National Bank of Rwanda a Gender Champion: Thinking through the Task Ahead

The use of big data analytics in the National Bank of Rwanda.

Big Data and Artificial Intelligence use in the National Bank of Rwanda

The National Bank of Rwanda's (NBR) Monetary Policy Decision Making Process.

Lending
Deposits
Money Markets
Trade Deficit
Currency
Loans
Banks
MFIs
Insurance
NPLs
Depreciation
Exports

Imports
GDP
Financial Markets
Inflation
T-Bills
Treasury Bonds
Commodity Prices
Interest Rates
Payment Systems
Liquidity
Credit
Money Supply

NBR IDENTITY STATEMENT

The National Bank of Rwanda strives to be a World class Central Bank that contributes to economic growth & development, by using robust monetary policy tools to maintain stable market prices. The Bank ensures financial stability in a free market economy as it embraces innovations, diversity, inclusiveness, and economic integration.

VISION
To become a World Class Central Bank

MISSION
To ensure Price Stability and a Sound Financial System

OUR CORE VALUES

INTEGRITY
We uphold high moral, ethical and professional standards for our people, systems and data

ACCOUNTABILITY
We are result-focused and transparent, and we reward according to performance

MUTUAL-RESPECT AND TEAM-WORK
We keep ourselves in high spirit, committed to each other for success

EXCELLENCE
We passionately strive to deliver quality services in a timely and cost effective manner. We continuously seek improvement by encouraging new ideas and welcoming feedback that adds value to customer services.

CONTENT

National Bank of Rwanda - a Gender Champion:
Thinking through the Task Ahead

Dr. Monique Nsanzabaganwa,
Deputy Governor National Bank of Rwanda

On September 13, 2019, the National Bank of Rwanda was declared a global Gender Ambassador by Alliance for Financial Inclusion; an acknowledgement that was based on gender diversity in top management, collection of sex-disaggregated data, and active engagement in AFI's gender and women's financial inclusion programs among others, and the Bank's continued interest in gender equality. This continued interest is partly seen in the Denarau Action Plan (DAP) adopted in Fiji in 2016, where NBR in partnership with Women's World Banking, sponsored article 10 of the DAP, that challenges leaders of AFI member institutions to "drive greater gender diversity within [...] their own institution and its initiatives and strategies".

Gender Diversity is imperative to all workplaces. People with different backgrounds and experiences can develop innovative ideas that will keep any workplace alive and thriving. Data shows that greater gender diversity in the workplace can lead to better performance, increased productivity and innovation. Despite this, organizations are not benefiting from this, given that most of them are dominated by a single-sex. For example, big central banks such as the US Federal Reserve and the European Central Bank are still challenged with the fact that there are still "missing women" in senior positions, as reported by Jack Ewing in the New York Times of October 22, 2019. Central banks being the monetary authority and regulator of the financial sector, it is key to accommodate a heterogeneity of values, beliefs and attitudes. In Donnery's (Deputy Governor of Ireland) speech, she highlighted the available research that shows how gender diversity can guard against group thinking. Ms Donnery explained that knowledge of risks can improve where there is gender diversity on the board as risks are more carefully examined, weighed and challenged.

In addition, having women on technical teams creates conducive internal dynamics within teams, brings more perspectives into the discussions, and enriches the quality of analyses. Women tend to have a greater sense of attention to detail, are more creative and express more empathy. These traits are complementary to their male colleagues', which tend to be based on pure data, logic, and accurate assessments (Laura Day, contributor on Huffpost), not to mean that women are not logical neither men don't have feelings.

By and large, gender diversity contributes to the effectiveness of central banks' mandates as monetary policy authorities and regulators or guarantors of financial sector stability. There are at least three reasons for which a monetary authority would value gender diversity; credibility, quality of its analysis and communication of the monetary policy. Gender diversity enhances the credibility of a central bank hence the effectiveness of its monetary policy. Nowadays, central banks attach high importance on how they are perceived by the public, by valuing their appearance such as independence, honesty, openness, transparency, etc, the higher their credibility, the higher the likelihood that a central bank's announcements will be accepted and at a lower cost (Alan S. Blinder, 1999). Therefore, it can be argued that central banks are bound by gender equality as an aspect of good governance, thus justifying the "missing women" criticism facing the big central banks that we cited above.

The quality of analysis also depends on the granularity of the information that is used, mainly sex-disaggregated data. A case has been made that central banks' policies aim to impact inflation cannot and are not gender-neutral in their outcomes especially on employment. For instance, inflation-unemployment trade-off in women might have a stronger, more prolonged negative impact on growth than that in men, if we are to go by the "good mother hypothesis". This hypothesis asserts that there is a higher co-incidence between a mother's income and the family's basic needs than a father's income. In other words, it speaks to a positive and strong relationship between women's prosperity and investment in human capital, which brings higher and more sustainable economic growth benefits.

Elissa Braunstein and James Heintz, in their article Gender bias and central bank policy: employment and inflation reduction, recommend that "central banks should incorporate gender-specific indicators in the creation of targets, such as gender-disaggregated employment figures or gender aware inflation rates [...] that account for gendered consumption and employment patterns". Applying the gender lens to the work a central bank does as a monetary policy authority, ensures that the plausible disproportionate adverse effects of its policies on the welfare of women (and of the households for that matter) in terms of employment or consumption patterns are mitigated.

Finally, it is imperative for central banks to ensure proper communication of monetary policy actions, especially to women who according to available evidence are responsible for a significant share of consumer decisions. Women represent a growing portion of the customers, clients and partners for many businesses. Research done is developed economies shoes that, they influence retail decisions at a higher share. In Rwanda, a third of business establishments are owned by women and a third are headed by women. About 95% of these businesses are in informal sectors, mainly small trading of goods and services, including fresh food and other food items. These women who do their businesses to sustain their families, are at the same time the ones feeling the hit when inflation goes up. With the weight of these items in Rwandans consumer basket, women are hardly a market segment to be ignored in central bank communication. A gender-diverse team will likely come up with better communication strategies to reach women with the right messages.

