Copernican Journal of Finance & Accounting

2025, volume 14, issue 2

e-ISSN 2300-3065
p-ISSN 2300-1240

Dziawgo, T. (2025). Regulatory Technology (Reg Tech) as an enhancement of compliance processes in financial institutions. Copernican Journal of Finance & Accounting, 14(2), 27–43. http://dx.doi.org/10.12775/CJFA.2025.007

Tomasz Dziawgo*
Warsaw School of Economics

REGULATORY TECHNOLOGY (REG TECH) AS AN ENHANCEMENT OF COMPLIANCE PROCESSES IN FINANCIAL INSTITUTIONS

Keywords: Reg Tech, Sup Tech, compliance.

J E L Classification: G28, K42, O33.

Abstract: This paper explores the evolving role of Regulatory Technology (Reg Tech) as a transformative catalyst in financial compliance. Emerging after intensified regulatory requirements post-2007–2009 subprime financial crisis, Reg Tech leverages technologies such as artificial intelligence (AI), machine learning (ML), blockchain, or cloud computing to enhance both efficiency and effectiveness of compliance processes in financial institutions. Based on academic literature, industry reports, and real-world case studies, the paper examines key advantages of Reg Tech adoption, including reduced compliance costs, improved risk detection, and enhanced reporting accuracy. It also highlights main barriers such as legacy IT systems, data privacy concerns, and skill gaps within compliance teams. From a policy perspective, the paper analyzes how regulatory authorities are embracing Supervisory Technology (Sup Tech) to modernize oversight functions, improve data collection, and strengthen market surveillance. The dual perspective – Reg Tech for institutions and Sup Tech for regulators – underscores the broader digital transformation of financial regulation. The paper concludes with policy recommendations aimed at fostering Reg Tech adoption through regulatory clarity, innovation facilitators, skills development, and stakeholder collaboration. Overall, the study provides a holistic assessment of how technology is reshaping compliance in the financial sector and identifies critical enablers for its responsible and scalable de-

Date of submission: October 7, 2025; date of acceptance: November 3, 2025.

* Contact information: tdziaw@sgh.waw.pl, Banking Institute, Collegium of Socio-Economics, Warsaw School of Economics, al. Niepodległości 162 street, 02-554 Warszawa, Poland, phone: +48 668 145 140; ORCID ID: https://orcid.org/0000-0001-5910-8997.

ployment. Among research questions are: What are the current advantages and risks of adopting Reg Tech solutions in financial institutions? What technological, organizational, and regulatory barriers hinder broader adoption? The hypothesis to be tested is as follows: Reg Tech adoption enhances regulatory compliance processes in financial institutions. In research paper, the following methods are leveraged: qualitative methodological approach focusing primarily on systematic review of academic literature and industry reports on the issue in question, comparative case study analysis of Reg Tech deployment within highlighted financial institutions as well as Sup Tech deployments within selected regulatory institutions, secondary expert insights gathered from white papers and publicly available data. Based on the above-mentioned methodological approach, the hypothesis was tested positively.

Introduction

Regulatory Technology (Reg Tech) has rapidly emerged as a crucial subset of Financial Technology (Fin Tech) in response to the increasing complexity and volume of financial regulations since the global subprime crisis of 2007–2009. In the aftermath of the crisis, regulators worldwide imposed stricter oversight and reporting requirements on financial institutions to prevent similar turmoil (Teichmann, Ruxandra-Boticu & Sergi, 2023). While these reforms improved overall resilience of the financial system, they also significantly raised the cost and burden of compliance for companies. In this context, Reg Tech solutions have gained recognition as innovative tools to transform how compliance is managed, leveraging latest technologies to help organizations meet regulatory obligations more efficiently and effectively. Industry reports underline the Reg Tech market's rapid growth as well. KPMG estimates global Reg Tech market value to grow by ~25% CAGR within 2022–2028 to ~$86 billion, depicting strong demand for tech-driven compliance solutions (KPMG, 2022). This growth underscores the rising impact of Reg Tech in today's financial sector.

This article provides an in-depth examination of Reg Tech's current state and future prospects, with a particular emphasis on academic and policy perspectives. The paper is organized into several sections. Literature review elaborates on main definitions of Reg Tech and maps out the ecosystem of stakeholders and technologies that constitute the Reg Tech landscape. Methodology presents key research questions, hypothesis to be tested, as well as methodological approach that will be leveraged in the research paper. Section "Reg Tech in practice – Key Advantages" explores real-world applications and used cases of Reg Tech in financial services, illustrating how these tools are being deployed and what benefits they offer. Section "Reg Tech – Barriers and Risks" highlights main chal-

lenges against Reg Tech adoption and the potential risks associated with Reg Tech implementations. "Regulatory Perspective & Sup Tech" shifts the focus to regulatory authorities, discussing how regulators view Reg Tech and how they are themselves adopting Supervisory Technology (Sup Tech) to enhance regulatory functions. Section "Policy Recommendations" emphasizes policy and industry recommendations to foster overall development of the Reg Tech sector, including potential steps for regulators, financial institutions, and technology providers. Finally, the conclusion synthesizes the findings and reflects on potential future of Reg Tech. Through the above-mentioned exploration, it is essential to depict how Reg Tech is reshaping compliance management and what obstacles have to be navigated.

