to post comments, complaints and suggestions on service delivery. As such, ICT improves the democratic process and facilitates citizen participation in decision-making across the world. Citizens have become a networked society and people – especially the youth – favour the internet as a means to air their views and opinions. On a more practical level, ICT can be applied to a wide variety of LG services. Below is a brief exposition of some examples:

- **Healthcare services:** ICT plays an essential role in effective and efficient service delivery. As such, it should be applied in the provision of healthcare services in local healthcare centres and clinics, where specialists can apply virtual e-medicine techniques and tools to help patients. Using ICT will ensure that healthcare services become less bureaucratic and simpler to access. For example, this will allow citizens to get their prescription medicine by placing an order on the system to avoid standing in long queues (Picot and Wernick 2007:668).

- **Administrative and social services:** One-on-one access to district services is often

time-consuming, or simply beyond the reach of people in some rural areas. E-governance mechanisms can make such services more readily available (Lynn, Heinrich and Hill 2000:235).

- **Sanitation:** Access to public toilets and sanitation includes the use of open-source online mapping services, particularly in poorer communities. It involves mapping, surveying and collecting data on the number and location of public toilets in a city. It also entails physical issues such as hygiene, lighting, safety, unclear opening times, absent caretakers and discretionary user charges (Lynn et al. 2000:235).

- **Pro-pedestrian work in an increasingly urban car-dependent culture:** Both the public and private sectors should support ICT applications within LGs. From a practical perspective, this includes the establishment of pro-pedestrian areas in an increasingly urban environment. This includes issues such as mobility, accessibility, motility (or the right to mobility), vehicular traffic, noise, pollution, traffic gridlocks, unusable and broken sidewalks, as well as businesses and households' encroachments of sidewalks (Gupta, Dasgupta and Gupta 2008:148).

TERMINOLOGICAL CLARIFICATION

Comprehensive conceptual clarifications of research-specific terms are provided in the appropriate chapters. However, to avoid uncertainty and ambiguity in the interpretation of concepts, terms utilised throughout the thesis are concisely defined below. Furthermore, capital letters as well as lower-case letters were used interchangeably and not consistently to indicate positions, posts and institutions throughout this thesis.

- **Development**

Development refers to the process of improving the quality of all human lives. It pertains to people's living standards, creating conditions that help boost people's self-esteem and increasing people's freedom by expanding their range of choices (Todaro 1992:792). For the purposes of this thesis, "development is seen as an outcome of governmental interventions in society that succeed in empowering people to consider feasible options in their lives and to make informed choices for the future" (Cloete and Auriacombe 2013). "These choices relate

to any action, from satisfying individual basic needs, to consolidating collective middle-class lifestyles, to eventually being able to fulfil a higher level of personal and collective needs, desires and goals" (Cloete and Auriacombe 2013).

- **Governance**

Du Toit, Knipe, Van Niekerk, Van der Waldt and Doyle (2002:64) define governance as "the actions undertaken to improve the general welfare of a society by means of the services delivered". Auriacombe (2009:78) argues that "this definition does not define what good governance entails…the fact that certain actions are taken and services are delivered does not necessarily imply good governance…the question is therefore, what constitutes good governance?"

- **Good governance**

Auriacombe (2009: 79) states that "different people, communities and societies have varying opinions on what constitutes good governance. As such, good governance is in the eye of the beholder. The inhabitants of Sweden, Belgium and Italy will most probably have a different perception of good governance than the inhabitants of the Ivory Coast in West Africa, Cuba and North Korea. It could therefore be said that the concept of good governance is a relative concept".

Therefore, it is crucial to define good governance in the context of urban service delivery and LG's role in it. In this regard, Gildenhuys and Knipe (2009:91) state that "good governance is when government attains its ultimate goal of creating conditions for a good and satisfactory quality of life for each citizen". From this description, Hirst (2000 in Molinyane 2012:14), concludes that "good governance refers to a government that actively and purposefully creates an effective political framework conducive to private economic action – stable regimes, the rule of law, efficient state administration adapted to the roles that governments can actually perform, and a strong civil society independent of the state" (Hirst 2000 in Molinyane 2012:14). Hirst's definition affirms Gildenhuys and Knipe's.

- **Local government management**

LG management refers to "... the system of managing the affairs of a locally established

authority. Local government management is the action of governing the affairs of a town or city through planning, directing, controlling and regulating business and industrial activities within a specific jurisdiction" (Coetzee 1985:27).

- **Sustainable development**

The focus on sustainable development is the result of the growing awareness of the global interventions to help alleviate environmental and socio-economic problems. Since the United Nations Conference on the Human Environment in 1972, in Stockholm, the concept of sustainable development has been on the international agenda (Ukwandu 2014:26). Since then, "sustainability and sustainable development has been interpreted in numerous ways. Sustainable development has gained increasing recognition worldwide as a conceptual development framework that recognises the interdependencies between economic growth, social equity and environmental integrity" (Ukwandu 2014:26).

In 1980, the World Conservation Strategy (in Ukwandu 2014:29) introduced this new trend and accepted the Brundtland Commission Report's definition of sustainable development as an approach that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987). Notably, the commission highlighted this interrelationship of environmental and socio-economic problems and argued that "ecology and economy are becoming more interwoven – locally, regionally, nationally and globally" (Wachernagel and Rees in Ukwandu 2014:38).

- **Sustainability**

Sustainability is based on the original idea that environmental and socio-economic resources can be used more appropriately. Sustainable practices will help prevent the current generation from exhausting resources in the short-term, so that future generations also have access to nature's bounty (Bell and Morse in Ukwandu 2014:35). The "concept was immortalised by the Brundtland Commission" (1987 in Ukwandu 2014:35), and has since been the the generally accepted definition of sustainable development.

This explanation of sustainable development is perfectly accurate and valid when applied to economic conservation and the use of environmental and other resources. It is the logical result

of the global approach to development in the mid-20th century, especially leading up to, and after, World War II until the end of the 1960s. During this period, development was consistently regarded as sustainable macro-economic growth patterns across society that were projected to result in sustainable micro-level socio-economic improvements (Thorbecke 2006 and Todaro and Smith 2011 in Ukwandu 2014:65).

- **Smart city**

Townsend (2013:15) defines a 'smart city' as a "place where information technology is combined with infrastructure, architecture, and everyday objects to address social, economic, and environmental problems". A smart city is a place where IT is combined with infrastructure, architecture and everyday objects to address social, economic and environmental issues. In essence, a city is regarded as smart if its investment in human and social capital, as well as traditional and modern ICT, fuels sustainable economic growth. Moreover, smart cities are characterised by a high quality of life and wise management of natural resources, through participatory governance (Caragliu, Del Bo and Nijkamp 2009:45). To this definition, Santinha and Anselmo de Catro (2010:79) add that a smart or intelligent city needs to have a "coherent framework and a unified methodology for the design and implementation of its intelligence".

