DIGITALLY TRANSFORMING REGULATORY REPORTING

Abstract

Regulatory reporting is an obligation for financial institutions, and for the right reasons. But it is complex, dynamic, and so far, manually intensive. Repercussions of inaccurate or delayed reporting are both monetary and reputational. Legacy systems, data management, and regulatory interpretation continue to remain the biggest challenges for regulatory reporting. On the bright side, technology advancements are touching every aspect of the reporting value chain and tapping into these presents tremendous opportunity for financial institutions to make reporting faster, more accurate, less manual, and thus cost effective. This paper explores the factors contributing to imperfect and delayed regulatory reporting, recent technology-driven trends being adopted to streamline reporting accuracy and efficiency, and opportunities that technology presents for financial institutions to digitally transform their regulatory reporting.

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1. Introduction

Around the globe, regulatory requirements for financial institutions (FIs) are ever-increasing. In 2022, the number of regulatory events monitored by TRRI was 61,228 which is equivalent to an average 234 daily alerts[1]. Being compliant is not only a business obligation but makes economic sense as well. An analysis estimates that the average compliance cost in 2022 was around $5.5 million while the average cost of non-compliance was over $15 million[2].

The consequences of failing to meet these regulatory standards are severe. In 2023 alone, financial institutions were fined a total of $6.6 billion[3]. Some of the high-profile cases include, Goldman Sachs being fined $6 million for failing to provide complete and accurate securities trading information, by the SEC in 2023[4]. JPMorgan was fined $125 Million due to widespread recordkeeping failures by the SEC in 2021[5], and there are several such stories.

" Goldman Sachs fined $6 million for failing to provide complete and accurate securities trading information, known as blue sheet data, to the SEC "

-SEC(US), 2023

" Equifax Ltd fined $13.31 million for failing to manage and monitor the security of UK consumer data. The breach allowed hackers to access the personal data of millions of people and exposed UK consumers to the risk of financial crime "

- FCA(UK), 2023

" Goldman Sachs fined $8.29 million for breaching credit risk reporting rules "

- ECB(EU), 2023

" Morgan Stanley Smith Barney LLC (MSSB) fined $35 million due to the firm's extensive failures, over a 5-year period, to protect the personal identifying information, or PII, of approximately 15 million customers "

- SEC(US), 2022

" J.P. Morgan fined $125 Million due to widespread recordkeeping failures "
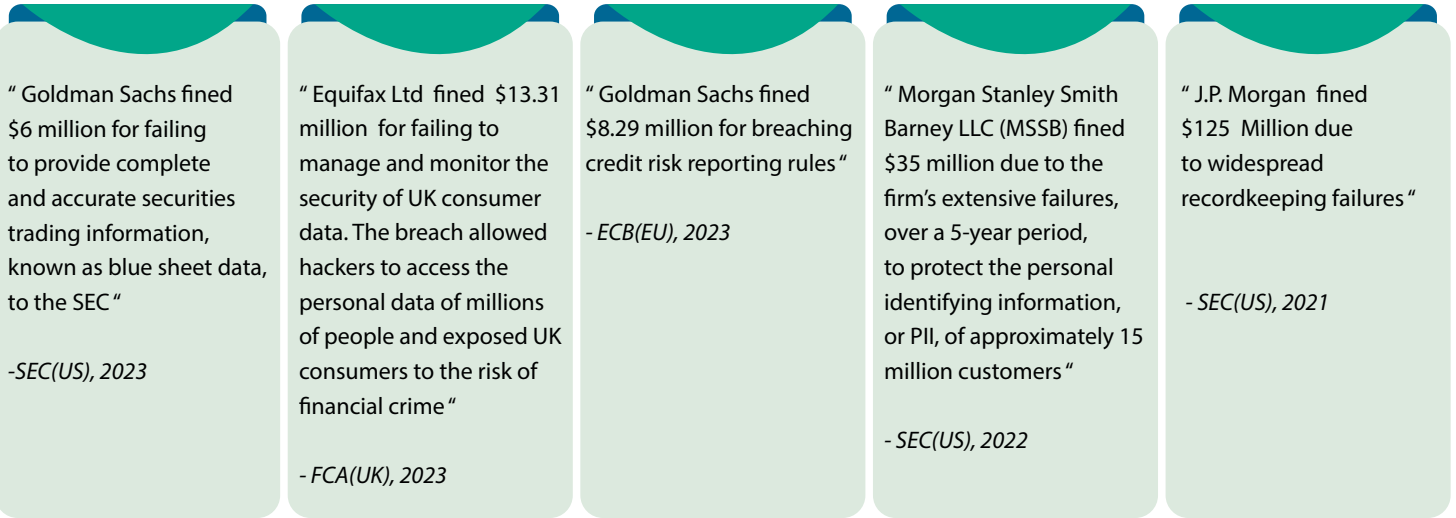
 - SEC(US), 2021

