The State of RegTech: The Rising Demand for “Superpowers”
Survey of 12 financial authorities representing 19 countries on 4 continents and markets of 1 bn+ people
# Financial Authorities Surveyed

<table>
<thead>
<tr>
<th>Financial Authority</th>
<th>Abbreviation</th>
<th>Country/Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banco Central do Brasil</td>
<td>BCB</td>
<td>Brazil</td>
</tr>
<tr>
<td>Banco de Moçambique</td>
<td>BDM</td>
<td>Mozambique</td>
</tr>
<tr>
<td>Bangko Sentral ng Pilipinas</td>
<td>BSP</td>
<td>Philippines</td>
</tr>
<tr>
<td>Bank Al-Maghrib</td>
<td>BKAM</td>
<td>Morocco</td>
</tr>
<tr>
<td>Bank of Ghana</td>
<td>BoG</td>
<td>Ghana</td>
</tr>
<tr>
<td>Bank of Tanzania</td>
<td>BoT</td>
<td>Tanzania</td>
</tr>
<tr>
<td>Banque Centrale des Etats de l’Afrique de l’Ouest</td>
<td>BCEAO</td>
<td>Benin, Burkina Faso, Cote d’Ivoire, Guinea Bissau, Mali, Niger, Senegal, Togo</td>
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<tr>
<td>Central Bank of Egypt</td>
<td>CBE</td>
<td>Egypt</td>
</tr>
<tr>
<td>Central Bank of Kenya</td>
<td>CBK</td>
<td>Kenya</td>
</tr>
<tr>
<td>Central Bank of Nigeria</td>
<td>CBN</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Comisión Nacional Bancaria y de Valores</td>
<td>CNBV</td>
<td>Mexico</td>
</tr>
<tr>
<td>Superintendencia de Banca y Seguros</td>
<td>SBS</td>
<td>Peru</td>
</tr>
</tbody>
</table>
The responses of financial authorities indicate that we are at a tipping point for RegTech solutions, with an open door for data “superpowers.”

Financial authorities would like to acquire “superpowers” that would allow them to access better tools for data analytics and automate data validation processes.

Financial authorities believe improvement in the quality of collected data and data analytics will have an impact on financial inclusion and customer protection, among other policy objectives.
Current practices

- Financial authorities are still transmitting data from reporting institutions by post or courier, email, and through data portals that entail security risks and hamper processing speed.
- Extensible Markup Language (XML) is the commonly-used data collection and exchange protocol given its simplicity and generality.
- Most financial authorities use Excel spreadsheets to analyze data even though Excel is not designed for processing large datasets and complex analytics.

The challenge

- The time spent validating data and insufficient human resources for proper data analysis are the biggest challenges facing financial authorities.
- Delays in report submission and incomplete data and low-quality data make it difficult to generate timely analytics. Instead, analytics are retrospective and reactive.

Most financial authorities collect data monthly or quarterly or as needed. The infrequent nature of data collection is a missed opportunity to monitor key risk metrics and identify early signs of stress.
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Retail Banking Supervision
Table 1. Number of supervised retail banks by country

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of licensed institutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morocco (BKAM)</td>
<td>19</td>
</tr>
<tr>
<td>Mozambique (BDM)</td>
<td>19</td>
</tr>
<tr>
<td>Nigeria (CBN)</td>
<td>21</td>
</tr>
<tr>
<td>Egypt (CBE)</td>
<td>38</td>
</tr>
<tr>
<td>Ghana (BoG)</td>
<td>39</td>
</tr>
<tr>
<td>Kenya (CBK)</td>
<td>40</td>
</tr>
<tr>
<td>Mexico (CNBV)</td>
<td>52</td>
</tr>
<tr>
<td>Tanzania (BoT)</td>
<td>58</td>
</tr>
<tr>
<td>Peru (SBS)</td>
<td>60</td>
</tr>
<tr>
<td>Philippines (BSP)</td>
<td>98</td>
</tr>
<tr>
<td>BCEAO</td>
<td>113</td>
</tr>
<tr>
<td>Brazil (BCB)</td>
<td>152</td>
</tr>
</tbody>
</table>