In general, the term 'smart city' refers to the use of smart informatics and ICT for urban governance. Buchen, Atwell and Tur (2013: 137) view the smart city concept as the integration of technology into a strategic approach to sustainability, citizen well-being and economic development. Notably, a smart city utilises ICT technology to build and maintain infrastructure that is conducive to the three pillars of sustainability, ensures improved access to services and fosters participative democracy.

This discourse is generally characterised by issues related to the 'digital divide', 'citizen intelligence', 'exclusivism' or 'enclaves' (eg spatial-digital divides). Townsend (2013:70) refers to 'smart growth', which seeks to balance urban population and economic growth with land use as well as ecological and energy constraints. They also refer to 'smart grids', which seek to distribute energy supplies more efficiently to satisfy users' demands, such as among intermittent renewable energy sources.

- **Electronic service delivery mechanisms**

The development of the computer has changed the way in which work is being done. The use of computers and the internet have opened up a vast field of information, possibilities and uses in the private and public sectors. Du Toit, Knipe, Van Niekerk, Van der Waldt and Doyle (2002:255) affirm this by stating that governments across the world "have realised the importance of this new technology in the delivery of services". This also applies to South Africa, where government has access to electronic means, such as the internet, e-governance and short message service (SMS), to deliver a range of services available to government (Cloete 2012:128-142).

Baqir and Iyer (2010:4) provide the following examples of electronic services that "include (but are not limited to) tax filing, identity management (issuance and renewal of identity cards, driving licenses and passports), online application for government jobs, determination of eligibility of government benefits, obtaining of birth certificates, marriage certificates, grants and registering to vote".

- **Internet**

Du Toit et al. (2002:428) define the internet as "a computer-based, worldwide information network, composed of a large number of smaller interconnected networks". This network enables governments to disseminate information to society, or to make information about government services available to anyone who needs that information.

Nowadays governments use the internet to be more accessible to citizens through websites, webpages and portals. This enables citizens to gain access to information such as press releases and news pertaining to the three spheres of government. The South African government's website contains government-focused information, while provincial websites include information on the provinces. A great variety of government-related information can be obtained from the government's website. There are also links to other websites or webpages. The South African Government Online website offers two paths, namely the services and information portals. Both portals provide a gateway to access the Government Communication and Information System (GCIS) webpage.

The service portal offers information on various services that are provided to three categories of information collectors. This includes services to citizens, organisations and foreign nationals. Public services available to people include giving birth, education and training and the world of work and citizenship. The people-based information on the website includes citizenship, which deals with personal identification (identification documents), voting and elections. In the case of personal identification, information is provided on issues such as an application for a first-time identity document; re-issuing an identity document, naturalisation and changing a minor's surname.

From the above discussion, it is obvious that the internet has become a valuable mechanism that governments can use to deliver a range of services.

- **E-governance/government**

The internet also enables e-governance, which has been defined as the process of enabling transactions between concerned groups and the government. This is done through multiple channels by linking all transaction points, decision points, enforcing/implementation points and repositories of data-using information and communication technologies. The ultimate aim is to improve a government's efficiency, transparency, accountability and effectiveness (Bhatnagar 2012: 22).

E-governance/government can be described as "a permanent commitment by government to improve the relationship between the private citizen and the public sector government through enhanced, cost-effective and efficient delivery of services and knowledge" (Du Toit et al. 2002:264). The World Bank affirms this description with the statement that e-government "refers to the use by government agencies of information technologies (such as the internet) that have the ability to transform relations with citizens, businesses, and other arms of government" (www.worldbank.org in Du Toit et al. 2002:264).

Traditional public service delivery is "predominantly administered through a single, paper-based process" (Du Toit et al. 2002:263). As an alternative service delivery mechanism, e-governance uses digital technology to enable people to access government information. Furthermore, e-governance relates to a government's use of ICT. As such, it encourages civil

society and political institutions to engage citizens through dialogue and feedback to promote greater participation in the governance process. For instance, e-governance covers political parties and politicians' utilisation of the internet to elicit views from their constituencies in an efficient manner. It gives civil society the opportunity to publicise views that are in conflict with those of the ruling party (Cloete 2012:128-142).

- **Short messages service (SMS)**

SMS is becoming increasingly important as an alternative service delivery mechanism. It allows people and institutions to send and receive short messages through mobile phones. Although government institutions in South Africa do not use this service to its full capacity, it is already used to deliver certain types of services to members of the public.

Kekana (2004:22) adds that, the "rapid increased usage of mobile phones has allowed many people to have access to relevant and useful information". This also includes information about government services. For example, the Department of Higher Education and Training (DoHET) uses SMSs to provide examination results to universities of candidates who have completed matric in order to finalise their application status for degrees. During LG elections, SMSs are also used to provide information about progress and problems that might occur at polling stations. Johannesburg motorists can nowadays register with the SMS traffic system and be informed of a traffic offence within a few days after the transgression.

RESEARCH METHODOLOGY

The purpose of this section is to present a brief introductory discussion of the research methodology used in the study. Deciding to follow either a quantitative or a qualitative approach during research design, determines which research methods or research techniques will be chosen.

Since the research covered two phases 2011-2013 and 2014-2017 respectively before and after the introduction of smart technology and in measuring the effect of smart technology, the research required to use both qualitative and quantitative approaches to quantify the effects of smart technology in the Local Governmnet revenue administration and management in Rwanda.

RESEARCH DESIGN AND SAMPLING

According to Schumacher and McMillan (1993:31), "research design is the plan and structure of the investigation; it is used to obtain evidence in order to answer specific research questions. The design describes the procedures of conducting the study". In support of this statement, Mouton (1996:107) adds "that research design could be viewed as the research project's 'blueprint' that precedes the actual research process". Le Compte and Preissle (1993 in Auriacombe 2012:98) "state that research design involves deciding what the research purpose and questions will be; what information will answer specific research questions and which strategies are most effective to obtain the required information". Hence, Yin (1994:19) states that "research design is the logical sequence that connects empirical data to the study's initial research questions, and ultimately to its conclusions". According to Mouton (1996:107), the research design enables researchers to anticipate the appropriate research decisions, in order to maximise the validity of the eventual results.

STUDY POPULATION AND SAMPLE SIZE

The study population for this research was mainly composed of land lease fees payers, councilors, staff in Local Governance and stakeholders. Based on the final reports of Local Government revenue collection and targets, and Rwanda Revenue Authority (RRA) reports the total population for taxpayers in Gasabo was 9,600 and in Bugesera 20,219.

Table 1: Distribution of sampling for quantitative data collection

Province	**District**	**Sectors**	**Cells**	**Villages**
Kigali	Gasabo	Kimironko	Kibagabaga, Nyagatovu, Bibare, Zindiro	32
Eastern Province	Bugesera	Nyamata	Kanazi, Muranyundo, Nyamata Ville, Rugarama II	32
2	**2**	**2**	**8**	**64**

This study covered a period depicting two phases 2011-2013 and 2014-2017 respectively and focused on the performance of LG revenue collection before and after the introduction of smart technology in the LG's administration and management. The research was limited to only land lease fees performance.