Figure 1: Penalties faced by Financial Institutions worldwide

Beyond monetary, consequences of non-compliance include reputational damage, affecting public trust and investor confidence, and operational disruptions that divert resources from strategic initiatives. Such failures can also hinder business opportunities, affecting merger, acquisitions, and market expansion efforts.

2. Challenges to regulatory reporting

FIs face immense challenges as they strive to comply with stringent obligations of filing regulatory reports accurately, and on time. Multiple factors like data sourcing and processing, legacy constraints of technology, inadequate or poorly implemented controls, and regulatory interpretation management contribute to imperfect regulatory reporting.

Data Sourcing and Processing

- High number of **non-authorized data sources** due to disparate sourcing and storage systems
- **Data duplication** and overlaps
- **Corrupt data source** due to obsolete data collection methods
- Absence of **front-to-back traceability**

Control Limitations

- Increased risk of errors with extensive use of **End-User Computing (EUC)** tools
- Lack of **data quality checks** to review Critical Data Elements (CDEs)
- Inability to track data elements' lifecycle for **data lineage / tracing**

Legacy Systems

- Siloed applications with **limited interoperability and integration** with other applications
- Systems **lack flexibility and agility** to create new or modify existing data models to meet changing requirements
- **Lack of online workflows** for report generation, governance & submission

Regulatory Interpretation

- **Significant growth** in no. of regulations
- **Insufficient documentation** of key regulatory requirements / interpretations
- **Inconsistent governance process** for review/ change / approval
- **Limited second** and **third-line** activities over interpretation and application

Figure 2: Factors contributing to imperfect regulatory reporting

2.1 Data Sourcing and Processing

A primary concern is the high number of non-authorized data sources, stemming from the disparate nature of the sourcing processes and storage systems. A "single source of truth" is often missing when it comes to data. This leads to redundancy, incompleteness and inaccuracies in the data being reported, ultimately affecting the quality of regulatory reports. Gartner research has found that organizations believe poor data quality to be responsible for an average of $15 million per year in losses[6].

2.2 Legacy Systems

Legacy systems and applications have upgradation and integration challenges making them incompatible with modern enterprise systems. This leads to high human-to-machine interactions, leaving room for human errors. Users also end up using different tools and applications for different tasks causing duplication and redundancies. Absence of end-to-end online workflows due to integration challenges makes users create workarounds, use offline tools, and maintain documents on individual devices. All these result in inefficiencies and inaccuracies in processing data and generating regulatory reports.

2.3 Control Limitations

Traditional data controls often lack the capability to enforce data quality at the point of entry. Hence errors introduced at this stage can propagate through the data lifecycle, leading to inaccuracies in reporting and analytical outcomes. As data moves through the transformation process, the need for quality controls is even more important. The absence of real-time, dynamic controls means potential issues may not be identified until the data has been used for decision-making or regulatory reporting. Audits by regulators often reveal gaps in the processes for regulatory reporting around reconciliation checks for errors and controls for models. Use of end-user computing applications (EUCs), such as spreadsheets, also result in failure to enforce adequate controls.

2.4 Regulatory Interpretation

The significant growth in the number of regulations has led to interpretation issues stemming from tracking, complexity, volume, and dynamic nature of regulatory requirements. Over time, regulations may overlap or conflict with each other, leading to confusion about which regulations take precedence or how to reconcile conflicting requirements. Another challenge is that some FIs do not keep centrally maintained, complete and clear records of regulatory interpretations.