Gender diversity at play in NBR

The National Bank of Rwanda (NBR) is very proud to be a gender-balanced organisation in terms of membership of its main organs (check website National Bank of Rwanda Annual Report 2018-2019 on www.bnr.rw). The appointing authority has played a role in the appointment of Board and Management, an example that the latter emulated while appointing staff in different positions. A visible gap was identified among the monetary policy and research side of the bank, which is the driving technical force behind the monetary policy committee. It is with the commitment of NBR to join the Gender Equality Seal certification process that the Bank examined itself and started to take practical steps to close the gaps noted. In the past, there was no female economist in managerial positions, however, we currently have two female heads of division who have been appointed from internal promotions. Efforts have also been put in training female young economists, thus creating a pool of future economists for the country.

So far, the less tackled areas, are using sex-disaggregated data in monetary policy analysis, modelling and forecasting as well as fine-tuning NBR communication strategies to mainstream gender. The Gender Equality Seal standing committee will prioritize them going forward.

NBR cares about increased voice and participation of women in the financial sector as a part of its mandate to ensure an inclusive and stable financial sector. It has set a regulatory standard on governance that enshrines gender diversity among other key considerations, that financial institutions' shareholders and board must take into account while appointing senior managers. NBR has even gone further and mandated the publication of the composition of these organs and structures in terms of male and female members, which enhances transparency and accountability of these institutions.

Scoping NBR's task as an influencer

There is no doubt Rwanda has made tremendous progress on inclusive and equitable access to finance for all. But some gender gaps are still visible whereby women tend to lag behind men. Though men and women have equal rights to financial services and physical assets, the state of power relations in a couple makes it challenging for women to have control over financial and physical assets. The visible gap in usage of financial services by women is hampered by cultural norms, social roles, and limited skills including low digital literacy. These legacy issues disproportionately keep women in small, informal occupations, or leave them underrepresented. Creating opportunities for women is, therefore, another area NBR's work will impact directly or indirectly.

Rwanda ranks well in many gender reports. The Power of Parity 2019 by McKinsey, shows that Rwanda's overall gender parity score (GPS) stands at 0.69 (on a measure of 0 for no parity to 1 for full parity). This puts Rwanda in the third position in Africa, after South Africa (0.76) and Namibia (0.72). However, Rwanda's "gender equality at work' metric is still low, for instance, the gender parity score for this metric sets at 0.54, way below other metrics such as physical security and autonomy (0.88), Essential services and enablers of economic opportunity (0.80), Overall gender equality in society (0.801), and Legal protection and political voice (0.71). The major pull-down factor for the GPS in equality at work is the high levels of informality and limited number of women in leadership positions in the private sector.
This finding is consistent with World Economic Forum's Global Gender Gap Report 2020 that ranked Rwanda 9th among the top 10 gender inclusive countries, but with a shortfall in women's economic participation and opportunity where it ranks 79th globally.

The National Institute of Statistics of Rwanda in its quarter 2, 2019 report, revealed that there was a gender gap on labor force participation that stood at 10 percent with fewer women, and unemployment at 4 percent points- more women than men. It's against this background, that NBR as a monetary authority, financial sector regulator and advisor to Government, has a developmental role to play. The key message for NBR and its stakeholders in economic management in Rwanda, is that more deliberate and coordinated efforts are needed to give impetus to women's economic status in the country, however this call also applies to macroeconomic policymakers as well as sectorial policymakers.

"Having women on technical teams creates conducive internal dynamics within a team, brings more perspectives into the discussions and enriches the quality of analyses."

2019
AFI GPF
Conference

The use of big data analytics in the National Bank of Rwanda.

Example of Interbank network analysis.

Patrick Mugenzi,
Young Economist,
Monetary Policy

The development of Information and Communication Technology (ICT) affect every aspect of today's economic and financial activity. This is explained by the fact that the use of ICT creates massive quantities of data, the so-called "big data" (FSB (2017). Central banks experience significant increase in financial big data sets, resulting from the use of new technologies that contribute to large and growing financial, administrative and commercial records. This development has the potential to strengthen analysis in central banks and improve the decision-making process. Indeed, big data provides more complete and high frequency information which are key for decision making in central banks in addition to traditional macroeconomic indicators. High frequency data are important for central banks to better understand impacts of different macro-economic shocks. For example, it has become increasingly popular to use intraday asset pricing data to study the effect of macroeconomic events on the economy, because it is known that asset prices react to macroeconomic events very quickly.

An increasing number of central banks have launched specific big data initiatives and the development of new analytical tools to deal with them. In this paper, we focus on one category of these big data techniques aiming at extracting summary information from large quantitative structured data sets. The main goal of these techniques is to obtain indicators by condensing large amounts of data

points available, by finding similarities between them and regrouping them in clusters.

In this paper, we show how NBR can benefit from big data analytics to improve its policy decision-making process using the case study of "interbank network analysis" in Rwanda. The functioning of this "network" is derived from graphical techniques and representations, showing how data is connected to other data, clarifying how these connections matter and showing how complex systems move in time. In practice, a network is made of elements (nodes), linked to each other either directly or indirectly, and this can be represented by several types of graphs. An important element is the importance of nodes (or links) in the network, evaluated using specific metrics. Another important feature of a network is the simplification of the visualization of a large and complex network, by regrouping nodes in clusters and filtering noise, through the use of specific machine learning algorithms.

Interbank market in a country plays an important role for monetary policy transmission mechanism and has a significant impact on the country's economy. The market allows liquidity to be transferred from banks with a surplus, to banks with a deficit, to reduce short-term liquidity holding for precautionary purposes, thus contributing to the efficient use of liquidity by banks, hence financing the economy. However, higher degree of interconnectedness in the interbank market makes it a potential source of bank

contagion, through which problems affecting one bank or a small number of banks may spread to other banks. Thus, understanding that the behavior of key players in the interbank fund market is important to determine appropriate policy instruments, aiming at improving the interest rate channel of monetary policy.

In addition, characterizing the actual topology of interbank funds networks and its change over time is important for policymakers given the relation between their structures and their resilience, robustness, contagion, and efficiency.

The global financial crisis led to a worldwide rethinking of the financial system's architecture. One of the major issues at the center of current academic and institutional debate is the optimal level of financial interconnectedness, which is the web of linkages among financial institutions through interbank markets. Two major forces oppose each other. On one hand, interconnectedness allows for an effective transmission of monetary policy impulses, makes financial institutions more capable of absorbing idiosyncratic shocks, and is ultimately essential for the overall functioning of the financial system. On the other hand, through contagion, financial interconnectedness brings about risks that failure of one bank spreads to other banks leading to a systemic crisis.

