



GREEN PAPER

ON DEVELOPMENT OF REGULATORY
TECHNOLOGY IN UKRAINE'S FINANCIAL
MARKET



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Preface



The development of technologies in the financial market has been a constant global trend, as both the internal processes of financial institutions and the consumer behavior of their clients are changing radically. In particular, the relevance of the development of regulatory technologies (RegTech) and supervisory technologies (SupTech) is constantly growing, taking into account a number of factors: the emergence of new financial services, the increase in the complexity and speed of operations of financial institutions and their clients, the growth in data volumes, the strengthening of regulatory requirements, new unforeseen challenges, in particular as a result of Russia's full-scale invasion of Ukraine and the strengthening of sanctions pressure on the aggressor state, a significant increase in cyber risks, and so on.

The inclusion of SupTech and RegTech development in financial system development strategies has been a global trend for several years in a row. The National Bank of Ukraine (NBU) is no exception and is also directing its efforts in this direction, as it understands the value of the effects obtained from their implementation.

This document, which is part of the implementation of the strategic measure Strengthening Cooperation with Market Participants for the Development of RegTech in Ukraine, focuses on the issues of applying RegTech in the financial market of Ukraine. We are convinced that the positive effects that all financial market players will receive from the implementation of RegTech, which are consistent with the automation of the NBU's supervision processes, will be worth the efforts made. The NBU, in particular, hopes that the development of RegTech will help increase the resilience, controllability, and competitiveness of the financial sector.

The document provides an update on the regulator's position on key issues of RegTech development and is intended for practical use and discussions with financial market participants. The NBU understands that market participants will play a decisive role in the implementation of RegTech. Therefore, with this document the central bank, among other things, declares its intentions to comprehensively promote the development of these technological solutions in the Ukrainian financial market within the framework of its mandate.

Objective and Target Audience

Creating conditions for the development of RegTech is one of the measures of the Strategy of Ukrainian Financial Sector Development until 2025 and the Strategy of the National Bank of Ukraine. This measure is aimed at making it easier, faster, and more efficient for financial market participants to comply with regulatory requirements without hampering the development of the financial sector and financial inclusion. The NBU supports the expediency and urgency of implementing technological solutions to meet regulatory requirements in the financial market of Ukraine.

This is a reference document that reflects the current state of interaction between RegTech¹ market participants and the NBU, and also determines the ways for the further development of RegTech in the financial market of Ukraine, reveals the main prerequisites and obstacles to the implementation of relevant solutions across the globe and in Ukraine.

The NBU recognizes the key role of RegTech market participants themselves in creating the prerequisites and prospects for the development of RegTech and sees the position of the regulator in forming a favorable environment for the emergence of new and development of existing RegTech solutions.

Thus, the main purpose of this document is to present the current position of the regulator on key issues of RegTech implementation, as well as the NBU's vision of its own actions to promote the development of RegTech. This document should become the basis for further dialogue with RegTech market participants. Based on the results of such dialogue, the NBU is open to coordinating joint actions with RegTech market participants.

¹ Participants in the financial market of Ukraine, supervised and regulated by the NBU (hereinafter referred to as regulated entities), RegTech solution providers, and other interested parties.

What Is RegTech?

The introduction of technological solutions to increase confidence in compliance with regulatory requirements into business practices has been going on for decades. However, due to the rapid evolution of technology and regulatory requirements, RegTech has not received a well-established, generally accepted definition.

The emergence and development of RegTech solutions is not unique to the financial sector. Foreign companies in highly regulated industries, such as public utilities, healthcare, and pharmaceuticals, are also using RegTech tools to fulfill their regulatory obligations¹. Therefore, some sources offer a "broad" definition of RegTech as "any technology and/or software designed to fulfill regulatory requirements and help companies understand and comply with such requirements"².

However, there are different definitions of RegTech in the financial sector:

- The Bank for International Settlements (BIS) defines RegTech as the application of financial technology (FinTech) to meet regulatory and compliance requirements, as well as to report to supervisors³.
- The UK Financial Conduct Authority defines RegTech as a part of FinTech (financial technology) that includes technological solutions that can help meet regulatory requirements more efficiently and effectively compared to existing capabilities. Implementation of effective RegTech solutions in companies can lead to an increase in the rate of "survival" of such businesses.
- The Asian Development Bank (ADB) defines RegTech as the use of technology, including information technology, for meeting regulatory requirements, reporting, and monitoring. The list of regulatory requirements "presupposes" the technological capability of the financial infrastructure, including through the interaction between RegTech market participants⁴.