Literature review

By definition, *Reg Tech* refers to the use of new technologies to facilitate regulatory compliance and oversight. It leverages a wide range of software and applications that help highly regulated industries – with particular regard to finance – automate or streamline their governance, risk management, and compliance processes. For instance, the World Economic Forum (World Economic Forum, 2022) defines Reg Tech as "the application of various new technological solutions that assist highly regulated industry stakeholders, including regulators, in setting, effectuating and meeting regulatory governance, reporting, compliance, and risk management obligations". Likewise, UK's Financial Conduct Authority (FCA) described Reg Tech as "the use of technology to help regulated firms meet their regulator obligations" (UK's Financial Conduct Authority, 2021). Institute of International Finance (IIF) defines Reg Tech as the "use of new technologies to solve regulatory and compliance requirements more effectively and efficiently" (IIF, 2016). M. Folwarski, on the other hand, defines Reg Tech as "entities that are concentrated around solutions based on latest technologies; they ease or solve regulatory and supervisory issues faced by financial institutions" (Folwarski, 2019). S. Kasiewicz states that Reg Tech is a sector consisting of companies that aim to develop and distribute technologies/solutions improving regulatory challenges in the economy as a whole (Kasiewicz, 2018). Butler and O'Brien state that Reg Tech "helps firms manage regulatory requirements and compliance imperatives by identifying the impacts of regulatory provisions on business models, products and services, functional activities, policies, operational procedures and controls […] helps control and manage

regulatory, financial and non-financial risks; and (d) performs regulatory compliance reporting" (Butler & O'Brien, 2019). The Financial Stability Board (Financial Stability Board, 2020b) notes that for regulated institutions, Reg Tech can "improve compliance outcomes, enhance risk management capabilities, and generate new insights into the business for improved decision-making", whereas for authorities, certain Reg Tech tools (referred to as Sup Tech when used by regulators) can help "generate real-time indicators of risk to support forward-looking supervision". These definitions highlight two key components of Reg Tech: efficiency gains (performing compliance tasks faster and at lower cost) and effectiveness gains (achieving better compliance outcomes, with fewer errors or data breaches) through technology. Reg Tech has its origins in Fin Tech, but unlike consumer-facing Fin Tech innovations (e.g., mobile payments or robo-advisors), Reg Tech is focused on the back-office of compliance and regulations. Over the past decade, it has evolved from a niche concept into a central component of financial institutions' compliance processes and a focus area for policymakers interested in leveraging technology for improving regulations (Arner, Barberis & Buckley, 2017).

It is also essential to highlight key stakeholders in the Reg Tech sector ecosystem, each playing a vital role in either developing, implementing, or supervising Reg Tech solutions. The primary stakeholders include:

- Regulated financial institutions, such as banks, insurance companies, asset managers, and Fin Tech firms, which are the end-users or clients of Reg Tech solutions. These institutions seek Reg Tech solutions to support with compliance requirements – from AML/ KYC checks to prudential reporting – more efficiently.
- Reg Tech providers, which range from young startups to more established tech companies. These providers build and offer compliance software, data analytics platforms, reporting tools, and other solutions tailored to regulatory needs. Many Reg Tech startups have emerged in the past few years, often focusing on niche compliance challenges or leveraging a specific technology (for example, a machine-learning solution for fraud detection or a blockchain-based system for regulatory reporting).
- Regulators and supervisory authorities, which impact Reg Tech through the rules and guidelines they set. They also engage directly with the Reg Tech ecosystem via initiatives such as innovation hubs and regulatory sandboxes (Broeders & Prenio, 2018). As noted by the European Bank-

ing Authority (European Banking Authority, 2021), public authorities across jurisdictions have been proactively monitoring Reg Tech developments and collaborating with industry to ensure that regulatory frameworks do not hinder beneficial innovations.

- Other, such as:
  - Investors and venture capital, which finance Reg Tech startups.
  - Industry associations and standards bodies, which may develop common data standards or best practices within sector.