Formula of Alain Bouchard

$$n=\frac{[\left(\frac{Z\alpha}{2}\right)2*P(1-P)*N]}{[(E^2)*N]+[\left(\frac{Z\alpha}{2}\right)2*P(1-P)]}$$

Where

n = the sample size

N = the household's size

P = the estimated frequency for the sample size n (proportion of success). For this study is 50%

E = Tolerable error (in this study, it is 10.33% ≈ 10%)

Z= Value given for the confidence interval according to the precision desired (1.96 is used)

$$n=\frac{[(1.96)2*0.50(1-0.50)*29819]}{[(01.0^2)*29819]+[(1.96)2*0.50(1-0.50)]}$$

$$n=\frac{28638.1676}{299.1504}=95.7=\text{ 96 people}$$

Using the Alain Bouchard sample size formula, the sample size for land lease fees payers to be interviewed in Kimironko Sector is 31 and in the Nyamata Sector 65, with 5% of the marginal error and 95% of the study confidence level, the recommended sample size for this study is 96 including District staff, councillors and stakeholders in LG.

Table 2: Population size for taxpayers

District	**Sector**	**No. Taxpayers**	**Sample size**
GASABO	KIMIRONKO	9,600	31
BUGESERA	NYAMATA	20,219	65
Total		**29,819**	**96**

Source: (RRA Report 2017)

A sample of selected taxpayers was studied and stratified, and a random sampling method was used to ensure that all categories of taxpayers will be studied. These will include the residential, agriculture and factory taxpayers.

DATA COLLECTION TECHNIQUES

In collecting primary data, structured and fixed alternatives questionnaires were used. The structured questionnaire was directed to audiences of taxpayers. This specifically captures information regarding taxpayers' awareness of the use of newly introduced smart technology. The fixed alternatives questionnaire captured information regarding the efficiency of smart technology in attending to the taxpayers, LG councillors, staff and officials' needs. The major reason why this methodology was used is that it takes into account the time series characteristics of data. In order to address the research objectives through empirical assessments, which contain numerical measurement, this helped the researcher to interpret and better understand and assess the effect of smart technology on LG revenues before and after introduction of smart technology.

Secondary data was used to augment the findings as well as establishing trends in the LG revenues for the phased periods 2011-2013 and 2014-2017. The aim of qualitative research is to provide complex conceptual and contextual descriptions of how taxpayers perceive and experience the effect of smart technology on LG revenues in two Districts and sectors respectively.

The study also involved consultations with key stakeholders. The approach to the work itself consisted of the following aspects:

- **Consultative:** To come up with credible results, taxpayers, staff in LG, local leaders and topic experts will be involved in the process. Conducting such a research will imply consulting all actors in addition to the target group; for instance, stakeholders such as Ministry of Finance and Economic Planning (MINECOFIN), Ministry of Local Government (MINALOC), Rwanda Revenue Authority (RRA), Rwanda Association of Local Government Authorities (RALGA), Rwanda Governance Board (RGB) and LODA (Local Entities Development Agency), to come up with results for technical staff, managers and experts who are involved in the process of setting up or introducing smart technology.

- **Appreciative inquiry:** The second prong of the approach is an appreciative inquiry. Appreciative inquiry helped to build on a vision for the future use of questions to focus on people's attention on past, current and future success. In the whole process of developing the study the research had to bear in mind what LG has achieved in terms of introducing smart technology.

DATA ANALYSIS

In the analysis of the data control questions were included in the questionnaires to counter check and correct the inconsistencies in the answers given by the respondents. Where the responses provided were assumed to be unsatisfactory there was provision for comments and suggestions when analysing data.

Data was edited for errors and missing values and thereafter data was captured using EPI DATA. Data analysis and presentation were tackled by the use of responses from focus group revenue collected versus annual set targets, percentages by use of SPSS. Qualitative data analysis was done using MS Word and Excel.

DELIMITATIONS OF THE STUDY

The research period covered two phases 2011-2013 and 2014-2017 respectively before and after the introduction of smart technology. Not all the required information was accessed due to lack of documentation and also due to non-response of some taxpayers and tax collectors who lack information on the existing system and practices for the land lease fees declarations and payments.

DATA PRESENTATION, ANALYSIS AND INTERPREATION

In collecting the data, we used secondary administrative data from Gasabo and Kimironko Districts as well as RRA revenue collection reports for the period from 2010 to 2017 and primary data was collected by use of questionnaires directed to the key taxpayers that own land in the two sectors of Kimironko and Gasabo respectively. This helped us to know if the taxpayers and tax collectors were familiar with the role of smart technology in local revenue collection. In addition to the key taxpayers, the questionnaires were also used to interview the District councils, technical staff and key stakeholders from MINECOFIN, MINALOC, RRA and GIZ.

ANALYSIS OF SECONDARY AND ADMINISTRATIVE DATA

The data below shows that before the (2011-2013) introduction of smart technology in LG/Districts for revenue collection, less revenue was collected and when Districts started using smart technology in revenue management and administration from 2014-2017, local revenue especially land lease almost doubled.

Status of land lease fees in Nyamata

The table below shows the number of taxpayers and land lease fees collected before and after the introduction of the smart technology.

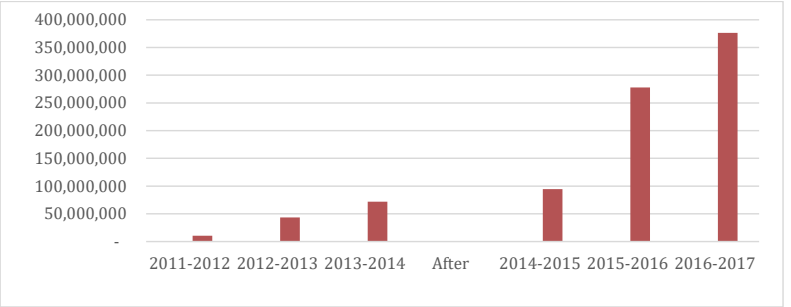
Table 3: Bugesera/Nyamata Sector taxpayers and land lease fees status

Before			
Period /Year	**Taxpayers**	**Revenue Collected**	**% Increase**
2011-2012	603	10,466,060	0%
2012-2013	737	43,311,944	76%
2013-2014	1,840	72,020,537	40%
After			
2014-2015	2,498	94,467,060	24%
2015-2016	12,546	277,900,272	66%
2016-2017	20,219	376,509,999	26%

Source: RRA and Gasabo District

As Table 4 shows, taxpayers increased and at the same time land lease fees increased from 2013-2014; land lease fees increased by 81% which is attributed to the use of smart technology in Land Lease fees collection.