From the perspective of institutions implementing RegTech, such solutions can be applied at every stage of the compliance processes. According to this functional definition, RegTech encompasses any use of technology to compare company performance data with established rules that are significant to both companies and their regulators in order to automate compliance or supervisory processes⁵.

At the same time, the established practice of the scope and content of the areas of process automation using RegTech may differ in different jurisdictions (see Annex 1).

Given the diversity of interpretations, the NBU suggests to interpret the term "RegTech" in the following way:

"RegTech is a set of technological solutions that can be used by legal persons to improve the efficiency of compliance with legislative requirements (regulatory compliance), as well as the requirements with which these persons decide to comply voluntarily (corporate compliance)⁶."

In this document, the NBU focuses on the part of RegTech used to ensure regulatory compliance in the provision of financial services by banks and non-bank financial services market participants (hereinafter referred to as "NFSM participants")⁷. This scope can be further decomposed into separate areas of RegTech solutions:

- risk management
- submission of reports to the regulator and provision of other information upon its request; disclosure of information
- prevention and counteraction to legalizing (laundering) the proceeds from crime, terrorism financing, and financing proliferation of weapons of mass destruction; sanctions screening (AML & CFT & Sanctions)
- fraud detection and prevention.

¹ <https://www.rtassociates.co/>

² <https://www.cbinsights.com/research/regtech-trends-fintech/>

³ <https://www.bis.org/speeches/sp200819.pdf>

⁴ <https://www.adb.org/sites/default/files/publication/820686/regulatory-technology-ecosystems-asia-financial-stability.pdf>

⁵ <https://www.adb.org/sites/default/files/publication/820686/regulatory-technology-ecosystems-asia-financial-stability.pdf>

⁶ In particular, it concerns the requirements for ensuring effective processes for building internal control systems and risk management systems.

⁷ Corporate compliance and compliance in other areas; regulatory compliance with regard to other regulatory authorities is not covered in this document.

Table 1. Areas of RegTech that the document focuses on

Area	Risk management	Reporting to the regulator	AML & CFT & Sanctions	Fraud detection and prevention
Details	<ul style="list-style-type: none"> ▪ Credit risk⁸ ▪ Liquidity risk ▪ Interest rate risk ▪ Market risk ▪ Underwriting risk ▪ Operational risk, including cyber risk and personal data protection risk ▪ Other compliance risks 	<p>The requirements for reporting submitted to the NBU are determined by:</p> <ul style="list-style-type: none"> ▪ rules for statistical reporting⁹ ▪ rules for statistical reporting in the special period¹⁰ ▪ rules for drawing up and submitting reports to the National Bank of Ukraine by non-bank financial services market participants¹¹ ▪ rules for reporting on exposures¹² 	<ul style="list-style-type: none"> ▪ Client identification and verification ▪ Transaction monitoring to detect transactions related to money laundering and terrorism financing ▪ Sanctions screening 	<ul style="list-style-type: none"> ▪ Monitoring of clients' transactions, actions, and behavior to identify atypical, anomalous, and suspicious transactions related to prohibited business activities¹³ ▪ Fraud prevention
Technologies	<ul style="list-style-type: none"> ▪ Data collection (API, AI&ML [NLP, OCR, etc.], RPA). Possible information presentation formats: XML, JSON, etc. ▪ Data processing, visualization, and analysis (BigData, AI&ML [NLP, OCR, etc.], RPA, nowcasting) ▪ Data storage (cloud computing) ▪ Data exchange between market participants, government agencies, and regulatory institutions, and protection of the data (API, DLT, etc.) 			
RegTech functionality	<ul style="list-style-type: none"> ▪ Analysis of regulatory documents of regulators and monitoring of changes ▪ Comparison of regulatory requirements with internal rules and system settings ▪ Notification of employees about changes / discrepancies ▪ Automated integration of regulatory changes into internal systems ▪ Risk monitoring and notification of deviations from the norm ▪ Client identification and verification ▪ Monitoring of transactions and detection of behavioral anomalies ▪ Monitoring of anomalous actions and behavior of a client, which may indicate access to the account of fraudsters when initiating payment transactions (in particular, monitoring of transactions using an electronic means payment by both clients and merchants) ▪ Automation of exchange processes about anomalous atypical and fraudulent transactions between market participants and, if necessary, with regulators and authorities ▪ Automation of internal reporting ▪ Automation of formation and submission of reporting to the regulator and other information at its request; disclosure of information 			