Retail banks are restricted to universal and commercial banks as well as thrift banks. The mean and median numbers of licensed institutions are 59 and 46, respectively. Brazil has the largest number of supervised retail banks (152) and Mozambique and Morocco the fewest (19).
Retail Banking Supervision – Data Collection
While the financial authorities surveyed used a variety of channels to collect different types of data, it is noteworthy that half receive operational reports by email and nearly half transmit financial integrity data by post/courier. Web-based data portals are also predominantly used for financial integrity and transaction data. 25% use other transmission methods including CDs and portable storage devices (USBs).
Channels used for collecting prudential data

All 12 financial authorities indicated which channels they use to collect prudential data; these were quite varied and sometimes involved multiple channels. The authorities use a combination of web-based data portals, bulk uploads, post/courier, and email. None of them has an API-based system in place for data transmission.
Channels used for collecting transaction volume and value data

- Commercially developed web-based data portal: 50%
- Internally developed web-based data portal: 38%
- Documents transmitted by e-mail: 25%
- Documents transmitted by post/courier: 25%
- Other transmission method (please describe): 13%
- Bulk upload (e.g., FTP/SFTP) system: 13%
- API-based system
- SWIFT Messaging system
- Documents transmitted by fax

Note: Transaction volume and value data (e.g., deposits and withdrawals)

Web-based portals are frequently used for collecting transaction volume and value data. Most are commercially developed (50%), closely followed by internally-developed portals (38%). Again, authorities rely on multiple methods to collect this information, some of which are inherently insecure.
Authorities overwhelmingly use a combination of internally-developed web-based data portals (43%) and post/courier (43%) to collect financial integrity data. This is notably a less digital approach than for other data types.
Channels used for collecting operational data

- **Documents transmitted by e-mail**: 50%
- **Commercially developed web-based data portal**: 25%
- **Internally developed web-based data portal**: 25%
- **Documents transmitted by post/courier**: 25%
- **Bulk upload (e.g., FTP/SFTP) system**: 13%
- **API-based system**:
- **Other transmission method (please describe)**:
- **SWIFT Messaging system**:
- **Documents transmitted by fax**:

Note: Operational data (e.g., service disruptions)

Half of the surveyed authorities reported transmitting operational data **by email**, followed by web-based data portals and post/courier. While email poses security risks for data transmission, operational data is comparatively less sensitive in nature.
Authorities reported collecting statistical data through a mix of web-based data portals (36% commercially developed and 27% internally developed) and bulk upload systems (27%). They also utilize post/courier services (18%) and email (9%).
Format or protocol used to collect and exchange data by protocol type

XML is the most commonly-used protocol, utilized by financial authorities for all types of data collection. Other formats include Excel and text files.
At least 50% of surveyed financial authorities collect prudential, transaction volume and value, financial integrity and statistical data through XML. Other formats, including Excel or text files are also predominantly used by financial authorities to collect data.
Most financial authorities collect prudential, transaction volume and value, and statistical data monthly and/or quarterly, along with financial integrity and operational reports that are additionally collected as needed. The infrequent nature of data collection is a missed opportunity to monitor key risk metrics and identify early signs of stress.
Collection frequency does not vary dramatically by type of data collection, suggesting that less frequent reporting timelines were a result of limitations in collection and analysis capacity, rather than requirements specific to the data.
Over half of surveyed financial authorities reported delays in submission of reports, incomplete data, and low quality of data as the main challenges regarding data collection. This suggests that it is difficult to generate timely and accurate analytics, which affects the financial authorities’ ability to make sound policy decisions. Also, analytics tend to be retrospective, making policy responses more reactive.
Retail Banking Supervision – Data Validation
Data validation processes range from fully manual to fully automated

Validation is conducted manually through cross-checking different reports.

There are two check levels: the first one is automated (formal check, automated control rules); and the second level is done by off-site supervisors.

Currently, we have a web-based software. It enables us to collect and analyze data. Although there is a tool to validate data, it has not been fully utilized yet. So, some plausibility checks are done manually.