Figure 1: Nyamata sector land lease fees collection



Source: RRA and Gasabo District

Status of land lease fees in Kimironko

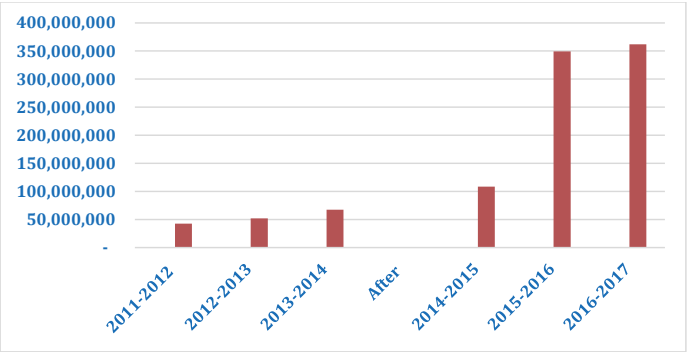
Table 4: Gasabo/Kimironko Sector taxpayers and Land lease fees collected

Before			
Period	**Taxpayers**	**Revenue Collected**	**% Increase**
2011-2012	2,827	42,786,589	0%
2012-2013	3,106	51,814,901	17%
2013-2014	3,487	67,408,202	23%
After			
2014-2015	4,567	108,338,445	38%
2015-2016	8,112	349,345,210	69%
2016-2017	9,600	361,922,049	3%

Source: RRA and Gasabo District

Table 5 above and Figure 2 below respectively show how the number of taxpayers and land lease fees increased since the 2014 revenue collection from 67.4 billion Frw in 2014 to 349.3 billion Frw in 2015. These figures show an increase in revenue of 81.37% after smart technology was launched and applied in revenue management and administration.

Figure 2: Kimironko land lease collection



Source: RRA and Gasabo District

ANALYSIS OF FINDINGS FROM PRIMARY DATA

Under the primary data, the research shows the descriptive analysis which covers the demographic of taxpayers, their knowledge, attitude, perception of LG revenue, compliance to file and pay land lease revenues, and other variables that led to the introduction of smart technology in collecting locally generated revenues.

The table below shows the number of cells sampled in Kimironko sector during collection of data to avoid interviewing the taxpayers from only one cell.

Table 5: Sample for qualitative data collection by sector and cell

Sector			**Respondents (frequency)**	**Percentage**
Kimironko	**Cell**	Kibagabaga	6	8%
		Nyagatovu	6	8%
		Bibare	6	8%
		Zindiro	6	8%
Total			**24**	**30%**
			Respondents (frequency)	
Nyamata	**Cell**	Kanazi	14	18%
		Maranyundo	14	18%

		Nyamata ville	14	18%
		Rugarama II	14	18%
Total			**56**	**70%**
Total respondents			**80**	**100%**

Source: Primary data, 2018

The Table 6 above shows distribution of Gasabo District respondents in their respective locations and over all representation for **Kimironko** for data collection general was 30% represented by 24 respondents, Kibagabaga cell represented by 10% (N=6), Nyagatovu 10% (N=6), Bibare 10% (N=6) and Zindiro 10% (N=6) respectively

Referring to Bugesera District, Nyamata sector's overall representation was 70% with 56 respondents, Kanazi cell was represented by 18% (N=14), Maranyundo 18% (N=14), Nyamata ville 18% (N=14) and Rugarama II 14% (N=18).

Demographic data

The table below shows how randomly taxpayers were picked during interview by sex and location. By doing this, it helped the researcher to know the number of male and female what own a land and pay land lease or not.

Table 6: Distribution of Respondents by sex and location

District	Sector	Male	Female	Total	Percentage
Gasabo	Kimironko	16	8	24	30.0%
Bugesera	Nyamata	45	11	56	70.0%
	Total	**61**	**19**	**80**	100%
	Percentage	**76.25%**	**23.75%**	**100%**	

Source: Primary data, 2018

In the data collection, respondents were asked their sex as shown in Table 7, to enumerate the respondents disaggregated by sex and location. This shows that the majority of the land owners are male with 76.25% (N=61) of them males and 23.75% (N=19) females. The survey reached

24 (30.0%) respondents including 24 males and 8 females in Gasabo, Kimironko Sector and 56 (70.0%) respondents including 45 males and 11 females in Bugesera, Nyamata sector.

Table 7: Distribution of taxpayers by age-group

Age category	**Kimironko**	**Nyamata**	**Total**	**Percent**
20 and below	1	0	1	1.25%
21-25	2	4	5	6.25%
26-30	2	6	7	8.75%
31-34	1	3	4	5.00%
35-39	2	5	7	8.75%
40-44	3	12	17	21.25%
45-49	2	4	5	6.25%
50-54	2	5	7	8.75%
55-59	3	8	8	10.00%
60-64	2	1	3	3.75%
65-69	2	4	7	8.75%
70-74	1	3	6	7.50%
74and above	1	1	3	3.75%
Total	**24**	**56**	80	100.00%

Table 8 indicates that 21.3% of respondents are aged 40-44, 10% are aged 50-59, 8.75% aged 26-30, 8.8% aged 35-39 and 8.75% aged 65-69. The data shows that few respondents are aged below 30, while the majority of the respondents are aged above 30.

Table 8: Distribution of respondents based on location and daily business

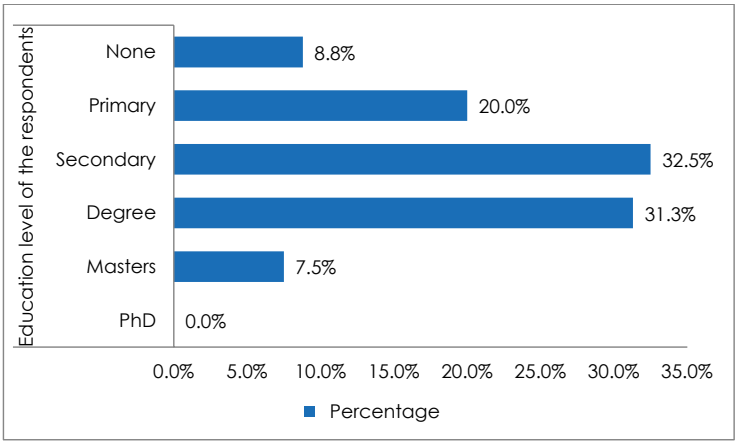
Daily business of Respondents	Location		Total	Percentage
	Kimironko	Nyamata		
Farming	0	13	13	**16.25%**
Not employed	1	0	1	**1.25%**

Own business	11	19	30	**37.50%**
Private sector	7	15	22	**27.50%**
Public sector	5	9	14	**17.50%**
Total	**24**	**56**	**80**	**100.00%**

Source: Primary data, 2018

In terms of daily business or occupation, Table 9, shows that the majority, 37.50% (N=30) are involved in their own businesses. This signifies that most of the land in both Kimironko and Nyamata belongs to the people who own businesses compared to those in the public sector with 17.50%.