⁸ Risk identification in accordance with the Regulation on Organization of Risk Management System in Ukrainian Banks and Banking Groups approved by NBU Board Resolution No. 64 dated 11 June 2018 (as amended), Regulation on Requirements to Credit Union Management System, approved by NBU Board Resolution No. 15 dated 2 February 2024 (as amended), and Regulation On Requirements to Insurer's Management System approved by NBU Board Resolution No. 194 dated 27 December 2023 (as amended).

⁹ Rules for Statistical Reporting to be Submitted to the NBU approved by NBU Board Resolution No. 120 dated 13 November 2018 (as amended).

¹⁰ Rules for Statistical Reporting Submitted to the National Bank of Ukraine during the Special Period approved by NBU Board Resolution No. 140 dated 18 December 2018 (as amended).

¹¹ Rules for Drawing Up and Submitting Reports to the National Bank of Ukraine by Non-bank Financial Services Market Participants approved by NBU Board Resolution No. 123 dated 25 November 2021 (as amended).

¹² Rules for Reporting on Exposures approved by NBU Board Resolution No. 9 dated 18 January 2024 (as amended).

¹³ Prohibited types of economic activity, in particular, mean the illegal organization and conduct of gambling and betting activities, fraudulent schemes using phishing, and the withdrawal of funds by committing fraudulent acts.

The evolution of RegTech is driven by the tightening of regulation as a result of crises or the desire to prevent them, but this driver has been sustained due to the development and accessibility of technologies in recent decades (in particular, the growth of computing power of computers and the emergence of artificial intelligence algorithms¹⁴). However, with the information overload of the last two decades, another evolutionary driver has emerged – not to drown in the volume of data and get at least something valuable from it.

This problem is becoming especially relevant not only for financial institutions, but also for regulators. They can develop and implement their own SupTech¹⁵, initiatives to respond to risks and threats, increase their own ability to receive, store, and analyze compliance with their own regulatory requirements. Therefore, it is important that SupTech and RegTech initiatives develop in sync.