> **An increasing number of central banks have launched specific big data initiatives and the development of new analytical tools to deal with them.**

Banks initially choose potential trading partners randomly, but over time they form preferential relationships via an elementary reinforcement-learning algorithm. It turns out that the dynamic evolution of the financial system shows the formation of a core-periphery structure, which is defined as a connected network that has two tiers, a core and a periphery. The core forming a fully connected clique, whereas peripheral banks are only connected to the core with the largest banks (core) taking on the role of money center banks and mediating between the liquidity needs of many small banks (periphery).

NBR has a database on all daily transactions happening on the interbank market. Using those data on number of transactions and value of transactions by bank, we can define the interbank network. With the use of R programming, we draw the edges of the network. This helps to analyze the weighted interconnections among banks transacting on interbank market. Below is an example of Rwanda's interbank market network in 2019 using big data analytics. As indicated, this kind of graph is very important for policy makers, for it makes it easy to define core (liquidity super spreaders) and periphery banks, a distinction that is key to designing appropriate policy tools to ensure stability of the financial system and effectiveness of monetary policy.

Interbank market network analysis in Rwanda: role of big data analytics

The interbank market network in our case represents patterns of connections between 16 commercial banks transacting among themselves. It may be useful to assign real numbers, called weight to every edge or connection. For a financial network like ours, the weights represent the monetary value of the transaction. Important characteristics of the network considered are: the vertex degree which corresponds to the number of edges connected to it, as well as the number of incoming and outgoing edges, respectively.

The network or graph is represented by an adjacency matrix. Let n=16 represent the number of participants in the market. The adjacency matrix A is a square matrix of dimensions n × n, means 16 columns and 16 rows, with elements denoted =1 if there is a link between the bank i and the bank j and o otherwise.
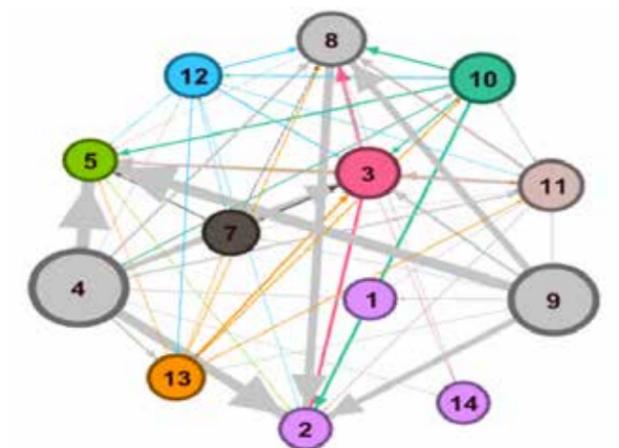
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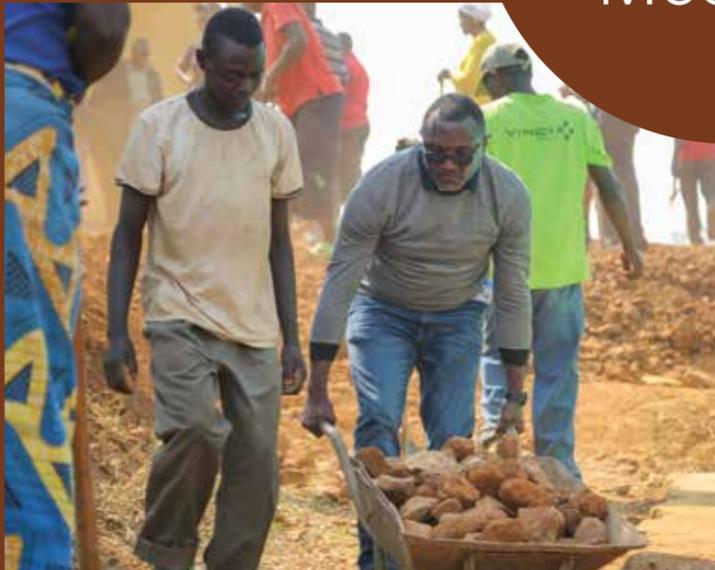
Phase 2 of
Cashless
Campaign

FAST TRACKING THE CASHLESS
— JOURNEY IN RWANDA —

The impact of financial inclusion and the implemented strategies

Mpinga Gretta,
Young Economist
Communication Division

Financial inclusion is the delivery of financial services to individuals and businesses at affordable costs to vast sections of disadvantaged and low-income groups. The financial inclusion journey in Rwanda started in early 2000 through the implementation of Vision 2020 which set the target to achieve 80% by 2017 and 90% by 2020. The first step towards achieving this ambitious goal was to employ financial literacy, a crucial part of the process of financial inclusion in a given economy. The financial literacy journey in Rwanda has yielded positive results by transforming the Rwandan's population from uninformed into informed consumers of the banking system.

Rwanda has spent over a decade employing strategies to ensure 90% of financial inclusion by 2020. Providing open access to financial services has enabled and empowered Rwandan citizens, including the poorest and most vulnerable, to have the knowledge, skills, and tools they need to make the right financial decisions. While financial inclusion has greatly impacted individuals and families, it has also stimulated the economy in their communities through investing in community development, which has led to the creation of jobs and boosted the quality of life.

One of the most effective strategies used by Rwanda to achieve financial inclusion was the implementation of Umurenge Savings and Credit Cooperatives (Umurenge SACCOs). The concept of Umurenge SACCOs was based on an understanding that banks and other financial institutions were more concentrated in urban areas whilst the majority of the Rwandan population lives in rural areas and totally excluded from the formal financial institutions (MINECOFIN, 2009). Within three years of opening the Umurenge Sacco, Rwanda had multiplied by 5 times the number of banked people, showing the significant role the Umurenge Sacco initiative has led in ensuring that all citizens, including those from rural areas, are financially included. There is a process underway to develop a shared core banking system for automating operations to offer better services at the standards of commercial banks.

Another tool that has boosted the success of Rwanda's financial inclusion is the establishment of ICT infrastructures across the country. ICT infrastructure has increased from 21 percent in 2008 to 89 percent in 2016 and has enabled the government together with private industries to establish programs availing savings, credit, and payments throughout the country, especially in rural areas.