The data validation process depends on the particular system, but mostly are automated and/or complemented with assessment of reasonability.

We have automated our validation process by developing rules for validating specific accounts into a program. Validation rules are able to identify arithmetical inconsistencies and produce a report. The feedback is shared with the reporting institution with a request to resubmit the report.

We have internal validation tools (automated) to ensure minimum requirements on data quality regarding integrity, consistency (historical and with other reports) and reasonability. These tools identify clearly erroneous data and make plausibility checks.
Given the need to manually validate data, 67% of financial authorities cited human error as the main challenge they faced with respect to data validation processes. This could be minimized with the introduction of APIs and connections between various data sources, databases, and outputs.
Suggestions given by respondents to improve data validation processes

In the future, we would like to implement artificial intelligence in our validation tools.

We would like to enable direct querying of data from core banking applications of the reporting banks.

We need to use efficient file formats that can minimize file size to speed up processing and validation. Also, we could improve turnaround time by consolidating various reports to minimize waiting time before the validation process can commence.

Data validation should be conducted automatically, along with output MIS reports. Also, all reports including control rules need to be automatized.
Retail Electronic Money (e-Money) Issuer Supervision
Licensed or authorized retail electronic money issuers under supervision

Only five central banks responded to questions related to supervision of e-money issuers. This was due in part to the fact that some do not regulate e-money providers. For others, the licensing process was in progress at the time of the survey.
Retail Electronic Money (e-Money) Issuer Supervision – Data Collection
E-mail is the predominant channel for receiving financial integrity and operational data while commercially-developed, web-based data portals are most commonly used to receive prudential data.
Once again, E-mail is the predominant channel for receiving financial integrity and operational data while commercially-developed, web-based data portals are most commonly used to receive prudential data.
Unlike retail banking supervision, **XBRL** is the most-used protocol for collecting or exchanging data from reporting retail electronic money issuers.
Format or protocol used to collect and exchange data by data type

XBRL is the most commonly-used format for all types of data collection.
Similar to retail banking supervision, most financial authorities collect data from e-money issuers on a monthly basis, followed by quarterly reporting.
Most reports are collected on a monthly basis, independent of type of data collected, implying data collection and analysis limitations for more frequent reporting.
Data collection challenges

- Data manipulation: 75%
- Low quality of data: 75%
- Delays in submission: 25%
- Incomplete data: 25%
- Incorrect interpretation of requirements: 25%

% of financial authorities

Data manipulation and low quality of data are the main challenges financial authorities face regarding data collection.
Retail Electronic Money (e-Money) Issuer Supervision – Data Validation
We currently analyze data through Oracle Discovery.

Our data validation system is in-built into the specialized core system.

We have automated our validation process by developing rules for validating specific accounts into a program. Validation rules are able to identify arithmetical inconsistencies and produce a report. The feedback is shared with the reporting institution with a request to resubmit the report.

We do comparison with previous months' data. De-duplication check is done using automated validation system.
Data validation challenges

- Human error: 60%
- System error: 20%
- Calculation error: 20%
- Other: 20%

Once again, **human error** is the main challenge financial authorities face with respect to the data validation process given the manual nature of the process.
Suggestions given by respondents to improve data validation processes

By doing a direct query of the electronic money issuers’ transactional system.

Introduce more validation rules.

With data analysis software that would allow analysis to be done before the end of every month.
Institutional Data Storage and Sharing
Over half of surveyed financial authorities have in-house storage capacity, with separate databases according to either category of institution (e.g., banks, non-bank deposit-taking institutions, retail electronic money issuers) or internal department (e.g., banking supervision, non-bank supervision, payments oversight). But some data still is stored in physical files and binders as reported by 25% of financial authorities. No cloud services are in use.
Of those reported to have separate databases, **92%** have a shared internal platform to enable selective restriction of access controls and linking or sharing of data across different internal databases.
Other government entities’ access to the data sharing platform