Moreover, it is worth mentioning that Reg Tech can be leveraged in certain solution segments addressing different compliance areas. Various classifications of such Reg Tech segments exist. EBA identified five areas in which Reg Tech solutions are actively applied in the EU financial sector: Anti-Money Laundering and Countering the Financing of Terrorism (AML/CFT), fraud prevention, prudential regulatory reporting, ICT security, and creditworthiness assessment (European Banking Authority, 2021). On the other hand, Deloitte distinguishes slightly different breakdown: regulatory reporting, risk management, identity management and control, compliance, as well as transaction monitoring (Deloitte, 2024). Financial Stability Board identified eight various domains: fraud detection, AML/CFT, KYC & identity verification, risk assessment, risk reporting, stress testing, microprudential reporting, and macroprudential reporting (Financial Stability Board, 2020b). Lastly, University of Cambridge & EY distinguish the following areas: risk profiling and due diligence, reporting, risk analysis, compliance, and market monitoring (Schizas, McKain, Zhang, Garvey, Ganbold, Hussain, Kumar, Huang, Wang & Yerolemou, 2019).

Methodology

The research paper aims to explore how Reg Tech solutions can support a more efficient, transparent, and error-proof compliance processes in the financial sector. Moreover, it seeks to provide understanding of key technologies leveraged by Reg Tech solutions, main institutional challenges, as well as potential benefits from adopting Reg Tech solutions. Among research questions are: What are the current advantages and risks of adopting Reg Tech solutions in financial institutions? What technological, organizational, and regulatory barriers hinder broader adoption? The hypothesis to be tested is as follows: Reg Tech adoption enhances regulatory compliance processes in financial institutions.

In order to verify the above-mentioned research questions and hypothesis, the paper leverages qualitative methodological approach focusing primarily on systematic review of academic literature and industry reports on the issue in question, comparative case study analysis of Reg Tech deployment within highlighted financial institutions as well as Sup Tech deployments within selected regulatory institutions, and secondary expert insights gathered from white papers and publicly available data.

Results

Reg Tech in Practice – Key Advantages

According to von Solms, development of Reg Tech is driven by three main components: financial expertise, regulations, and technology (von Solms, 2020). This section aims to depict adopted Reg Tech solutions in particular areas via leveraging latest technologies.

Adoption of Reg Tech solutions by financial institutions has accelerated in recent years, though the maturity of implementation varies across institutions, jurisdictions, and compliance domains. Secondary research data indicates that many banks and financial firms have moved beyond experimentation to deployment of Reg Tech tools in their processes. A 2021 EBA study, for example, found that ~75% of surveyed banks have Reg Tech projects already in use, rather than pilot (European Banking Authority, 2021). In certain areas – notably AML/CFT compliance, fraud detection, and ICT risk – an even higher proportion (over 80%) of use-cases had reached full deployment in firms' workflows.

One of the most widespread is AML transaction monitoring and Know-Your-Customer (KYC) processes. Banks are leveraging machine learning algorithms and advanced analytics to monitor transactions for suspicious patterns that might indicate money laundering or fraud (Nowakowski & Waliszewski, 2021), replacing or augmenting the traditional rule-based monitoring systems. These Reg Tech solutions can sift through vast volumes of transaction data in real time and flag anomalies or high-risk customer behaviors more accurately, improving detection of illicit activity (Jeyasingh, 2023). Similarly, for KYC and customer due diligence, Reg Tech tools enable digital identity verification by, for instance, using biometrics or document verification APIs and continuously monitoring client profiles for changes, significantly speeding up onboarding and periodic reviews. Another key area is regulatory reporting and data management. Traditionally,

banks have had to compile large regulatory reports (on capital adequacy, liquidity, etc.) manually or via in-house IT systems – a process that is both time-consuming and labor-intensive. Reg Tech firms offer integrated reporting platforms that connect to an institution's data sources, automatically extract and transform the required data, and generate regulatory reports in the prescribed formats. This can significantly improve data consistency and data standardization. A notable example in Europe is the Austrian "AuRep" platform – a collaborative project where banks and the central bank developed a shared data reporting utility – often cited as a Reg Tech innovation that streamlined prudential reporting through a centralized data model (Broeders & Prenio, 2018). Beyond reporting, risk management and analytics are being improved by Reg Tech solutions: for instance, AI-driven tools help in credit risk assessment by analyzing alternative data on borrowers (potentially aiding compliance with responsible lending rules), and scenario modelling tools assist with stress testing and regulatory capital planning. Even relatively new areas of compliance such as ESG reporting (Environmental, Social, Governance metrics) are being supported by Reg Tech, with dedicated platforms emerging to help banks collect and report ESG data in line with regulatory expectations on sustainability.