Commercial banks have also played an essential role in financial inclusion, through improving access to their services. Commercial banks like Bank of Kigali used digital products such as IKOFI, which is a digital wallet that offers financial services with a focus on farmers, agribusinesses, and other people in the agricultural ecosystem.

All strategies employed by the Rwandan government to ensure financial inclusion have improved the standards of living and strengthened Rwanda's financial system. However, there are challenges that limit the complete engagement of all Rwandans in the financial system. To measure the state of financial inclusion in Rwanda and challenges that limit individuals from taking advantage of the progress that has been made in expanding access to affordable financial services, FINSCOPE surveys were conducted. The first one in 2008 revealed that 79% of Rwandans adults were not using formal financial institutions, and the recent survey in 2016 shows that only 11 %(0.7 million down from 1.3 million in 2012) are excluded and 89 %(5.5 million) of Rwandan adults have or use financial products or mechanisms.

Although overall levels of financial inclusion are relatively high in Rwanda, both FINSCOPE surveys revealed that farmers in Rwanda are largely unbanked. This is due to lack of awareness, rigid product structures, and unfavorable services offered to a high number of low-income people. All these challenges limit farmers from accessing basic financial services of banks and financial institutions.

It is imperative to make financial services and banking products available to low-income groups at a reasonable cost. This can be largely achieved by fully utilizing Rwanda's growing mobile banking system. Mobile banking is one of the most developed alternatives that is being experienced in the country at the moment. The adoption of mobile phones in the payment ecosystem has not only revolutionized traditional banking, but also financial inclusion. While traditional banking requires users to physically go to a bank, while mobile banking puts financial access in people's hands without taking a step out of their homes. Today, mobile phones are used as virtual credit cards without a bank account.

A relevant example is that, by 2015, there were major mobile money players such as MTN and Tigo. The two telecommunication companies collectively led a successful growth of mobile payments from 200,000 users in 2012 to more than 1,000,000 users in 2017, and mobile payment users from more than a 1,000,000 in 2012 to more than 9,000,000 million in 2017. Additionally, both Tigo and MTN have formed partnerships with banks that facilitate customers to transfer money from mobile money wallets to their bank's accounts, or withdrawal process known as Push&Pull.

Mobile banking is one of the basic financial services that has helped achieve financial inclusion at a cheaper price. However, it requires an understanding of all users and non-users of technology in the financial sector and how it could be used to improve the efficiency and inclusiveness of financial service and avoid payment of excessive charges.

Financial products such as Umurenge Sacco's and digital platforms like IKOFI have made financial inclusion successful in Rwanda. It is clear that consumers without traditional banking relationships have found the costs of financial services to be higher than relying on alternative methods of financing like sticking to cash transactions. However, digital and mobile banking has provided the potential solution to include much of the unbanked population, due to accessibility and low costs. Rwanda can achieve 100% financial inclusion faster by building more awareness about the issue, and by bringing together all stakeholders to fully integrate the mobile banking system in the financial system because at the end of the day an effective financial system requires the participation of all citizens.

> " The financial literacy journey in Rwanda has yielded positive results by transforming the Rwandan's population from uninformed into informed consumers of the banking system. "

Lending to farmers is a key driver for financial inclusion efforts in rural Rwanda

Authored by Emmanuel Nsekanabo, Communications and Market Development Manager, Access to Finance Rwanda

4 years ago, the FinScope survey indicated that 86% of adults in Rwanda are from households that are involved in farming activities. Unquestionably, the agriculture sector contributes considerably to poverty reduction by enabling income generation and ensuring food security for a large part of the population.

It's good news that the agriculture sector in Rwanda has steadily progressed over the past years in terms of productivity.

The progress is supported by the intended efforts from the Government of Rwanda guided by its ambitious development agenda, Vision 2020. However, lack of access to credit has long been cited as one of the major issues for local farmers.

Despite producing about 30% of Gross Domestic Product and providing livelihoods for over 70%of the population, the agriculture sector receives only 6% of loan products and services, according to central bank data.

To increase financial inclusion for the farming community, Access to Finance Rwanda (AFR) has partnered with private financial service providers to restructure and strengthen delivery of financial products and services to farmers. AFR has worked with Urwego Opportunity Bank, Réseau interdiocésain de microfinance – RIM Ltd, and Umutaguha Finance Company and Unguka Bank in a bid to establish a well-functioning agriculture finance unit.

The work AFR is doing through its partnership with the Umutanguha Finance Company is particularly valuable as we are gathering insights into a farmer's relationship with the company itself.

AFR entered into the partnership with the microfinance institution, Umutanguha Finance Company 2 years ago. The partnership was established to set up and build an agriculture financing unit. AFR built the microfinance institutional capacity into agriculture financing by training the microfinance firm staff with skills and knowledge in credit analysis and appropriate for the farming sector .

As result of the collaborative and successful partnership, Umutanguha Finance Company (like a few other financial service providers) in Rwanda have realised that lending to the farming community can be profitable just like any other sector of society. Four agricultural loan products have been developed. These include; farm production loan (labor, land renting and preparation), Agriculture Asset loan, Input loan (pests and fertilizers), and a post-harvest loan

A 33-year-old farmer, Mark Muhire, based in Huye District, Southern Rwanda, is one of the farmers who have benefited from an AFR agricultural loan product that is designed around the crop production cycle. Unlike other types of business loans, this particular loan product enables a farmer to service back the loan after harvesting and selling produce. For instance, when Muhire gets a loan to invest in rice farming he is allowed to pay back the loan after six months when he harvests. Muhire harvests twice in a year meaning he has an opportunity to borrow twice a year and invest back into rice farming.

Muhire has been banking with Umutanguha Finance Company, for the last two years with AFR's support. Prior to that, Muhire says that his loan applications for an agriculture loan had been rejected by many commercial banks in Rwanda with the reason being that lending to farmers is a high risk. Muhire was grateful to hear about organisations that are changing their perceptions on lending to the agribusiness sector.

Muhire has so far received credit for investing in rice and cassava farming worth 8 million Rwandan francs (USD 8,695) in the last 2 years. Contrary to the belief of some financial institutions that lending to farming would increase their Non-Performing Loan (NPL) rate, Muhire highlights a different picture, so far he has never defaulted according to the Umutanguha Finance Company.

Muhire cultivates rice on 2.5 hectares of marshland. He cultivates cassava on a hill adjacent to his rice field. His credit facility from Umutanguha Finance Company enables Muhire to buy seeds, fertilisers, rent land and employ 40 people per season.