Figure 3: Distribution of respondents based on education level



Source: Primary data, 2018

The findings reveal that 64% of the taxpayers interviewed are educated with 32.5% having completed secondary education and 31.3% university (degree), 20.0% completed primary education, 7.5% have master's degrees and 8.8% don't have any formal education. Since this

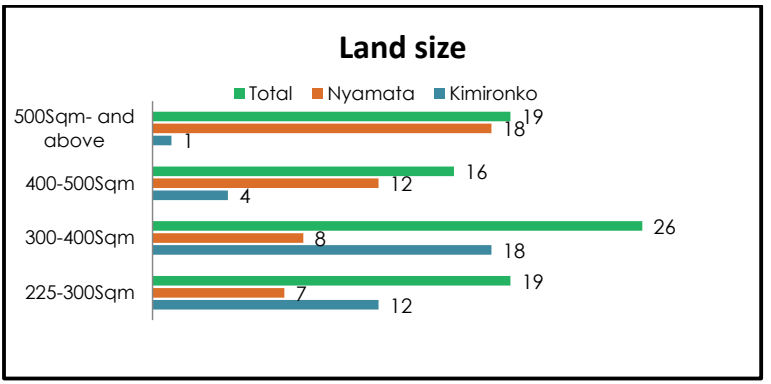
research was targeting urban sectors, it shows that educated people are more interested in owning land in urban centres than in rural areas.

Respondent land ownership

Results indicate that all those taxpayers interviewed had land in Nyamata and Kimironko which represents 100%. Based on sex, 66.66% (N=16) male respondents own land in Kimironko, 33.33% (N=8) female respondents own land in that area. In Bugesera, Nyamata sector, 80.35% (N=45) males and 19.64% (N=11) females own land.

Average size of the land

Figure 4: Distribution of size of land per Square Metre



Source: Primary data,2018

Our findings show that the taxpayers who own land of 300-400 square metres at the rate of 26% which signifies residential are particularly in Kimironko sector. In Nyamata respondents confirmed owning land above 500 square metres which justifies as agricultural land 18% and 1% being residential. These findings show that the majority of the taxpayers in Nyamata own big land because it is considered a rural District and the land is meant for agriculture use hence exempted from land lease fees if the land is more than 2 hectares, according to Law No 59 which determines taxes and fees levied to LG.

Payment of land lease fees

Table 9: Distribution if taxpayer pays land lease fees

		Do you pay land lease fees?	
		Yes	No
Kimironko	Male	16	0
	Female	8	0
Nyamata	Male	45	0
	Female	11	0
	Total	80	0
	Percentage	100.0%	0.0%

Source: Primary data, 2018

According to our findings, the figure above indicates that all taxpayers who were interviewed confirmed that they comply and pay land lease by 100% saying Yes and No being 0% in both Kimironko and Nyamata. This means that taxpayers are aware of their obligation to pay land lease fees.

Paying land lease fees

Under this finding, the research wanted to know when the taxpayers started paying land lease fees to justify if even before and after introduction smart technology taxpayers were paying land lease fees.

Table 10: Distribution of period when taxpayer started paying land lease fees

		Which period did you start paying land lease fees?	
		2011-2013	***2014-2017***
Kimironko	Male	6	10
	Female	2	6
Nyamata	Male	22	26
	Female	5	3

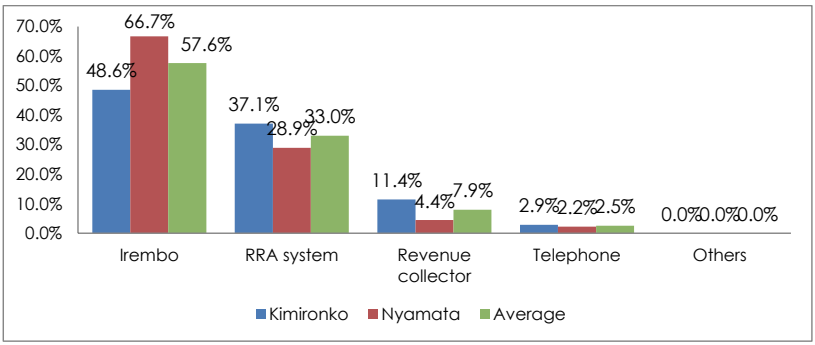
	Total	35	45
	Percentage	**43.75%**	**56.25%**

The results show that 56.25% representing 45 respondents started paying land lease fees in the period 2014-2017 compared to 43.75% in 2011-2013. It implies that smart technology may have contributed to the awareness and facilitation of easy payment of land lease fees especially from those with land in Kimironko.

Knowledge of the system used to declare land lease fees

This question was presented to the taxpayers to confirm if they know the existing system or smart technology used in declaring or filling of the land lease.

Figure 5: Distribution of taxpayers' land lease fees declaration



Source: Primary data, 2018

It was observed that more respondents in Nyamata (66.7%) use IREMBO services compared to 48.6% who use a similar system in Kimironko. On the other hand, in Kimironko a relatively high percentage (37.1%) use the RRA system compared to 28.9% in Nyamata. In Kimironko 11.4% use revenue collectors, compared to 4.4% who use a similar service in Nyamata. The use of telephones in land lease fee declaration is similar in Nyamata and Kimironko, 2.2% and 2.9% respectively.

The result above shows that on average 57.6% of the taxpayers know that land lease fees declaration is done by IREMBO; at the same time on average 33% of the respondents use the RRA system; 7.9% use the revenue collectors to help them pay land lease fees; and 2.5% use their handset telephones to file.

Ideally IREMBO is not the system used to file, rather the RRA system; but this information shows that much as taxpayers comply and pay land lease fees, it does not mean they are aware and have the knowledge of which system is used to file or declare land lease fees.

Knowledge of the system used to pay land lease fees

This question was presented to the taxpayers to confirm if they know and differentiate the existing system or smart technology used during payment of the land lease.

Table 11: Distribution on how taxpayers pay land lease fees

Location	Mobile Money	Mobicash	Tigo cash	Airtel Money	Bank	Revenue collector	Others
Kimironko	45.7%	2.9%	0.0%	0.0%	48.6%	2.9%	0.0%
Nyamata	26.7%	4.4%	0.0%	0.0%	68.9%	0.0%	0.0%
Average	**36.2%**	**3.7%**	**0.0%**	**0.0%**	**58.7%**	**1.4%**	**0.0%**

Source: Primary data, 2018

Our finding shows that on average 58.7% use the banks to pay land lease fees and 36% of the respondents use mobile money, 3.7% Tigo cash and 1.4% use revenue collectors.

With the above results, it significantly shows that banks are preferred to other modern systems when it comes to payment. The explanation from the majority was that they needed to have proof of payment for future reference; without knowing that even if you use mobile money you can still use the system to print proof of payment. This brings us to conclude that much as the impact of smart technology is seen, there is a need to educate the taxpayers on how to use it rather than paying through revenue collectors.

Smart technology facilitation

This question was introduced to allow the research investigate the taxpayers point of view if the system helps or facilitate them during the filling and paying land lease fees.

Table 12: Distribution of smart technology facilitation to pay and file lease fees

Location and Sex		Yes		No	
Kimironko	Male	15	96.3%	1	3.7%
	Female	8	100.0%	0	0.0%
Nyamata	Male	43	94.3%	2	5.7%
	Female	11	100.0%	0	0.0%
	Total	**80**	**97.6%**	**3**	**2.4%**

Source: Primary data, 2018

Of the taxpayers' perception of whether smart technology facilitates them to pay land lease 97.6% of the respondents agreed that it supports them in paying and filing, and 2.4% represented by 3 said no. This brings us to the conclusion that smart technology has played a big role in enabling taxpayers to be aware of and comply with land lease fees in general, than before its introduction.