3. How is industry responding?

Technology is fueling transformation of regulatory reporting in several ways:

3.1 Reporting Process Automation

Reporting Process automation streamlines and optimizes the generation and submission of reports through automated tools and systems, leading to significant improvements in accuracy, speed, efficiency, and overall quality. Insigna Financial from Australia partnered with SolveXia to automate the preparation of XBRL data to be submitted to the Australian Prudential Regulatory Authority (APRA)[7]. By automatically converting Excel work papers into APRA ready XBRL documents, staff could easily upload the returns onto APRA's portal. This saved a considerable amount of time and reduced the risk of errors associated with manual entry.

Most common use cases of automation in regulatory reporting are:

- Data extraction and standardization of data collection from various sources

- Data quality checks and reconciliation

- Report generation and submission

Now with GenAI maturing for enterprise use, industry is looking at automated regulatory change tracking.

3.2 Simplified Data Management

Traditional data management effort often involves massive multi-year programs to consolidate data from different sources into centralized data lakes. This is changing. Firms are adopting modern approaches of Data Fabric and Data Mesh to make data more accessible from disparate stores. Data fabric is an architectural approach that provides a unified and integrated view of data across various systems and locations, without physically moving the data. On the other hand, data mesh emphasizes decentralization and domain-oriented thinking in data management, while reducing friction to data access.

ING used IBM's data fabric solution to get high-quality, governed, and regulatory audit – ready data across the entire enterprise, including the multiple locations in which the company operates. ING had sought an automated abstraction layer, between data and the consumers of this data, across its hybrid cloud environments. And that layer had to adhere to ING's governance policies, deliver data from different record sources, and map directly to ING's company language. The end goal was reducing complexity and manual work and offering new possibilities to ING data consumers and industry regulator[8].

3.3 Platform Modernization

Firms also struggle with accurate regulatory reporting because they haven't invested in the purpose-built reporting solutions. Manual operations and workarounds lead to messed-up data and thus inaccurate reports. Evidence shows that firms investing in strategic solutions have far more faultless and efficient regulatory reporting.

Data management being key for regulatory reporting, cloud-based solutions offer scalable, flexible and lower cost infrastructure for data storage, processing, and analysis. Ability to store large volumes of granular data, reconfigure data as per need, online data analysis and transformation, integrate data into workflows go a long way in automating regulatory reporting. Using Google Cloud, ANZ created a single unified data platform and architecture that helps deliver data quicker, cheaper, and in a more automated fashion. By using Google Cloud's technology stack and architecture pattern, ANZ has improved performance, elevated operational efficiency, and reduced costs. The outcome of the first phase of the project led to a 50% effort reduction in the overall reporting process, made the data readily available on business day one, and fully automated the data quality (DQ) monitoring, thereby shifting effort from DQ identification to resolution[9].

Financial Institutions are also moving towards AI based solutions. Specific AI algorithms are attuned to handling large datasets, and addressing data quality by detecting and rectifying inconsistencies, errors and duplicates. This enhances the overall reliability and accuracy of data. For example, SmartStream's cloud-native, AI-based solution, SmartStream Air, helps with data quality management by enabling large sets of data to be compared within seconds using AI, regardless of format and complexity[10].

FIs are also leveraging point solutions like Collibra as a part of their technology modernization efforts to streamline parts of the regulatory reporting value chain. Collibra focuses on improving the organization's data governance and quality, offering a centralized platform to manage data.

3.4 Regulatory Reporting as a Service (RRaaS)

By partnering with specialized third-party providers, firms are benefiting from expertise, streamlined processes, reduced operational burden, and enhanced accuracy. This service model is increasingly being adopted by firms globally to offload complex and resource intensive regulatory work.

ApoBank has partnered with Regnology to leverage its managed services for regulatory reporting. Regnology offers application management and scalable infrastructure services, while handling hosting. The model also allows predictable cost of ownership based on a transparent subscription and support model, insulating customers against the cost of regulatory change[11].