The benefits reported from these real-world implementations are significant. Before wider Reg Tech adoption, according to Banking Compliance Index and Compliance Savings Index, financial institutions had to provide at least one Full Time Employee (FTE) for any regulatory change to ensure full compliance (Continuity, 2019). Thus, financial institutions often cite increased efficiency and cost savings as the primary drivers for adopting Reg Tech. Automating compliance tasks that were previously manual drastically cuts down the labour hours required. Because of reducing human workload on repetitive checks, Reg Tech allows compliance representatives to focus on higher-value analysis, open-ended cases, and decision-making. Another crucial benefit is improved accuracy and risk reduction. By adopting a modern Reg Tech platform, the bank can ingest all trading data and apply machine learning models that learn normal patterns and detect anomalous trading that could signify insider trading or manipulation. Many compliance failures (and resulting fines) in the past have been due to human error, outdated systems, or slow processes. BCG estimated that withing 2009–2020 banking sector alone paid ~$400 billion in fines due to non-compliance (Boston Consulting Group, 2021). Academic studies note that Reg Tech solutions, if implemented correctly, lead to a more consistent approach to data quality and monitoring, thus reducing the risk of reg-

ulatory breaches (Teichmann, Ruxandra-Boticu & Sergi, 2023). This translates into fewer compliance violations, potentially avoiding significant fines and reputational damage. Moreover, several Reg Tech tools provide real-time or near-real-time compliance capabilities, which is an important factor (Financial Stability Board, 2017). For instance, traditional compliance reports are compiled once per certain time period (monthly/quarterly), but a Reg Tech dashboard might give management and regulators a daily view of key risk indicators, enabling proactive intervention (Packin, 2018). Beyond compliance itself, there are several other advantages to be mentioned. Better compliance data and analytics can yield insights into a bank's operations and customers. As the FSB observed, Reg Tech can generate new business insights that improve decision-making process by turning compliance from a check-the-box necessity into a source of competitive advantage (Financial Stability Board, 2020b). For example, the analysis of customer transaction patterns for AML might also highlight legitimate customer behaviors that inform product marketing or credit scoring improvements (Grassi & Lanfranchi, 2022).

Reg Tech – Barriers and Risks

While the promise of Reg Tech is considerable, the journey to implement these technologies is often impeded by significant barriers. Financial institutions face both internal and external challenges when adopting Reg Tech solutions. A major set of hurdles is technological and data-related. Many banks struggle with legacy IT systems and data silos that make it difficult to integrate new Reg Tech tools (European Banking Authority, 2021). Bank's compliance data might be spread across outdated databases and formats, and a Reg Tech solution may require consolidated, well-structured data inputs or connectivity via modern APIs. EBA found that "interoperability and integration with existing legacy systems" is one of the top challenges cited by financial institutions, with vast majority of surveyed banks indicating that integration issues pose a major obstacle to Reg Tech uptake. Moreover, data privacy and security considerations are to be discussed as well. On one hand, Reg Tech often requires pooling and analyzing sensitive information (customer data, transaction records, etc.), but privacy regulations (like GDPR in the EU) restrict how data can be shared with third-party providers. Banks are understandably cautious about sending data to cloud-based Reg Tech solutions or startups, fearing breaches or legal violations (European Banking Authority, 2021).

A critical barrier to Reg tech adoption is the lack of necessary skills and awareness. On the financial institution side, the effective use of Reg Tech requires compliance teams to have or develop a required level of technological proficiency, e.g., understanding how AI models work, interpreting data output, or managing cloud-based tools. Many institutions cite a skills gap, i.e., current staff are experts in compliance rules but not in data science or IT, which can hinder successful deployment of Reg Tech tool (European Banking Authority, 2021).

From the Reg Tech vendor side, a complementary issue is that numerous financial institutions have limited awareness or understanding of Reg Tech offerings. Providers observe that a large share of potential bank clients are not fully aware of what Reg Tech solutions exist or how they could benefit from them. In surveys, Reg Tech providers reported that the "lack of buyer awareness of Reg Tech's potential" is widespread – with some estimating over half of banks have low awareness in certain tech domains (European Banking Authority, 2021). This lack of understanding can lead towards skepticism; for example, bank executives might perceive Reg Tech startups as too immature with unproven solutions, thus being hesitant to adopt them.

Another external barrier is the lack of harmonization in rules and standards across jurisdictions (Papantoniou, 2022). Especially for international banks or Reg Tech providers aiming to serve multiple markets, divergent national regulations mean solutions must be customized for each jurisdiction, losing economies of scale. For example, differing AML rules or reporting formats country by country prevent a "one-size" Reg Tech product – providers perceive this fragmentation as a key obstacle to wider market adoption.

Apart from adoption barriers, it is crucial to address the risks associated with Reg Tech implementation as well. Introducing advanced tech into compliance processes can create new failure modes if not properly managed. Regulators and risk managers have underlined potential operational and compliance risks stemming from heavy reliance on Reg Tech tools (Financial Stability Board, 2020a). A primary concern is compliance risk itself – the risk that an institution, by relying on a Reg Tech solution, might actually fail to comply with regulations due to errors or limitations of the technology.