"Before I started getting credit from the microfinance institution, I used to cultivate only cassava on just half a hectare of land. I am now farming cassava on 13 hectares of land as a result of getting an agriculture loan," says Muhire.

Muhire, a father and husband with a son and daughter, says that he has managed to earn a decent living and hopes for a brighter future. He is able to send his children to school and he can afford medical insurance for himself and his family. He has set up a business for his wife, who trades in rice and cassava flour in the Huye trading centre.

After establishing a relationship with the Umutanguha Finance Company, he now has a stronger belief in expanding his commercial farming. "I have realised the potential of using credit to invest in agriculture. I want to modernise and expand my farming through adding on more crops and size of land. I also plan to invest in a small-scale rice and cassava flour mill," says Muhire, who dropped out of high school to concentrate on commercial farming.

Given that the largest portion of Rwanda's population depends on agriculture, financing to farmers like 33-year-old Muhire would yield strong results for many banks and financial service providers willing to open up their policies on lending to this sector. AFR are proud to be one of the first businesses to operate lending services and products to this sector and can see the potential of this untapped market to improve economic stability for the country.

During the **AACB** Conference

MPFSS 2019

THE NATIONAL BANK OF RWANDA'S (NBR) MONETARY POLICY DECISION MAKING PROCESS.

The key role of most central banks is to conduct monetary policy that ensures stability of their economies' prices for a desired level of economic growth. How the decision on policy is made and is communicated to the public is a vital part for the effectiveness of the central banks in achieving their goals. The monetary policy decision making process has seen a significant evolution over time, in many economies including Rwanda. Changes that have been realized include the key policy decision to be taken, the composition of the teams involved in the decision-making, tools used in analyzing the possible decision and how it is communicated to stakeholders and the public in efforts to improve the quality and transparency of the decisions.

The Central Bank Rate (CBR) as the NBR's key policy decision

The National Bank of Rwanda (NBR) conducts its monetary policy through the price-based framework i.e. influencing the price of money (interest rates) in order to affect aggregate demand and therefore inflation/consumer prices. Other frameworks for implementing monetary policy include monetary-targeting, exchange rate targeting and direct-control of prices etc.

Since Rwanda's independence until 2018, NBR has used monetary-targeting and direct-control of prices, after which it switched to price-based framework.

In a simplified summary of how the price-based framework works, a decision is made on a central bank interest rate (CBR), also known as the key policy rate, that will be used as a basis for the interest rates on the money market. This in turn should affect the rates at which the commercial banks lend to households and firms. If the interest rate is high, consumers would rather save and get easy returns from their money rather than invest or consume it. This is because, holding other things constant, it would be more expensive to invest and the

Mikebanyi Ziraje, Priscille

opportunity cost of consuming would be high. The effect of the high interest rate would be a slowdown in economic activity and therefore a drop in prices due to sellers' efforts to attract customers.

When the interest rates are low, there would be more incentive for investment and consumption which would lead to a rise in prices which encourages more supply by producers and leads to an economic boom. However, when prices rise in an exaggerated manner, consumers' purchasing power is reduced and therefore aggregate demand falls. With prices that fall in an exaggerated manner, production is also discouraged and could lead to reduced employment rates and therefore a fall in aggregate demand. The ideal scenario for an economy is a low and stable increase in prices to encourage production activities but not on the cost of the consumer's purchasing power.

The National Bank of Rwanda aims to ensure that price changes remain within the band of +/-3% around 5% in line with East African Community inflation target which is part of the convergence criteria toward its plan of a monetary union.
In light of this concept, the central bank rate should be set after a rigorous analysis of the international and domestic economy to avoid scenarios of unexpected events that exaggerate price changes beyond the target.

The Decision Makers on the Key Policy

The NBR's decision making process has evolved from having the Governor as the sole decision maker to having a team that includes technical staff, managing staff as well as external experts involved in a team named the Monetary Policy Committee (MPC). These changes have come about as the importance of transparency and quality decisions for effective monetary policy implementation has been realized over time.

The MPC officially meets four times a year, that is once per each quarter of the calendar year, plus whenever deemed necessary. The process leading to the MPC decision and communication of the decision takes approximately 6 weeks and can be summarized in six stages.

Stages in the Decision-Making Process

Stage 1:
Announcement of initial meetings and MPC decision date and preliminary preparations of presentations from different areas

The coordinator of the team in charge of forecasting division communicates with staff and management of the bank the calendar of the MPC and once confirmed, it is published on the NBR website. This enables the public to know when to expect the policy stance (maintaining, increasing or reducing the central bank rate).

After the announcement, staff from the Monetary Policy and Research Directorate (MPRD) update their data and make preliminary-analyses in the various sectors that are key for consideration for the CBR decision. The forecasting approaches that would be used in the MPC cycle are then discussed by the forecasting team and adjusted if necessary.

A market survey of price expectations is also conducted before the first meeting.

Stage 2:
Initial Presentations of Domestic and International Economic conditions

During MPC preparations, the Monetary Policy and Research Directorate meets twice and staff present analyses on different aspects of the domestic and global economy to the chief economist and

departments in charge. These presentations include current trends, projections and possible shocks in the near future, and their implications on the domestic economy as a whole and hence inflation in the policy decision period. Discussions and feedback on areas of improvement of the analyses, headed by the Chief Economist, are provided by both the staff and the management team.

Presentations are made on the analysis of the following areas:

The Global Economy: Rwanda is a small open economy that is likely to be affected by global shocks hence the importance of an update on trends such as key economies' performances, key trading partners, performance of commodity markets and financial markets among others.
The Real Sector: The situation of the performance of the domestic economy is also analyzed using detailed GDP trends, turnovers of different sectors, Industrial Index Production among others.

The External Sector: This covers an analysis on Rwanda's import and export developments, and developments of sources or destinations of the exports or imports etc.
The Monetary Developments: This analysis covers liquidity developments, monetary aggregates such as money supply and total deposits, interest rate developments such as interbank and money market rates, and credit market developments etc.

Inflation Developments: This includes detailed core and headline inflation trends, drivers of these trends, and market expectations survey results and near-term forecasts of inflation.

Fiscal Developments: How the government is financed, where it spends and where it plans to spend its money is an important factor to consider when it comes to inflationary pressures.