Specialized RRaaS providers integrate seamlessly with a firm's existing systems, applying predefined rules and validations tailored to meet specific regulatory requirements and timelines. They offer:

- o Automated Processes
- o Microservices Architecture
- o In-built Rules and analytics
- o Web-based UI and dashboards
- o Market standardized reporting formats
- o Audit Trail

4. Approach to digitally transforming regulatory reporting

Fundamentally transforming regulatory reporting requires an end-to-end understanding of various moving parts in the value chain, the role they play in making regulatory reporting accurate, timely and cost effective. Each moving part, right from data sourcing to report submission presents opportunities for transformation and put together they deliver the most efficient and effective regulatory reporting.
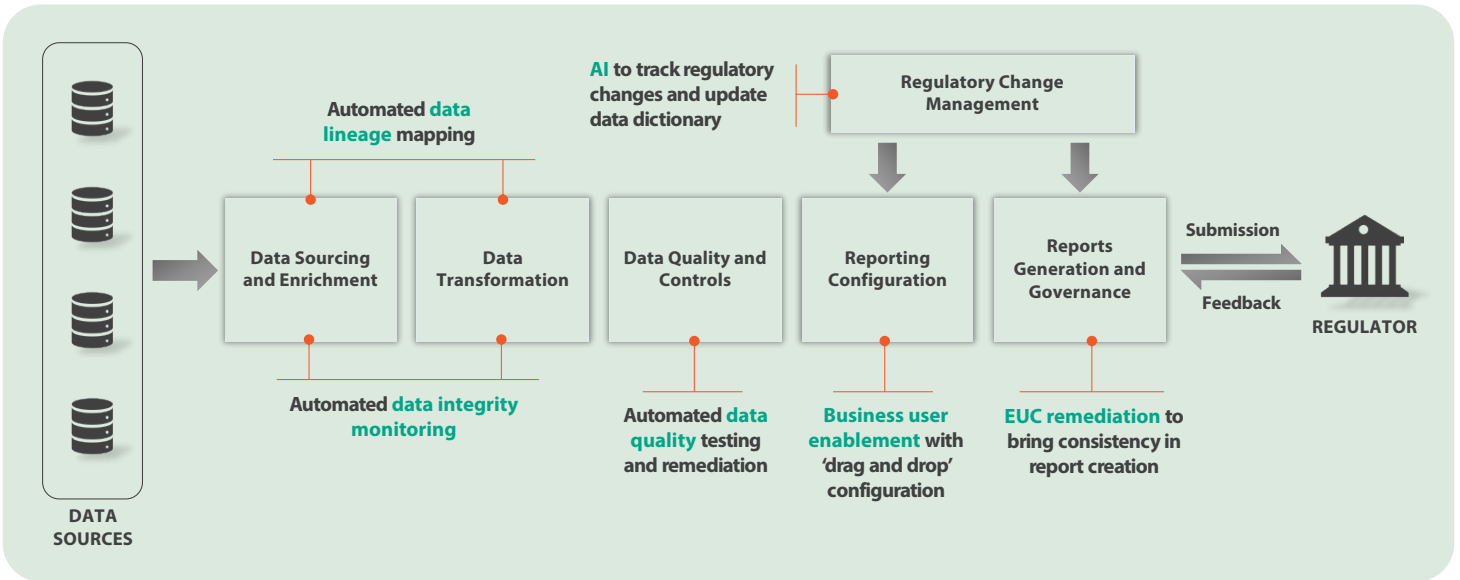

Figure 3 – Regulatory reporting value chain and select digital transformation opportunities

4.1 Data Sourcing, Enrichment and Transformation

Automated data lineage mapping

With different lines of businesses, geographic spread and a myriad of IT systems, data collection and processing in a financial institution tends to be disparate. Institutionalizing common practices of data sourcing, enrichment and transformation requires monumental effort. While worth the effort, it is complex and expensive. Technology interventions like automated data lineage provide an easy way to understand the data lifecycle. Data lineage is the mapping of data as it flows through the organization from data sources to point of consumption. It captures data movement, processing, and transformation. For regulatory reporting this becomes critical for traceability audit and addressing Matters Requiring Immediate Attention (MRIAs), and Matter Requiring Attention (MRAs) from the regulator

Figure 4- Data Lineage

Following a significant fine regarding reporting data sourcing methodologies, Infosys developed the firm wide CCAR audit related source and data lineage tracing infrastructure for one of the leading Global Systemically Important Banks (GSiB). Infosys created data/source trace overview process document for the FRY 14 reports that would be used by internal auditors to review the report line-item level (MDRM level) source lineage.