Another significant risk area is operational dependence and third-party risk. When a financial institution relies on a third-party Reg Tech provider for critical compliance functions, it incurs concentration risk and outsourcing risk. It is possible that if many financial institutions rely on the same Reg Tech provider, this particular provider could become a "systemically important third party whose

failure would have system-wide implications" (European Banking Authority, 2021). Even if not systemic, the failure or service disruption at a provider could leave client financial institutions unable to fulfill key tasks. This relates to business continuity risk – outages or downtime in Reg Tech services could interrupt a bank's compliance processes as a whole. Moreover, if a Reg Tech provider goes out of business or withdraws a product, client firms may find themselves struggling to replace the function. Furthermore, ICT and cybersecurity risks are paramount. Using cutting-edge tech means dealing with potential vulnerabilities: data breaches, hacking of compliance systems, or simply IT failures. If a Reg Tech tool is cloud-based, concerns could appear such as: Does the bank know where its data is stored? Is it in a jurisdiction with strong data protection? If not, this could violate regulations or pose security concerns (Financial Stability Board, 2020b).

Regulatory Perspective & Sup Tech

Regulators and supervisors have a unique dual perspective on Reg Tech. On one hand, they encourage and monitor the adoption of Reg Tech by industry as a means to improve compliance outcomes; on the other hand, they are themselves adopters of technology (Sup Tech) to enhance their supervisory capabilities (Dziawgo, 2021). Policymakers recognize that Reg Tech can help address the challenges of supervising a complex, data-heavy financial system, and they do not want regulatory frameworks to unduly impede beneficial technological progress (Broeders & Prenio, 2018).

From the regulator's perspective on industry Reg Tech, a key interest is how these tools can improve regulatory compliance and reduce systemic risk. The Financial Stability Board's 2020 report highlighted that Reg Tech for firms could improve compliance outcomes and risk management, which, in turn, benefits regulators by strengthening the overall resilience of the financial system (Financial Stability Board, 2020b). Moreover, regulators see potential in Reg Tech to produce higher-quality and more timely data (Banaś, 2024). Traditional regulatory reporting often involves significant lag (data is weeks or months old by the time regulators see it) and potential errors. If, through above-mentioned solutions, supervisors can gain access to cleaner data in near-real-time, they can conduct more effective oversight (Broeders & Prenio, 2018).

A natural extension of regulators' interest in Reg Tech is the rise of Sup Tech (Supervisory Technology) – the use of similar innovative tech by regulatory

authorities themselves. Sup Tech has quickly become a strategic priority for many regulators, as they face their own challenges of limited resources and an explosion of data to analyze. In essence, Sup Tech aims to digitize and modernize supervisory processes, making oversight more data-driven and effective (World Bank Group, 2021). Sup Tech solutions generally fall into two broad categories: data collection and management, and data analytics for supervision (Broeders & Prenio, 2018). In the data collection and management, Sup Tech includes tools to improve how regulators gather information from regulated entities (Dziawgo, 2021). This ranges from automated regulatory reporting – where instead of submitting reports, firms might provide regulators with direct data feeds or use standardized data models to allow automated data pulls – to advanced systems for data validation and visualization on the supervisory side. For example, some central banks have introduced API-based reporting to directly receive granular data (Australian Securities & Investments Commission). The Austrian AuRep platform mentioned earlier is a collaborative Sup Tech/Reg Tech initiative: banks send data to a centralized "data cube" accessible to the regulator, reducing duplication of reporting (Austrian Reporting Services). Other Sup Tech data collection innovations include machine-readable regulation – Monetary Authority of Singapore have piloted this, aiming to provide rules in a format that both firms and regulators' software can understand (Monetary Authority of Singapore). On the data analytics side, Sup Tech encompasses a variety of applications: market surveillance tools that use big data techniques to monitor trading markets for anomalies; misconduct analysis, which might involve scanning disclosures, social media, or complaints for indications of misconduct; and micro-prudential supervision analytics, where machine learning might help identify banks with early signs of trouble by detecting patterns in their reported metrics (Broeders & Prenio, 2018). For instance, the Bank of Italy has combined structured data (like suspicious transaction reports) with unstructured data (like news articles) to better identify money laundering trends (Bank of Italy). These Sup Tech initiatives mirror the private sector's Reg Tech in many ways, but are tailored to regulatory goals. Global surveys indicate that Sup Tech adoption has accelerated among regulators since the mid-2010s. The FSB's survey of its member regulators showed that by 2020, the majority had some form of Sup Tech or innovation strategy in place, a sharp increase from a few years prior (Financial Stability Board, 2020b). Regulators hope Sup Tech will allow them to keep pace with the fast-

moving, complex financial sector by leveraging the same technologies that private companies are using.