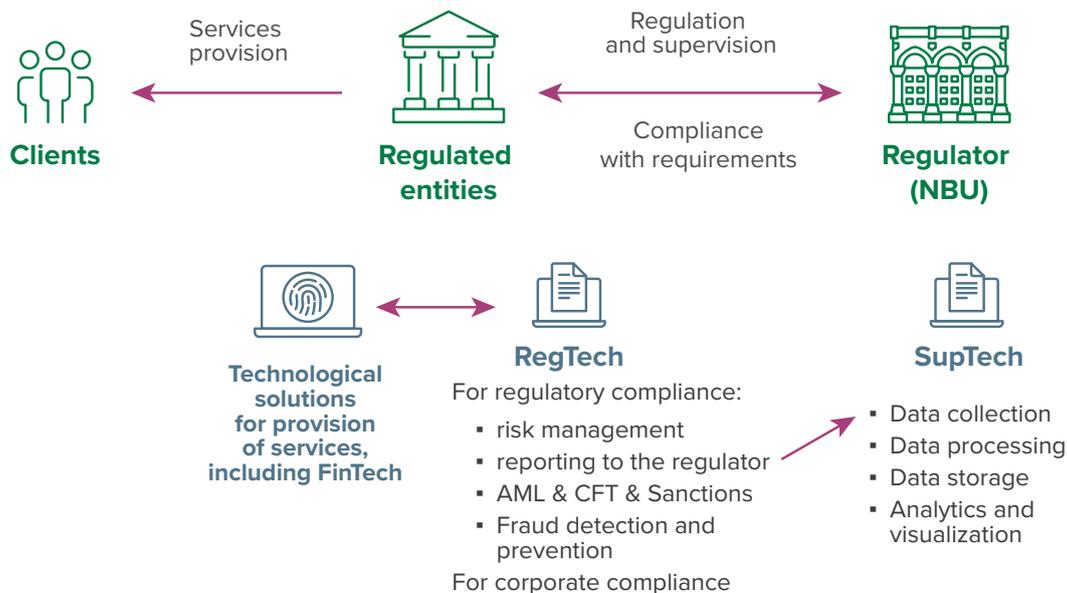


Figure 1. Interrelation of RegTech with main Tech¹⁶ directions in the field of finance

RegTech and SupTech are linked through the exchange of data between regulated entities and regulators for the purpose of regulation and supervision by the latter. There should be an established exchange of data between software that helps provide financial services and RegTech. It may also contain some RegTech components.

However, not all regulators are implementing RegTech and SupTech initiatives. In 2022, only 71% of respondents in surveys of regulators¹⁷ indicated that they had already made efforts in this direction. Out of these regulators, 50% were using one or more SupTech applications, 27% had an application being developed, and 23% reported having a technology support strategy or a roadmap.

This could be partly due to the following:

- Key elements should include a flexible infrastructure for data collection, storage, management, and processing, as well as tools for data analysis and visualization¹⁸. Not all regulators and financial market infrastructure sectors are ready for this.
- There are no single standards and compatibility of various systems. One option for solving this problem is "semantic convergence", or the creation of a business ontology of the financial sector¹⁹ – in other words, the standardization and unification of glossaries, taxonomies, and entities in systems for collecting, storing, exchanging, and analyzing data between supervised institutions and regulators.

¹⁴ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

¹⁵ SupTech is a set of technological solutions to facilitate and improve regulators' supervisory processes.

¹⁶ FinTech is a set of technologies that have the potential to transform the provision of financial services spurring the development of new business models, applications, processes, and products.

¹⁷ <https://www.jbs.cam.ac.uk/wp-content/uploads/2023/01/2023-ccaf-state-of-suptech-report.pdf>

¹⁸ <https://www.adb.org/sites/default/files/publication/820686/regulatory-technology-ecosystems-asia-financial-stability.pdf>

¹⁹ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

Ultimately, it is through systemic cooperation and/or an active role of the regulator in simplifying regulatory procedures that the implementation of regulatory instruments can lead to the emergence of new public goods²⁰:

- a common ontology in the market (or at least a glossary)
- common data formats and legally valid tools for data exchange
- common norms, principles, and ethics of artificial intelligence and/or data analysis
- collaborative tools (e.g., "data lakes")
- compatibility of IT systems using open standards of syntactic and technical interoperability.

I Regulated entities

Process optimization

Less time needed to conduct transactions, reduction of labor costs for correcting errors, and – as a result – freeing the staff for more useful work

Compliance with regulatory requirements, which, in particular, reduces the risks of applying enforcement measures, including penalty sanctions

Economic efficiency

Expected outcomes of introducing RegTech

Implementing RegTech solutions reduces regulated entities' operating costs thanks to shorter transaction times, increasing the speed and quality of regulatory compliance, and freeing the staff from repetitive manual tasks, enabling faster and better customer service. In addition, the risks of regulatory non-compliance are reduced thanks to faster recognition, notification, and response to potential violations.

II Clients

- Better communication and more accessible products
- Stronger security

III Regulators

- Better quality of reporting
- A transparent financial market for regulatory decision-making
- Timely response to violations and systemic risks

Figure 2. Main outcomes of introducing RegTech

The implementation of RegTech, depending on the nature of the regulation for compliance with which the relevant products are intended, can create the following additional value for businesses²¹:

- increased readiness for complying with new regulatory requirements, and testing before their implementation;
- higher quality and transparency of communication between the regulator and market participants;
- better efficiency of data processing^{22,23}, in particular improved semantic compatibility (the same understanding of the essence of data and individual data elements);
- more reasonable and stable investments in IT, since the standards for technology integration and data exchange are clearly defined and brought to the attention of all market participants;

- increased level of data protection
- analysis and management of transactions in real time
- more effective detection of fraud and theft, in particular, reducing the level of "false positive" activations of existing rule-based systems for monitoring typical transactions
- greater standardization of internal processes, and higher transparency and/or interest for investors and creditors
- potentially – streamlining and raising the efficiency of internal IT infrastructure
- as a result of all of the above – creating competitive advantages, increasing market value, improving data quality, and fostering financial inclusion.