Payment notification

This research question was presented to the taxpayers to know if before payment of land lease fees, they are notified or reminded ahead of time.

Table 13: ***Distribution on taxpayers being notified by system for payment***

		Does the system notify (reminder) you before the due date to avoid late filing and payment?				**Does the system help you know the amount due anytime, anywhere?**			
		Yes		No		Yes		No	
Kimironko	Male	12	63.2%	7	36.8%	9	75.0%	3	25.0%
	Female	5	83.3%	1	16.7%	2	66.7%	1	33.3%
Nyamata	Male	19	61.3%	12	38.7%	16	72.7%	6	27.3%

	Female	7	87.5%	1	12.5%	3	75.0%	1	25.0%
Total /percentage		**43**	**73.8%**	**21**	**26.2%**	**30**	**72.3%**	**11**	**27.7%**

Source: Primary data, 2018

Our findings show that 73.8% (N=43) of the respondents agreed that the system notifies them before the time about the date due for filing and payment of land lease fees to avoid delays. However, there are 26.2% (N=21) who confirmed that the system did not notify them on time to avoid delays.

More female respondents seem to be notified by the system than male respondents, for example 83.3% males and 87.5% females were notified by the system in Kimironko and Nyamata respectively compared to 63.2% females and 61.3% males in Kimironko and Nyamata respectively.

It is also noted that 72.3% agree that the system helps them to know the amount due anytime, anywhere, while 27.7% disagree with that. There is no significant difference when comparing Kimironko and Nyamata.

Awareness of smart technology

The question was presented to taxpayers to understand if they are aware of different means used by local Government during the senstisation and awareness of the taxpayers to file and pay land lease fees.

Table 14: Distribution of taxpayer's awareness of the system used to pay and declare land lease

Location	Radio	Advertisement	Community Meeting	Internet	Posters at District, Sector and Cell	Tax week campaign	Others
Kimironko	13	2	4	1	2	2	0
Percentage	54.3%	8.3%	16.0%	4.16%	8.3%	8.3%	0.0%
Nyamata	33	2	14	2	5	0	0
Percentage	58.92%	3.57%	25%	3.57%	8.92%	0.0%	0.0%

Overall Total	**46**	**4**	**18**	**3**	**7**	**2**	**0**
Overall Average	**57.5%**	**5%**	**22.5%**	**3.75%**	**8.75%**	**2.5%**	**0.0%**

Source: Primary data, 2018

Based on the data above the majority of the taxpayers or respondents knew about the system from the radio which represents 57.5% (N=46) and 22.5% (N=18) know the system through community meetings, 8.75% (N=8) from posters at District, sector and cell offices, 5% (N=4) from advertisements and 3.75% (N=3) from the internet and 2.5% (N=2) from tax week campaigns.

Kimironko has a relatively high percentage of respondents who knew the system from radio (54.3%) than Nyamata (58.92%). The same for advertisements, Kimironko has 8.3% compared to 3.57% in Nyamata.

On the other hand, Nyamata has a high percentage (25%) of respondents who became aware of the system from community meetings compared to 16% in Kimironko, the same for internet (2.9% and 4.4%) in Kimironko and Nyamata respectively. In addition, Nyamata has 8.3% of respondents who got information about the system from posters at district, sector and cell offices compared to 8.92% in Kimironko.

This signifies that local government needs to invest a lot in the campaign and education of the taxpayers especially through locally organised tax week campaigns on a quarterly basis at the District level.

4.3.2.9 Comparison of smart technology and previous system

Under this guiding question, it was presented to the taxpayers to allow the researcher know taxpayers point of view in terms of comparison between previous or current system have been helpful.

Table 15: Distribution of taxpayer's comparison between the new system and previously used system

		Before was helpful		Current is helpful		Current is not helpful		None of the above	
Kimironko	Male	3	19%	13	81%	0	0.00%	0	0.00%
	Female	2	13%	6	38%	0	0.00%	0	0.00%
Nyamata	Male	2	4%	43	77%	0	0.00%	0	0.00%
	Female	2	4%	9	16%	0	0.00%	0	0.00%
	Total/per-centage	9	11.25%	71	88.75%	0	0.00%	0	0.00%

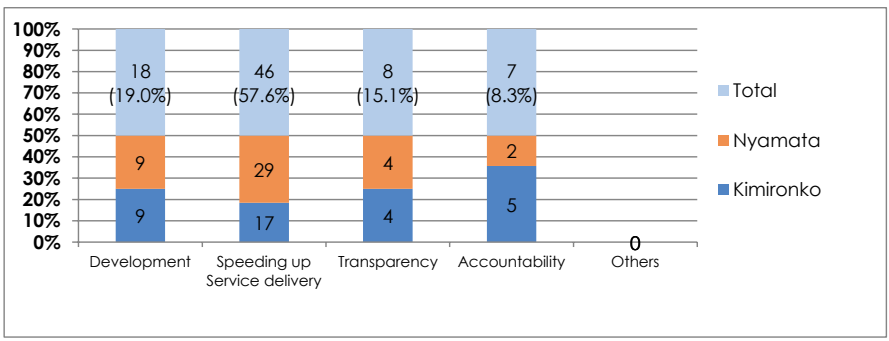
Source: Primary data, 2018

The finding indicates that the current system/ smart technology is very helpful by 88.75% and those that say the previous one is not helpful represent 11%. This brings us to the conclusion that smart technology plays a big role in filing and paying of land lease fees at the same time helping the LG authority in management administration of land lease fees.

4.3.2.10 Meaning of smart technology to a citizen

Under this question, the researcher wanted to know apart from using smart technology being used to file and pay Lendlease fees, what other service can be offered by use of smart technology as citizen of Rwanda.

Figure 6: Distribution of smart technology meaning as citizen of Rwanda



Source: Primary data, 2018

The Figure above, demonstrates what smart technology entails for citizens. The majority of the taxpayers represented by 57.6% (N=46) said that smart technology helps in speeding up services delivery, 19% (N=18) declared that smart technology helps in development,

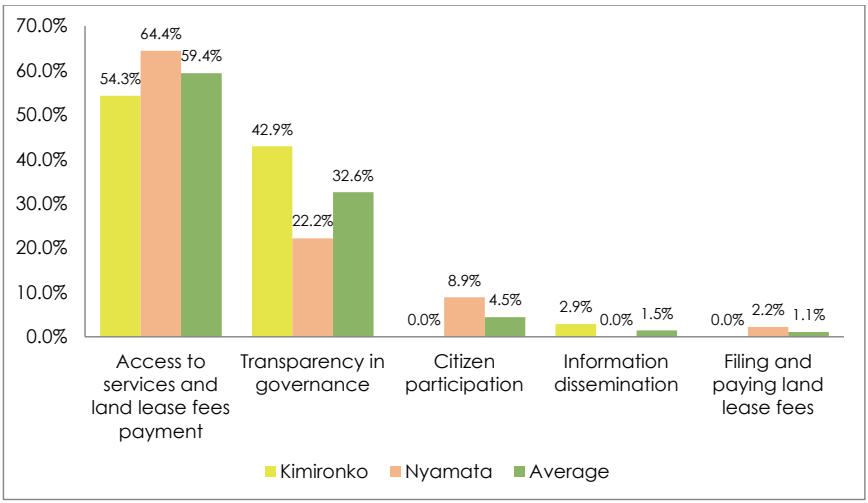
15.1% (N=8) indicated that smart technology helps in transparency and 8.3% (N=7) related it as being useful for accountability purposes.