Importantly, regulators acknowledge that with the benefits of Sup Tech come new risks and responsibilities. The FSB's work highlighted concerns among supervisors about resource and expertise constraints – adopting Sup Tech requires attracting data scientists and technologists into regulatory agencies, which can be difficult given competition with the private sector (Financial Stability Board, 2020a). There is also cybersecurity risk: as regulators handle more granular and potentially personally identifiable data through Sup Tech systems, they become targets for cyber attacks, necessitating robust defences. As such, many authorities are moving cautiously – piloting Sup Tech internally, sharing lessons in forums, and establishing governance frameworks.

In summary, from the regulators' viewpoint, Reg Tech and Sup Tech are two sides of a transformative coin. They present an opportunity to create a more efficient, responsive, and data-driven regulatory regime that benefits both industry and supervisors. Regulators are striving to strike the right balance: promoting and adopting innovation to keep up with the industry, while maintaining vigilance about the new risks and ensuring that core regulatory objectives – consumer protection, market integrity, and financial stability – are upheld or strengthened in the process. This perspective informs many of the policy initiatives and recommendations that have emerged around Reg Tech.

Policy Recommendations

Given the analysis above, a number of policy and industry measures are recommended to further highlight benefits of Reg Tech while mitigating its risks. These recommendations target key stakeholders – regulators, financial institutions, and Reg Tech solutions providers:

1) Provide clear regulatory guidance and expectations: Regulatory authorities should issue formal guidance or supervisory statements on the use of innovative compliance technologies. By articulating supervisory expectations (e.g., requirements for model validation, data security standards, and documentation for automated processes), regulators can encourage financial institutions to adopt Reg Tech solutions with confidence. Regulatory sandboxes and pilot programs can be used to refine such guidance. As previously noted, a lack of standardization in regula-

tory data and inconsistent regulations across jurisdictions hamper Reg Tech scalability (European Banking Authority, 2021).

2) Leverage innovation facilitators (regulatory sandboxes, hubs): Regulators should continue to use and expand innovation facilitators as a means to test and refine Reg Tech and Sup Tech in a controlled environment (Grassi & Lanfranchi, 2022). Regulatory sandboxes allow firms to experiment with new Reg Tech solutions with supervisory oversight and feedback, helping identify both the benefits and any regulatory gaps or risks that need addressing. Through such collaboration, regulators can collectively develop best practices on approving novel solutions. Joint industry-regulator tech sprints (hackathons) focused on compliance problems are another collaborative tool that has shown success (e.g., the FCA's tech sprints on AML compliance). The recommendation is for regulators to actively invite Reg Tech firms and banks to participate in solving regulatory challenges – this builds mutual understanding and can even lead to co-developed Sup Tech tools. In addition, establishing forums where banks, Reg Tech providers, and regulators regularly meet (either under industry associations or regulatory committees) can help in knowledge-sharing and aligning expectations. Such engagement ensures that when new rules are being drafted, the potential for Reg Tech solutions is considered, and conversely, that Reg Tech developers understand the regulatory nuances of the problems they are tackling.
3) Enhance skills and capacity building: A recurring theme is the need to invest in human capital – both within regulatory agencies and financial institutions – to effectively integrate technology into compliance. Regulators should train their supervisors in data science and modern IT to better assess firms' Reg Tech deployments and to use Sup Tech tools. Likewise, banks and other financial institutions should upskill compliance and risk teams, perhaps hiring more personnel with technology/data science backgrounds, to bridge the gap between compliance expertise and technology expertise. Governments and industry bodies might facilitate this by developing specialized training programs or certifications for "Reg Tech professionals" (similar to how there are certifications for risk management or AML officers).
4) Promote Stakeholder Collaboration and Ecosystem Growth: To address the challenge of low awareness and trust in Reg Tech, stakeholders should take collective action to promote success stories and foster a community

of practice. Industry associations, perhaps under guidance from regulators, can publish case studies where Reg Tech implementation led to clear improvements in compliance, thereby demonstrating the tangible benefits. Regulators can also highlight instances (anonymized or in aggregate) where firms using advanced analytics saw better compliance outcomes, to encourage peers. Concretely, this could include government incentives for innovation (grants or tax credits for Reg Tech R&D), incubator programs for Reg Tech startups, or prize competitions for solutions to pressing regulatory problems. Large financial institutions might consider adopting a more open approach, like partnering with startups or providing anonymized datasets for development of new compliance algorithms; this kind of cross-industry collaboration can accelerate innovation. Furthermore, data sharing frameworks could be developed for compliance purposes, in a privacy-compliant manner. For example, in fighting financial crime, banks and regulators are exploring privacy-preserving techniques to share intelligence about threats. Facilitating such collaboration (with appropriate legal safe harbors) can amplify the effectiveness of both Reg Tech and traditional efforts. Collaboration also means aligning Reg Tech developments with broader initiatives such as cybersecurity frameworks and data privacy regimes, ensuring that they move in harmony rather than at cross-purposes.