The key outcomes were:

- Implementation of a centralized trace for all sources and processes for meeting CCAR regulatory submission requirements

- Creation of an automation playbook for the long-term strategic roadmap for the bank to gain competitive advantage in regulatory reporting

- Upgrade of data quality, transformation, enrichment processes through updated data governance strategies

- Creation of a robust source lineage in line with CCAR principles of establishing a unified view of all risk management and consolidated capital evaluation within firm
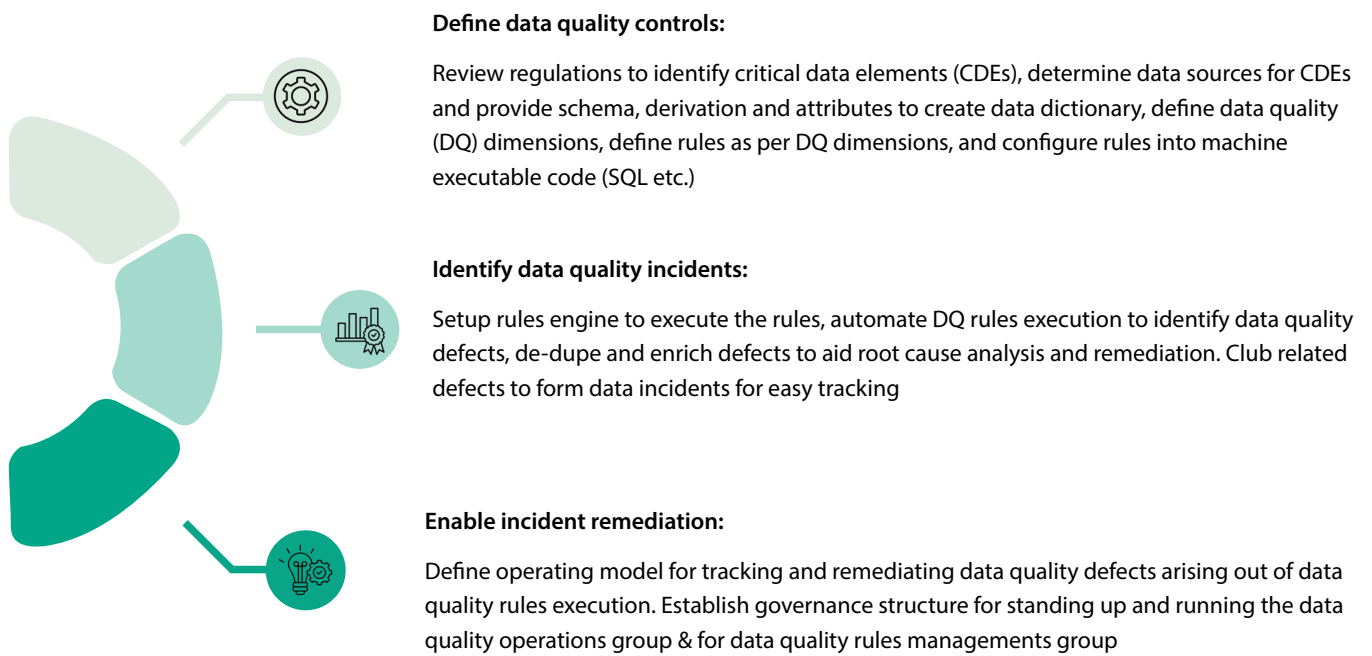
Data fabric can help automate data lineage. Data fabric solutions automatically capture, catalog and manage metadata from all sources. This metadata includes information about data origin, format, transformations which is required for constructing data lineage.

Automated data integrity monitoring

Data integrity monitoring regularly checks data for accuracy, consistency, and reliability. Implementing it at data sourcing and transformation stage can detect potential data quality issues before they escalate. Duplication checks, orphan checks, null checks, format checks etc., can largely be automated with solutions from leading vendors like IBM, Datameter, Informatica. Further, machine learning can uncover unusual patterns in data. It does this by finding the general structure of the data and flagging anything that deviates from that structure. Techniques like clustering can group similar data points together, making it easier to spot outliers. Additionally, specific anomaly detection algorithms, like Isolation Forest or Local Outlier Factor, can pinpoint anomalies by comparing each data point to its neighbors and assessing how different it is. While AL/ML can also modify data on it own, it is not recommended for transactional data, without human involvement.