This implies that, smart technology being used for filing and paying land lease fees signifies speeding up service delivery which demonstrates development, transparency in the whole process and enables accountability.

Innovative practices of smart technology

With this question, the research wanted to know from citizen point of view what other innovative practices should taxpayers think can be used by smart technology in Local Government in future.

Figure 7: Distribution of taxpayer's views on innovative practices of smart technology in future



Source: Primary data, 2018

The results above show that smart technology brought innovative applications which could improve in future while on average, 59.4% indicated that smart technology improves access to services and land lease fees payment, 32.6% for enhancing transparency in governance, 4.5%

for iincreasing citizen participation, 1.5% for information dissemination and 1.1% for filing and paying land lease fees.

In a nutshell, Nyamata has more people who said that smart technology should be used in future to improve access to services and land lease fee payment, 64.4% compared to 54.3% in Kimironko. On the other hand, 42.9% in Kimironko said the technology should be used for transperency in governance compared to 22.2% in Nyamata. For other innovative practices, there is no significant difference between respondents in Kimironko and those in Nyamata.

Sustainability of smart technology

By presenting this question to taxpayers, the research wanted to know the citizen point of view if the smart technology should be sustained and continue to be used by Local Government

Table 16: Distribution of taxpayers' proposal for sustainable smart technology

Location and sex		Yes		No	
Kimironko	Male	16	100.0%	0	0.0%
	Female	8	100.0%	0	0.0%
Nyamata	Male	45	100.0%	0	0.0%
	Female	11	100.0%	0	0.0%
	Total	80	100%	0	0.0%

Source: Primary data, 2018

The findings indicate that taxpayers' recommendation is for smart technology to be sustained in LG for better administration and management of LG revenues with 100% of respondents recommending this.

This corresponds to Figures 6 and 7 where the respondents highlighted that technology is key for speeding up services delivery, promotes accountability and transparency.

OPINION OF THE TAX ADMINISTRATOR AND STAKEHOLDER

To complement the quantitative information collected from the questionnaire by interviewing taxpayers, the researcher conducted interviews with District officials and councillors (members of executive committee, economic commission members), technical staff (executive secretaries, directors of finance, revenue collectors and inspectors), Rwanda Revenue authority staff (Headquarters and LG level), IREMBO staff that work closely with LG, sector revenues inspectors, revenue officers and revenue collectors in both Gasabo (Kimironko) and Bugesera (Nyamata) as well as stakeholders that support Districts in revenue administration and management such as MINECOFIN, MINALOC, RALGA and GIZ.

District officials and stakeholders

This table below illustrates the sampling of District officials and stakeholders interviewed as the keys persons and experts that contribute to the administration and management of the Local Government revenues for their point view.

Table 17: Distribution of respondents by sex and location

District	Sector	Male	Female	Total
Gasabo	Kimironko	4	2	6
Bugesera	Nyamata	6	4	10
	Total	**10**	**6**	**16**
	Percentage	**62.5%**	**37.5%**	**100%**

Source: Primary data, 2018

The above Table shows overall interviews conducted with 16 respondents including 62.5% (N=10) male and 37.5% (N=6) female officials. The mutually reinforcing combination of quantitative and qualitative research allowed the researcher to gather high quality data through the triangulation of data source to obtain high research findings and recommendations.

System functions in management of local revenues

The revenue inspectors, revenue officers and revenue collectors interviewed both in Gasabo and Bugesera appreciated the automated local government tax management system since it has various functionalities that ease their daily work; for example, the majority of revenue officials interviewed demonstrated some key functionalities of the system such as: registration of new tax payers, taxes and fees declaration, outstanding fees declaration, documentation and financial reports, tax payers' database, among many others. In addition, the officials interviewed testified to the relevance of the system in taxes related data management because you can extract whatever information you may need anytime and anywhere.

Furthermore, the automated system/smart technology helps in speeding up services delivery, provides the foundation for accountability and transparency in taxes and fees management.

Finally, the officials indicated how much the system helps in auditing and fraud detection processes.

On 16th March 2018 one of the Revenue Inspectors in Nyamata sector is quoted *"This system is more important for me compared to the previous traditional way of declaration and paying taxes. This system has simplified the process the taxes collection and financial reporting. Before I used to struggle when it comes to reporting but today it takes just 30 minutes"*.

Comparison of current system and previous system

The majority of interviewees indicated that the current system is more efficient compared to the previous or traditional ones used before the introduction of smart technology. This shows how helpful it is in terms of revenue management and administration.

Another important note is the appreciation of the system being very easy and quick when doing tax transactions and reporting. Respondents indicated that the system is very useful especially for tax declaration and data related information management. The system has reduced the queue compared to before its introduction since people can pay from wherever they are and

taxes/revenue staff can easily access the information related to any person in the system without using receipt books as before.

On 8th March 2918 a revenue officer in Gasabo District, at Kimironko sector said: ***"****Before the introduction of smart technology, payment was done in receipt books, but as of now tax payers can pay from wherever they are and it is automatically seen in the system. Before we could use receipt books, but smart technology determined declaration of reference number which is automatically seen in the system, so there are no long queues as the payments are done online, it is easy and quick to access data anytime".*

Effects of smart technology

All revenue officials and stakeholders interviewed demonstrated how smart technology is very important for LG/District revenue collection and management. It was indicated that the system helps to speed up service delivery which was not the case before; it helps to keep the information of all tax payers, helps to detect tax defaulters and tax evaders. The local officials use the system to update and retrieve the database for taxpayers and the system is used to monitor and evaluate the declaration and payment of taxes as well as financial reporting.

Generally, the use of an automated system/smart technology is more productive than the use of the traditional approach of paying taxes. Since its introduction, the quick service delivery, time management, accountability, transparency and fraud detection were enhanced because proper reporting and documentation have been possible with the use of the automated system.

Benefits and opportunities of smart technology in revenue collection

The introduction of smart technology has provided more benefits and opportunities for efficient revenue collection and management at decentralised entities, the majority of staff interviewed indicated that the system has reduced the level of tax evasion, embezzlement of government funds, reduced fraud, and enhanced transparency at different levels, they said that the system helps to identify the taxpayers wherever they are and at any time and helps to monitor what type of revenue is being collected and detect any possible issues that may arise beforehand, the system enables revenue payers to avoid unnecessary mistakes and errors and helps to keep accurate data and the majority of officials interviewed indicated that revenues have increased since the introduction of smart technology.