Stage 3:
The first pre-MPC meeting

The same analyses in stage two are presented again to the MPC but with incorporations of the feedback from the first meetings' discussions.
After this meeting, policy documents that will be included in the Monetary Policy Report are drafted.

Stage 4:
Second Pre-MPC meeting.

A baseline projection of the policy rate that would maintain the inflation within the benchmark band is presented to the MPC by the forecasting and modelling team. Projections of important macroeconomic variables under the same stance are also presented. These projections are made using forecasting models that incorporate past, current situations and the medium-term outlooks of important economic variables and relationships. Possible risks or shocks in the domestic and international economy that could make the projections not realized are discussed and the MPC agrees on what alternate scenarios will be analyzed for consideration in the final meeting.

Stage 5:
Final MPC Meeting

The MPC meets again to discuss the baseline scenario and the alternative scenarios (if any). A final decision is then made on whether to keep the existing central bank rate, increase it or to reduce it, depending on projections and expert judgement of the most likely situation in the policy horizon (period the current decision is most likely to impact).

Stage 6:
Communication of the Policy Decision to the Public

Finally, several steps are taken to inform the public about the MPC decision in a bid to educate them about the CBR transmission mechanism.

First, a press conference is held the day after MPC meeting accompanied by a press release to the public.
A day after the announcement, staff gather for a presentation on the monetary policy decision.
2 days after the MPC announcement, the central bank communication team together with the Monetary policy department organize an outreach to Bank Managing Directors, Commercial bank Treasures and University students to explain to them the monetary policy stance.

A week later, the monetary policy report is finalized and published on NBR website.

The first Pre-MPC meeting.

Second Pre-MPC meeting.

Communication of the Policy Decision to the Public

Communication of the Policy Decision to staff

Communication of the Policy Decision to University students

Communication of the Policy Decision to Bank Managing Directors

Enhancing Responsible Lending practices to advance Financial inclusion and Consumer Protection in credit granting institutions.

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Promoting inclusive finance, where all segments of society have access to suitable and affordable financial services, is a key focus and concern of all governments. Financial inclusion has become an increasingly common and high-profile policy objective to accelerate progress toward meeting global and national financial inclusion objectives.

All financial consumers should be treated equitably, honestly and fairly at all stages of their relationship with financial service providers. Treating consumers fairly should be an integral part of good governance and corporate culture for all financial services providers and authorized agents.

Significant work has been done by both public and private institutions in Rwanda to promote financial inclusion. The first study to measure the level of financial inclusion was conducted in 2008. Back in 2005, the Financial sector assessment program revealed that Rwanda's economy has made considerable progress in overcoming the devastating consequences of the 1994 genocide against Tutsi, but the domestic financial sector was still facing challenges with economic activity concentrated in a few sectors and a weak credit culture. This first demand side survey provided the status of access and usage of financial services and products in Rwanda.

In 2008, only 47% of adult Rwandans were financially included with only 21% formally served. The study also indicated that majority of the population were mainly served by informal sector. These findings forced policy makers to develop a number of initiatives to increase the level of access to finance in Rwanda. These initiatives include but are not limited to: The idea of Umurenge SACCO that was discussed and supported during the National Dialogue Meeting chaired by His Excellency the President of the Republic of Rwanda, National Microfinance Policy Implementation Strategy, and the role of BNR to establish and review regulatory frame works that support financial inclusion.

The logic behind the formulation of these policies was to ensure the growth of the microfinance sector, which mainly focuses on serving the undeserved population and increasingly contribute to financial inclusion, thus facilitating economic growth and poverty reduction. The above financial inclusion initiatives coupled with the political will to achieve inclusive growth and proper coordination mechanisms among stakeholders produced tangible results in the next Finscope surveys 2012 and 2016 as indicated below.
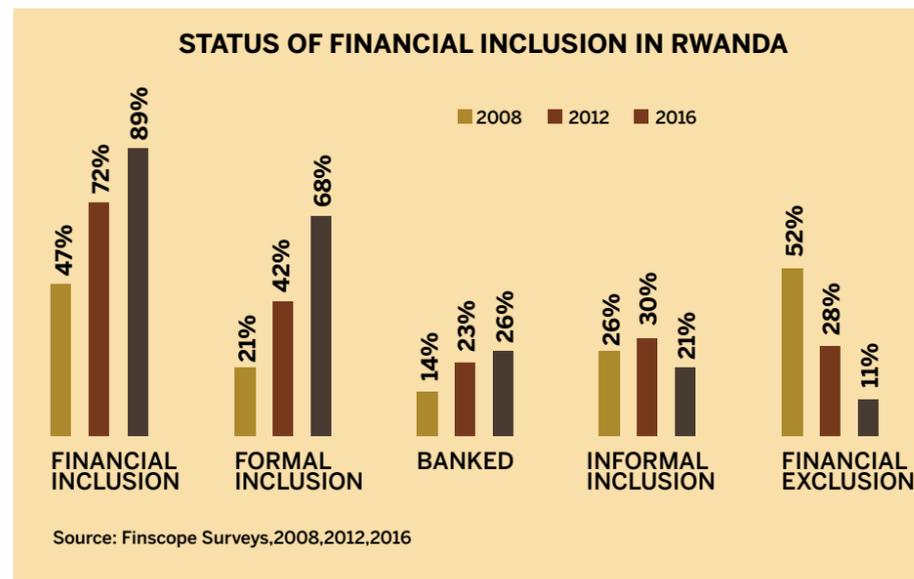
STATUS OF FINANCIAL INCLUSION IN RWANDA

Legend: 2008, 2012, 2016

- FINANCIAL INCLUSION: 47%, 72%, 89%
- FORMAL INCLUSION: 21%, 42%, 68%
- BANKED: 14%, 23%, 26%
- INFORMAL INCLUSION: 26%, 30%, 21%
- FINANCIAL EXCLUSION: 52%, 28%, 11%

Source: Finscope Surveys, 2008, 2012, 2016

What is Responsible lending?

Access to credit is sometimes considered a crucial measure of financial inclusion. Many international comparisons such as, the Financial Access Survey of the International Monetary Fund uses the number of retail loans as one of the key statistics when evaluating financial inclusion. Availability of credit in general provides the population with more options to realize their economic plans.

Responsible lending is defined as "the willingness of lenders to act on the customer's best interest, ensuring transparency of terms and conditions as well as supporting borrowers in case they experience repayment difficulties".