4.2 Data Quality and Controls

Implementing a robust data quality management capability has a direct impact on accuracy and completeness of regulatory reports and thus reduction in regulatory fines. A data quality management framework should consist of:

Define data quality controls:

Review regulations to identify critical data elements (CDEs), determine data sources for CDEs and provide schema, derivation and attributes to create data dictionary, define data quality (DQ) dimensions, define rules as per DQ dimensions, and configure rules into machine executable code (SQL etc.)

Identify data quality incidents:

Setup rules engine to execute the rules, automate DQ rules execution to identify data quality defects, de-dupe and enrich defects to aid root cause analysis and remediation. Club related defects to form data incidents for easy tracking

Enable incident remediation:

Define operating model for tracking and remediating data quality defects arising out of data quality rules execution. Establish governance structure for standing up and running the data quality operations group & for data quality rules managements group

To overcome erroneous regulatory reporting, and non-standardized data quality management operations, Infosys helped a Tier 1 financial institution to streamline regulatory reporting by building a state-of-the-art data quality management platform. Infosys designed and built an intuitive, user-centric platform, with automated DQ incidents detection, controls monitoring, and semi-automated remediation workflow.

The key outcomes were:

- Proactive monitoring of data quality leading to reduction in reporting errors

- Standardized operating model & processes with complete audit and accountability

- Cost optimization due to reduced impact of data quality issues in other downstream systems

4.3 Reporting Configuration

Automating the report creation requires translating the reporting requirements into machine executable code (SQL, VBA etc.). Typically, this is considered IT development activity. However, the dynamic nature of reporting requirements creates a dependency on IT team every time there is a change in reporting requirement. The opportunity for FIs is to make this a business user activity. It can be accomplished by standardizing taxonomies, templatizing business rules, setting up rules library, and using low code / no code tools, enabling business users with 'drag and drop' configuration capability in an intuitive user interface.
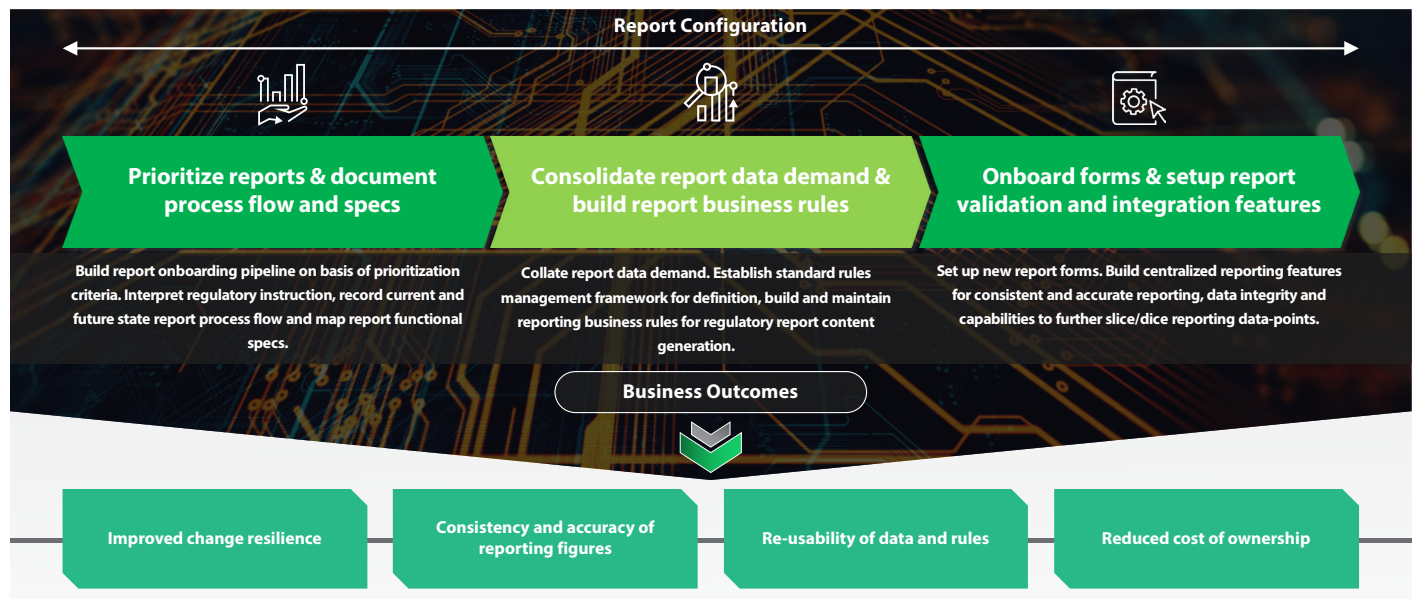