Existing challenges in use of smart technology

In terms of the existing challenges that affect the use of smart technology in revenue collection and management at District level, the revenue officials and stakeholders indicated a number of challenges as such as: Lack of, limited and interrupted network, because some areas are not under network coverage, the system still keeps the name of the taxpayer even when the business has closed down and or relocated and this can mislead the financial reporting, Accessing information at the District level is still a problem the registration process is very slow, no full access at District level, to accounting reports of collected fees, Lack of knowledge and skills on this smart technology by the District officials and Limited capacities building among staff to use the smart technology.

CONCLUSIONS AND RECOMMENDATIONS

The smart technology for revenue collection was launched at the time when LG faced complex challenges, including the incomplete and poor revenue collection reports, lack of updated taxpayers' data base, there was no consolidated District's own revenue, fraud, embezzlement of collected revenues, poor planning and forecasting; which indeed kept the LG's own revenue potential from not being achieved.

It is this that motivated the researcher to carry out this study which investigated the role of smart technology in revenue collection in Nyamata sector and Kimironko sector using perception data from 29,819 taxpayers sampled from two Districts Gasabo and Bugesera. The

questionnaire that was used, aimed at measuring taxpayers' knowledge of the tax system, as well as their opinions on the changes smart technology had brought in LG revenue collection. To complement the quantitative information, face-to-face interviews were conducted with about 96 taxpayers, District and sector officials involved in the revenue administration and management and other stakeholders from RRA, MINECOFIN, MINALOC, RALGA and GIZ that support the LG technically and financially in revenue administration.

After analyzing the findings, the study found that taxpayers are satisfied with what smart technology has brought to their day-to-day operations in declaration and paying of the mandatory taxes and fees to LG.

The results suggest that the system helps to speed up service delivery which was not the case before; it helps keep the information of all taxpayers, helps to detect tax defaulters and tax evaders.

RECOMMENDATIONS

The results of the study lead to a range of recommendations to RRA that can support the institution in its attempts to improve taxpayers' attitude towards taxes and their compliance levels. The recommended interventions fall into different categories and RRA as tax administration system which initiated the design and development of smart technology RALGMS and currently managing and updating the system on a regular basis; should take note of the following:

The study revealed that District officials/ technical staff have no mandate and right to register or deregister the taxpayers rather they are required to submit the details of the taxpayers to RRA officials for registering a new taxpayer which often leads to limitation of Districts' full use of the system hence it needs to be handed over fully to LG and RRA should stay with the coordination role.

Again, the study reveals that at District level, officials have no access to information needed and accountability reports related to revenue collection which also needs to go through RRA staff to generate the report needed and often causes delays. RRA should thus give the

responsible technical staff all the credentials to allow them to have access to any information needed at any time.

The study also identified that, even if RRA were able to deploy the staff at District level to technically support the District and sector officials, most of them have not gone through intensive training on how to fully use the system easily and as a result it delays service delivery to the taxpayers on time. Thus, RRA needs to organize an intensive training for all deployed staff to allow them have skills to use the system and offer timely and quality service delivery to the taxpayers.

RECOMMENDATION TO DISTRICT OFFICIALS

The study pointed out that some District officials and technical staff are not familiar with the smart technology used in collecting local revenues due to lack of ownership in managing the system. Some say it belongs to RRA not the District. This requires District officials to be actively involved in sensitisation and educating the taxpayers on the use of the system at the same time participating in getting the solutions for improving and making use of the system in general.

The findings reveal that, much as taxpayers know that there is a new system used to declare and pay land lease fess, they do not know exactly which system is used. When asked which system do you use to file and pay land lease fees, some responded that it is IREMBO, RRA system, revenue collectors and telephone. This is a very important message the District officials need to take note of when the taxpayers pay revenues to tax collectors which is not allowed against the zero cash policy introduced in 2012. The District officials should put in place a mechanism for sensitising taxpayers to the right and acceptable system used in paying land lease.

RECOMMENDATION TO POLICYMAKERS

The findings reveal that sectors in rural areas have no internet network and for those that have it, it is not strong enough to offer services to taxpayers when required. This calls upon government to invest more in internet network coverage to allow both service providers and taxpayers to benefit from the existing smart technology in place, and improve service delivery.

There is a need to harmonise all revenue collection systems and use one rather than using a number of systems such as RALGMS and IREMBO for Rwanda online. It becomes very difficult for the taxpayers to know which system to use when it comes to payment of LG revenues.

In conclusion, the findings reveal that since the introduction of smart technology a lot have been achieved in terms of revenue collection in general by reducing the level of tax evasion, embezzlement, reduced fraud, and enhanced transparency at different levels, the system helps to identify the taxpayers wherever they are and at any time and helps to monitor what type of revenue is being collected and detect any possible issues that may arise beforehand and the system helps to keep accurate data.

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APPENDICES I: Revenue collection for all Districts 2016-2017

	DISTRICTS	TOTAL REVENUE COLLECTIONS (Frw)	TARGETS (Frw)	ACHIEVEMENT
1	GASABO	10,122,021,347	11,654,014,998	87%
2	NYARUGENGE	7,551,088,770	8,045,539,498	94%
3	KICUKIRO	5,292,984,640	5,597,654,329	95%
4	BUGESERA	1,992,915,684	1,516,452,203	131%
5	RUSIZI	1,935,776,565	1,483,442,453	130%
6	RUBAVU	1,934,015,754	1,839,521,296	105%
7	MUSANZE	1,420,288,173	1,548,238,660	92%
8	RWAMAGANA	1,277,158,819	1,157,660,083	110%
9	HUYE	1,069,200,815	1,057,786,850	101%
10	NYAGATARE	1,024,190,075	920,050,693	111%
11	MUHANGA	957,169,525	959,318,314	100%
12	KAMONYI	955,631,624	1,011,772,304	94%
13	GICUMBI	929,618,565	863,593,412	108%
14	NYAMASHEKE	883,327,051	705,466,099	125%
15	NGOMA	859,950,723	939,870,485	91%
16	KAYONZA	778,284,948	833,915,842	93%
17	GATSIBO	765,818,962	886,680,721	86%
18	NYAMAGABE	747,702,130	998,589,763	75%
19	NYABIHU	746,357,086	718,609,500	104%
20	KARONGI	741,709,161	787,683,856	94%
21	KIREHE	729,278,354	812,046,748	90%
22	NYANZA	704,876,441	561,449,279	126%
23	BURERA	704,568,977	607,240,565	116%
24	RUHANGO	686,068,774	634,644,781	108%
25	RULINDO	681,790,937	599,945,517	114%
26	GAKENKE	608,360,660	612,374,077	99%
27	NGORORERO	596,067,737	556,487,957	107%
28	RUTSIRO	490,390,477	393,129,190	125%
29	NYARUGURU	477,953,091	592,032,098	81%
30	GISAGARA	332,734,418	297,359,289	112%
	Total	47,997,300,283	49,192,570,860	98%

Source: District and RRA revenue collection reports 2017