Only 18% of financial authorities provide other government entities (such as the Ministry of Finance, Financial Intelligence Unit, etc.) access to the internal data sharing platform. For those that do not provide access (82%), information is shared with other government entities in hard copy (paper documents) or by e-mail or USB.
Digital data storage formats

- Relational Database Management System (RDBMS): 83%
- Spreadsheet (e.g. Excel, Google Sheets): 50%
- Extensible Markup Language (XML): 33%
- Comma-Separated Values (CSV): 17%
- Raw text files: 17%
- Other Document-based Management System (DBMS): 8%
- Geographic Information Systems (GIS): 8%

83% of financial authorities store data in RDBMS (such as MS SQL Server, IBM DB2, Oracle, MySQL, Microsoft Access, etc.) while 50% used Excel spreadsheets. These formats are designed for organizing data by common characteristics and cannot store complex images, designs, and multimedia information that defy easy categorization.
Institutional Data Analysis and Use
Most of the data collected is analyzed to support decision-making as indicated by 75% of surveyed financial authorities.
Adequacy of human resource capacity to analyze data

Only half of the financial authorities have adequate human resource capacity in terms of number of staff and staff expertise to analyze the collected data.
58% of financial authorities surveyed lack analytical tools appropriate for effectively analyzing the data collected.
92% of surveyed financial authorities use **Excel** to analyze data for decision-making purposes. Excel is not designed for processing large datasets and applying complex analytics required by today’s fast-moving and large datasets. In addition, **75%** report using **off-the-shelf commercial software** and **58%** use **self-developed data platforms** for analysis, either in addition to or in the absence of Excel. These include software such as SAP, STATA, and R.
Descriptive analytics still dominate as all financial authorities use collected data to highlight what has happened. Only 64% make predictions and offer suggestions for addressing the predictions (prescriptive analytics) and 45% predict what is likely to happen in the future (predictive analytics) using collected data.
While nearly half of financial authorities have a dedicated team of at least 6 specialists, **42%** lack a dedicated data analytics team.
Investment priorities for using data analytics

Investment priorities for financial authorities, in order of highest priority, are **quality of data**, **access to data**, **staff training and capacity building**, and **analytical tools**.
At least 89% of surveyed financial authorities believe that improvement in the quality of collected data will have significant impacts on financial inclusion, customer protection, supervision of licensed institutions, and financial integrity.
Approximately 80% of financial authorities believe improvement in data analytics will significantly impact financial inclusion, financial integrity, customer protection and supervision of licensed institutions.
Institutional Data Challenges and Potential Tools
Identified “pain points” in order of importance

<table>
<thead>
<tr>
<th>Pain Point</th>
<th>Not important</th>
<th>Slightly important</th>
<th>Moderately important</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of appropriate analytical tools for data analysis</td>
<td>50%</td>
<td></td>
<td>33%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Insufficient human resources for proper data analysis</td>
<td>8%</td>
<td>42%</td>
<td>25%</td>
<td>25%</td>
<td></td>
</tr>
<tr>
<td>Data validation process is insufficiently secure</td>
<td>17%</td>
<td>17%</td>
<td>50%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Data validation process is expensive</td>
<td>17%</td>
<td>8%</td>
<td>33%</td>
<td>33%</td>
<td>8%</td>
</tr>
<tr>
<td>Data validation process is time-consuming</td>
<td>8%</td>
<td>8%</td>
<td>25%</td>
<td>33%</td>
<td>25%</td>
</tr>
<tr>
<td>Data collection process is insufficiently secure</td>
<td>25%</td>
<td>8%</td>
<td>25%</td>
<td>25%</td>
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</tr>
<tr>
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<td>8%</td>
<td>33%</td>
<td>17%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Because data validation processes are largely manual, financial authorities have ranked **time-consuming data validation** (58%) as the most important “pain point,” followed by **insufficient human resources** for proper data analysis (50%), and **lack of appropriate analytical tools** (50%).
Financial authorities have ranked **access to better tools for data analytics** (83%), and the **ability to automate data validation** (81%) as the **most important “superpowers”** they would like to have given the potential value to their organizations.