Report Configuration

Prioritize reports & document process flow and specs	Consolidate report data demand & build report business rules	Onboard forms & setup report validation and integration features
Build report onboarding pipeline on basis of prioritization criteria. Interpret regulatory instruction, record current and future state report process flow and map report functional specs.	Collate report data demand. Establish standard rules management framework for definition, build and maintain reporting business rules for regulatory report content generation.	Set up new report forms. Build centralized reporting features for consistent and accurate reporting, data integrity and capabilities to further slice/dice reporting data-points.

Business Outcomes

Improved change resilience	Consistency and accuracy of reporting figures	Re-usability of data and rules	Reduced cost of ownership

Figure 5 – Reporting Configuration

4.4 Reports Generation and Governance

Once the reporting logic is configured, the next steps in the regulatory reporting process are generating the report as per scheduler, adjustments, internal reviews, and submission to the regulator. There are significant manual touchpoints in these steps, including heavy use of EUCs. Regulators have highlighted concerns around use of EUCs, including lack of control on usage, poor documentation and incomplete registration. EUC remediation is crucial for bringing transparency and consistency to report creation. Some of the things that can be done in this regard are:

- Identify all the EUC applications used for report generation and governance

- Minimize the use of EUC applications

- Establish a governance framework that includes procedures and standards for EUC usage, documentation, access control, change management, backup and recovery

- Implement version control mechanisms and capture audit trails

Infosys Case Study – Streamlining report generation and submission

Infosys helped a Tier 1 financial institution overhaul its regulatory report generation and governance platform. Infosys integrated multiple applications, developed online capabilities for all offline user actions, redesigned the information architecture, and simplified the workflow and UX.

The key outcomes were:

- Reduced time-on-task by 50%

- Robust governance workflow

- Easy accessibility of information

4.5 Regulatory Change Management

According to a recent Regnology survey, 41% of financial institutions have reported understanding regulations' minutiae and translating them to technologies and workflows as the firm's greatest regulatory reporting challenge[12]. Regulatory change management is the most manually intensive activity in the regulatory reporting value chain. AI can help! PWC conducted a Proof of Concept (PoC) for interpretation of reporting requirements using NLP. It tested the concept of using AI to translate report requests into a machine-readable format. The PoC successfully demonstrated that AI can ingest English requests, interpret them accurately, produce a code capable of extracting the right data and fulfil the requests. The PoC also produced a pseudocode (i.e., plain language description similar to SQL but for business users' consumption) that can be translated into query languages apart from SQL. This would enable organizations to implement other query technologies to translate the pseudocode into their preferred query language[13].

5. Final Thoughts

AI-enabled, end-to-end automation of regulatory reporting, from data sourcing to regulatory interpretation, business rules configuration to report generation and governance, is the compliance north star vision of financial institutions. As evidenced throughout this paper, organizations are actively pursuing this vision.

Thankfully, even though regulators are getting more demanding, they also feel the pain of financial institutions, and are favoring more granular, raw data driven reporting over data aggregation-based reporting. European Central Bank's (ECB) Integrated Reporting Framework (IReF) is a testimony to that. Banks' Integrated Reporting Dictionary (BIRD), a collaborative initiative between ECB, European Banking Federation, the national central banks, and banking industry to design a common integrated dictionary with a redundancy-free input and data transformation rules to provide a univocal interpretation of regulations, would aid in standardizing reporting[14]. Efforts like these would go a long way in automating the reporting value chain.

So even though end-to-end automation of regulatory reporting might still be a few steps out, the industry is surely getting there. Trusted transformation partners like Infosys will have a role to play.

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