Conclusion

Regulatory Technology (Reg Tech) has emerged as an integral component of modern financial regulation and compliance management. This expanded analysis has shown that Reg Tech solutions are able to significantly improve how financial institutions meet regulatory obligations – by automating repetitive tasks, analyzing risks with greater precision, and facilitating more timely and transparent reporting. At the same time, adopting these technologies is not without challenges, and it necessitates a rethinking of traditional compliance paradigms. Therefore, based on the above, the following hypothesis might be formulated: Reg Tech adoption enhances regulatory compliance processes in financial institutions was tested positively.

From an academic and policy perspective, it is clear that Reg Tech's rise is driven by significant trends – development of technologies, regulations, and increasing financial expertise Financial institutions that leverage Reg Tech solutions can benefit from not only reduced compliance costs, but also in enhanced risk management and business insights, as already proved by secondary data. Regulators, too, stand to benefit by embracing Sup Tech, potentially overseeing the financial system with greater insight than was previously possible. However, if Reg Tech solutions are improperly implemented or overseen, they can introduce new vulnerabilities: algorithmic biases, cyber threats, systemic concentration risks, etc. The "human element", i.e., expertise or ethical considerations, will remain essential. Therefore, it can be assumed that the future of Reg Tech will involve a model of augmented compliance: a partnership between "human" professionals and technology systems, each complementing the other. Compliance officers could work alongside data scientists; regulators will combine traditional examinations with analytical dashboards.

Policy developments in the coming years will be instrumental in shaping Reg Tech's trajectory. It is encouraging that regulators worldwide are actively engaging with technology and with industry players – through innovation offices, guidelines, and international coordination – to ensure that rules adapt to technological change. The recommendations outlined in the previous section, if implemented, would go a long way to address current pain points.

Looking ahead, several emerging technologies and trends could further transform Reg Tech. Developments in artificial intelligence might enable even more sophisticated compliance analytics that regulators are comfortable with. Blockchain and Distributed Ledger Technology (DLT) could play a bigger role in areas such as regulatory reporting, providing regulators with real-time visibility into transactions while preserving privacy through cryptography. Open banking and API ecosystems may ease the integration challenge by standardizing how financial data is exchanged, thus benefitting Reg Tech deployment. Moreover, as financial services extend into decentralized finance (DeFi) and other novel spaces, Reg Tech will also need to evolve to address compliance in those areas.

References

Arner, D., Barberis, J., & Buckley, R. (2017). FinTech, RegTech, and the reconceptualization of financial regulation. *Northwestern Journal of International Law & Business*, 37(3), 371–413.

Australian Securities & Investments Commission, www.asic.gov.au (accessed: 10.07.2025).

Austrian Reporting Services, www.aurep.at (accessed: 11.07.2025).

Banaś, D. (2024). Possibilities of increasing the effectiveness of supervision over the pension market through the use of Sup Tech. *Zeszyty Naukowe Politechniki Poznańskiej. Organizacja i Zarządzanie*, 90, 43–59. https://doi.org/10.21008/j.0239-9415.2024.090.03.

Bank of Italy, www.uif.bancaditalia.it (accessed: 11.07.2025).

Boston Consulting Group. (2021). Building a Stronger, Healthier Bank. https://www.bcg.com/publications/2021/embracing-change-post-pandemic-in-the-banking-industry (accessed: 15.07.2025).

Broeders, D., & Prenio, J. (2018). Innovative technology in financial supervision (suptech): The experience of early users. (No. 9 ed.) Financial Stability Institute/Bank for International Settlements. FSI Insights on policy implementation No. 9 https://www.bis.org/fsi/publ/insights9.pdf (accessed: 16.07.2025).

Butler, T., & O'Brien, L. (2019). Understanding RegTech for Digital Regulatory Compliance. In: Lynn, T., Mooney, J., Rosati, P., Cummins, M. (eds) Disrupting Finance. Palgrave Studies in Digital Business & Enabling Technologies. *Palgrave Pivot*, Cham. https://doi.org/10.1007/978-3-030-02330-0_6.

Continuity, www.info.continuity.net/bci (accessed: 10.07.2025).

Deloitte. (2024). Reg Tech Universe 2024, https://www.deloitte.com/lu/en/Industries/technology/analysis/regtech-companies-compliance.html (accessed: 16.07.2025).