Due to the new emerging lending mechanisms such as digital lending and traditional lending in general, financial service providers should not strive to profit from limited financial capability of consumers. Lenders should embark on setting and clearly communicating fairly all terms and conditions, and business should conduct transparent pricing to promote public trust in the financial sector. Standardized pre-contractual disclosure practices should be adopted where applicable and possible to allow comparisons between products and services of the same nature.

In regard to this, the National Bank of Rwanda has issued regulation n° 02/2016 of 24/06/2016 to determine key facts statements and disclosure of annual percentage rates for fixed term credit contracts between a financial service provider and a consumer. Under this, formal credit providers are required to summarize the credit information in a standardized form known as "Key Facts Statements (KFS)" and provide this form to the client for signature before entering credit contract. This KFS form should be written in either one of the 3 languages that the client is conversant with.

Above this written form, lenders are also required to provide oral explanations related to the credit in case the client needs additional information.

The role of responsible lending in the financial sector.

The impact of the 2008 global financial crisis highlighted the need for more financial consumer focused practices as consumers face more sophisticated and complex financial market products and services, new product development, and financial service innovation including the rise of FinTech products.

Responsible finance ensures that consumers have all the information about an offer before signing the contract or extending any current credit. Lenders must honestly disclose the information related to the terms and conditions of credit rates, fees, and charges before lending money.

Responsible finance also protects customers from over-indebtedness. If lenders disclose and communicate all terms and conditions properly to the borrowers before entering into credit contract, borrowers will be able to take rightful decisions on whether to take the loan or not, based on their capacity to repay.

Responsible lending practices increase public trust and confidence towards financial system, enhances financial inclusion, and promotes competition. The way customers are treated before and after borrowing also has an implication on their future business dealings with lenders. For instance, if they are not fairly treated by one lender, then customers are likely to shift to another lender who offers the same product but with fair and clear terms and conditions.

When credits are provided responsibly (i.e. credit are provided to borrower based on his capacity to repay, the borrower is aware of all terms and conditions of the loan before signing the contract), it will have an impact on the quality of the loans issued. In other words, the borrower's capacity to repay the loan is high, hence reducing non-performing loans and leading to financial sector stability.

Responsible lending practices

1. Information disclosure

There are two aspects of effective disclosure of credit information: what is disclosed and how it is disclosed. While the content of disclosure should ensure that consumers get all relevant information, the method of disclosure should ensure that the information is presented in a way that is relevant and does not manipulate the consumer.

2. Proper credit information disclosure during advertising

Misleading advertising can thus lead consumers to wrong choices (even if they receive correct information later in the sales process). Reliance on advertising is more pronounced in rural areas where consumers usually have less experience with financial services and are thus more susceptible to misleading information. Given the low level of financial literacy among the population, lenders should be responsible and be in position to provide warnings when drafting their credit advertising message. For example, Borrowers should be acknowledged and warned that "Borrowing money costs money".

3. Matching oral disclosure with written content

Establishing clear and specific rules on the information that must be orally presented to consumers during the pre-contractual stage of the sales process, should both be reinforced and expanded upon written disclosure. Lenders need to package information about a certain credit product and deliver it authentically either in written or oral channels and in plain language.

4. Publishing credit price comparisons and credit selection advice

The users of financial products and services must be able to find price comparison information that is relevant to them. The lender's website and other public places should therefore cover all typical lending products. The basic type of a price comparison website should present comparative tables ordered according to user-specified filters. Data on credit product prices also need to be reliable and regularly updated, as well as independently verified by the operator.

5. Proper verification of borrower's income, credit history and creditworthiness before granting a loan

When assessing the riskiness of a potential client and his ability to repay the loan, income verification is the primary tool most lenders use. In more formalized economies, most lenders require formal confirmations of borrower's income (employer's confirmation, tax returns for self-employed, etc.) while less-documented countries or countries with higher share of shadow economy use other sources of information to confirm the creditworthiness of the borrower. Therefore, there is a need to timely report credit information of a client in the credit reference bureau, to help future credit assessment across lenders.

Lessons from the recent 2008 global Financial Crisis

A decade after the recent global financial crisis, management and boards of the key global financial institutions have paid insufficient attention to the lending behaviors, hence failure to prevent excessive and inappropriate responsible finance. It is even possible that some turned a blind eye to miss-selling, unsuitable recommendations, and other misconducts. Failure to prevent these delinquencies and hiding of key information, led to misleading customers about risks involved in undertaking certain credit facilities that forced them into credit traps.

Therefore, there is a need to create competitive markets in order to provide consumers with greater choice amongst financial services, and create competitive pressures on providers to offer competitive products, enhance innovation, and maintain high service quality. Consumers should be able to search, compare, and where appropriate, switch between products and providers easily at reasonable and disclosed costs.

> " An increasing number of central banks have launched specific big data initiatives and the development of new analytical tools to deal with them. "

London Stock Exchange

Launch of the first Rwandan Franc denominated bond listed on the London Stock Exchange.

BNR
Engage

**University
Challenge**

BIG DATA AND ARTIFICIAL INTELLIGENCE USE IN THE NATIONAL BANK OF RWANDA

By Violette and Dominique

Introduction

One may wonder, what these popular terms "big data and artificial intelligence" mean? Big data - described by some as the new oil of the 21st century, is voluminous data generated by the increasing use of digital tools and information systems. Whereas artificial intelligence is defined as a theory and development of computer systems that simulate human intelligence with the ability to think like humans and mimic their behavior. We continue to witness the development and use of web-based services, which are because of different emerging technologies and the continued internet evolution leading to a rapid increase of financial, administrative and commercial records. Big data has been characterized with a list of 5V's which has grown over time to represent both the prospects and challenges that organizations could face in their business operations while leveraging the technology.

The volatility of the data refers to the continuous changes in technology, which could lead to invalid analyses if not treated carefully. Variety implies the generation of data from various sources such as commercial data, social networks, sensors, and transactional data to mention a few. Volume stands for the nature of the technology, data generated in large amounts such as terabytes or even petabytes. Veracity represents the noise and bias in the data, which could be a challenge to bring value to organizations if not handled well. Lastly, velocity refers to the speed at which the data is generated i.e. real-time or near real-time.