Dziawgo, T. (2021). Supervisory Technology as a new tool for banking sector supervision. *Journal of Banking and Financial Supervision*, 1(15), 5-13. https://doi.org/10.7172/2353-6845.jbfe.2021.1.1.

European Banking Authority. (2021). EBA analysis of Reg Tech in the EU financial sector. https://www.eba.europa.eu/sites/default/files/document_library/Publications/Reports/2021/1015484/EBA%20analysis%20of%20RegTech%20in%20the%20EU%20financial%20sector.pdf (accessed: 18.07.2025).

Financial Stability Board. (2017). Financial Stability implications from Fin Tech. https://www.fsb.org/uploads/R270617.pdf (accessed: 18.07.2025).

Financial Stability Board. (2020a). FSB report highlights increased use of Reg Tech and Sup Tech. https://www.fsb.org/2020/10/fsb-report-highlights-increased-use-of-regtech-and-suptech/ (accessed: 19.07.2025).

Financial Stability Board. (2020b). The use of Supervisory and Regulatory Technology by authorities and regulated institutions. https://www.fsb.org/uploads/P091020.pdf (accessed: 19.07.2025).

Folwarski, M. (2019). *Sektor Fin Tech na europejskim rynku usług bankowych. Wyzwania konkurencyjne i regulacyjne*. Warszawa: Poltext.

Grassi, L., & Lanfranchi, D. (2022). Reg Tech in public and private sectors: the nexus between data, technology and regulation. *Journal of Industrial and Business Economics*, 49, 441–479. https://doi.org/10.1007/s40812-022-00226-0.

IIF. (2016). Regtech in Financial Services: Solutions for compliance and Reporting. https://www.iif.com/Publications/ID/1686/Regtech-in-Financial-Services-Solutions-for-Compliance-and-Reporting (accessed: 18.07.2025).

Jeyasingh, B. (2023). Impact of Reg Tech on compliance risk due to financial misconduct in the United States banking industry. *Digital Economy and Sustainable Development*, 24. https://doi.org/10.1007/s44265-023-00024-z.

Kasiewicz, S. (2018). Koncepcje regulacji Reg Tech w bankowości. *Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu*, 531, 221–230. https://doi.org/10.15611/pn.2018.531.20.

KPMG. (2022). A user's guide to RegTech: Navigating the challenges and what success looks like. https://assets.kpmg.com/content/dam/kpmg/uk/pdf/2022/11/innovate-finance-regtech-industry-and-adoption.pdf (accessed: 20.07.2025).

Monetary Authority of Singapore, www.mas.gov.sg/ (accessed: 11.07.2025).

Nowakowski, M., & Waliszewski, K. (2021). Artificial intelligence and algorithms assisting personal finance. A legal and economic perspective. *Business Law Journal*, 8, 2–10. https://doi.org/10.33226/0137-5490.2021.8.1.

Packin, N. (2018). Reg Tech, compliance and Technology Judgement Rule. *Chicago-Kent Law Review*, 93(1), 193–215.

Papantoniou, A. (2022). Reg Tech: steering the regulatory spaceship in the right direction?. *Journal of Banking and Financial Technology*, 6, 1–16. https://doi.org/10.1007/s42786-022-00038-9.

Schizas, E., McKain, G., Zhang, B. Z., Garvey, K., Ganbold, A., Hussain, H., Kumar, P., Huang, E., Wang, S., & Yerolemou, N. (2019). The Global RegTech Industry Benchmark Report. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3560811.

Teichmann, F., Ruxandra-Boticu S., & Sergi B. (2023). Reg Tech – Potential Benefits and Challenges for Businesses. *Technology in Society*, 72. https://doi.org/10.1016/j.techsoc.2022.102150.

UK's Financial Conduct Authority (FCA). (2021). 2021: A Critical Year for Reg Tech. https://www.theglobalcity.uk/PositiveWebsite/media/Research-reports/2021-A-Critical-Year-for-RegTech-final.pdf (accessed: 30.06.2025).

von Solms, J. (2020). Integrating Regulatory Technology (Reg Tech) into the digital transformation of a bank Treasury. *Journal of Banking Regulation*, 22, 191–207. https://doi.org/10.1057/s41261-020-00138-w.

World Bank Group. (2021). The next wave of Sup Tech innovation: Sup Tech solutions for market conduct supervision. https://documents1.worldbank.org/curated/en/735871616428497205/pdf/The-Next-Wave-of-Suptech-Innovation-Suptech-Solutions-for-Market-Conduct-Supervision.pdf (accessed: 10.07.2025).

World Economic Forum. (2022). Regulatory Technology for the 21st century. https://www3.weforum.org/docs/WEF_Regulatory_Tech_for_the_21st_Century_2022.pdf (accessed: 05.07.2025).