Central banks take on big data information and Artificial Intelligence

The surge of big data information has caused a stir within central banks all over the world with the concept being very hard to ignore. Central banks are considering adopting the technology and leveraging the analytical features that come with it since the phenomenal has presented a surge in financial data and is strengthening analysis for policy enhancement and decision-making. The Bank of England stressed that this is a shift in tack from analyzing structured, aggregated sample data collected with a specific set of questions in mind, to analyzing data that is more heterogeneous, granular and complete such that these data are fit for multiple purposes (Big data and central banks, Bholat, D 2015).

The data volume surge comes hand in hand with specific tools and techniques of their analysis known as big data analytics, which refers to the general analysis of these large amounts of datasets. It is important to note that big data analytics is not entirely a new approach to running analyses on large datasets but a technique that borrows from traditional techniques that previously used to deal with complex datasets long before the modern-day analytics. Big data analytics and AI techniques are characterized by various statistical modelling approaches such as text mining techniques, network analysis and machine learning. These techniques require statistical skills, which is an important factor for central banks looking to invest in the technologies.

Opportunities for central banks

The adoption and use of big data in the banking sector have been identified as a characteristic that will play an important role in the enhancing of the quality of economic analysis and complement research with improved techniques. For example, IMF is carrying out research in the field to identify new ways of measuring economic indicators, market prices, business sentiments, etc. Central banks all over the world are looking into making use of the financial big data sets to pursue their mandates and inform decision-making by processing large data sets that are readily availed to them to identify value that could be drawn to complement current traditional approaches. These institutions have identified pilot areas in which the technology could bring value. Among these are; the production of official statistics, macroeconomic analysis and forecasting, financial market monitoring and financial risk assessment from granular financial datasets collected from various institutions.

Big Data in the National Bank of Rwanda

As the modern economy provides the challenge of measuring fast-evolving forms of economic activity, and the opportunity to exploit huge amounts of new data and information coming from different sources is increasing. The National Bank of Rwanda (NBR), as other central banks, has entered a new era whereby the need for accurate, timely, relevant, detailed and granular data has become critical for it to achieve effectively its mission. The NBR started the journey to embrace Big Data Analytics as a key enabler in its strategic orientation and is exploring new opportunities and trying new approaches to use Big Data analytics in the area of the monetary and financial stability policies.

The NBR has been using data for a long time, but in the past few years, it started investing in building modern and high capacity infrastructure that collects and processes huge amount of data from both external stakeholders and internal sources through Electronic Data Warehouse (EDHW). Part of this data is automatically transmitted through the data warehouse and non- automatically data processed from reports, mails exchanges and surveys data. The EDHW collects and stores granular data from all financial institutions in the country and key economic players. These institutions include commercial and development banks, microfinance institutions and SACCOS, insurances and pension fund, money transfer operators, telecoms, forex bureaus, credit reference bureau and Rwanda Revenue Authority, totaling to over six hundred institutions. This available information is transforming the traditional approach where the Bank had to rely on stakeholders to report data, but currently, granular data is accessed and analyzed at any given time. This is revolutionizing the reporting and analysis in the NBR and the potential to speed up statistics production and analysis is huge.

How Big Data enhances analytics in BNR?

On the journey to leverage on Big Data Analytics to drive the economic analysis, a new generation of technologies and tools is being explored in the Bank to exploit the growth and availability of these high frequent and massive data. Innovative techniques and methods, such as machine learning and artificial intelligence, are providing richer, more informed measurements and analyses on the economy to help policy-makers, researchers and businesses. For a better understanding of the benefits and importance of Big Data, below are two initial projects that the Bank is exploring to use Big Data for official statistics and economic analysis.

Use case 1: Financial inclusion and Big Data

Rwanda considers financial inclusion as an integral enabler for achieving its development and poverty reduction objectives, and the Government of Rwanda targets achieving 90 percent financial inclusion by 2024, pushing the NBR to regularly monitoring of the progress achieved without waiting the 4 years lag indicators from the FINSCOPE survey. To keep track of the progress of financial inclusion implementation, the Bank needs to set up a framework to collect and analyze high frequent indicators and know segments of the population for which financial inclusion is lagging ,and the key areas, which require additional policy interventions.

The financial inclusion and Big Data project will exploit using granular and high-frequency data on transactions on accounts (savings, borrowing and payments) from Banks, MFIs, SACCOs and Mobile money operators. This will allow answering a number of questions: For example, how frequently do individuals use bank accounts and for which reasons (e.g., payments, savings)? How much and frequently do individuals borrow and for what purpose (e.g., consumption, business, housing, education, health, etc.)? How likely are they to repay on time and which characteristics are associated with the presence of arrears and defaults? How much do individuals save? How extensive is credit rationing and which factors are more likely to be associated with? How common is it for individuals to have relationships with more than one financial institution? In this project, statistics on

all the aspects of the usage of financial services will be computed for different demographic groups, e.g. by gender, age group, employment status, urban-rural, type of financial institution (commercial banks, MFIs and SACCOs) and across geographical locations to provide a complete overview of access to finance. This will help to take appropriate and timely decision to respond to identified challenges.

Use case 2: Consumer Price Index Compilation using Big Data and Artificial Intelligence

In the country, all whole sellers and many retailers use Electronic Billing Machine (EBM) to process invoices when selling their products and services. EBM records all the information on the product at the time and point of purchase which the NBR and other partners are exploring the possibility to use to compute Consumer Price Index (CPI) on a very high frequency. As more shops move over to bar code readers, the potential benefits to compilers of CPI increase. Artificial Intelligence can be used to read unstructured (scanned) EBM data, processing and transforming into tidy data usable for compilation, analytics and forecasting. These data provide the potential to deliver up-to-date and accurate information on the number of sales over a chosen period of individual products uniquely identified by the bar code number and the total value of those sales and by implication the average transaction price or unit cost. In addition, it is easy to analyze by characteristics, outlet type, and geographical location of the individual products.

It is expected that EBM data could result in more accurate low-level indexes and provide the opportunity to implement superlative indexes at the lowest level. Another possible advantage is that the EBM sample may be more representative of the relevant universe because the weights are estimated more accurately and updated more frequently. Yet another advantage is that data can be cleaned according to rules that can be applied consistently and studied academically.

In summary, the NBR is keen to benefit from the Big Data Analytics and AI, which are seen as an effective tool to support macroeconomic and financial stability analysis.