²⁰ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

²¹ <https://www.pwc.in/industries/financial-services/fintech/fintech-insights/regtech-a-new-disruption-in-the-financial-services-space.html>

²² <https://www.bankinghub.eu/operations/regtech>

²³ <https://bulletins.bfconsulting.com/en/infographic-the-benefits-of-regtech/>

Current State and Prospects of RegTech Development in Ukraine and Globally

Current State

The history of RegTech development can be divided into four stages:

- the emergence, which began after the stock market crash in 1987, when regulatory authorities began to digitize their processes (for example, the U.S. Securities and Exchange Commission’s Electronic Data Gathering, Analysis, and Retrieval System – EDGAR), and lasted until the Global Financial Crisis of 2008
- the stage between the 2008 Global Financial Crisis and the end of 2019 (the first mentions of COVID-19), which is associated with a rapid increase in the number and variety of regulatory methods, as well as with the boom of the IT sector and the development of new technologies that were able to cope with this increase. This stage was also characterized by the emergence of new risks of fraud on the part of clients, financial institutions, and other persons in conditions of political and economic crises and the need to quickly identify problems / risks and make appropriate decisions

- since the end of 2019, both the internal processes of financial institutions and the consumer behavior of their clients have been changing dramatically due to the outbreak of the COVID-19 pandemic, which gives a new impetus to the development of RegTech
- this direction remains relevant, taking into account the new unpredictable challenges that financial institutions continue to face: russia’s full-scale invasion of Ukraine and increased sanctions pressure on the aggressor state, a significant increase in cyber risks and prudential risks associated with virtual assets, and a slowdown in the pace of globalization and sometimes a reverse in this trend.

RegTech has a direct correlation with the regulation of the relevant industries: the larger the scope of regulation for specific industries, the greater the need to apply RegTech (Figures3¹ and 4²).

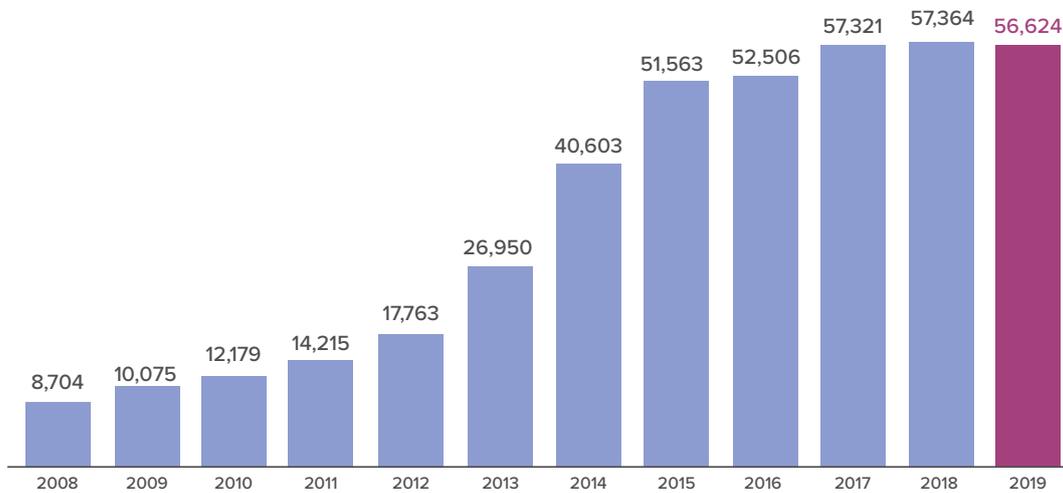


Figure 3. Annual quantity of regulatory notifications in Regulatory Intelligence (RegTech solution by Thomson Reuters)

¹ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

² <https://www.brinknews.com/how-to-turn-compliance-into-a-competitive-advantage/>

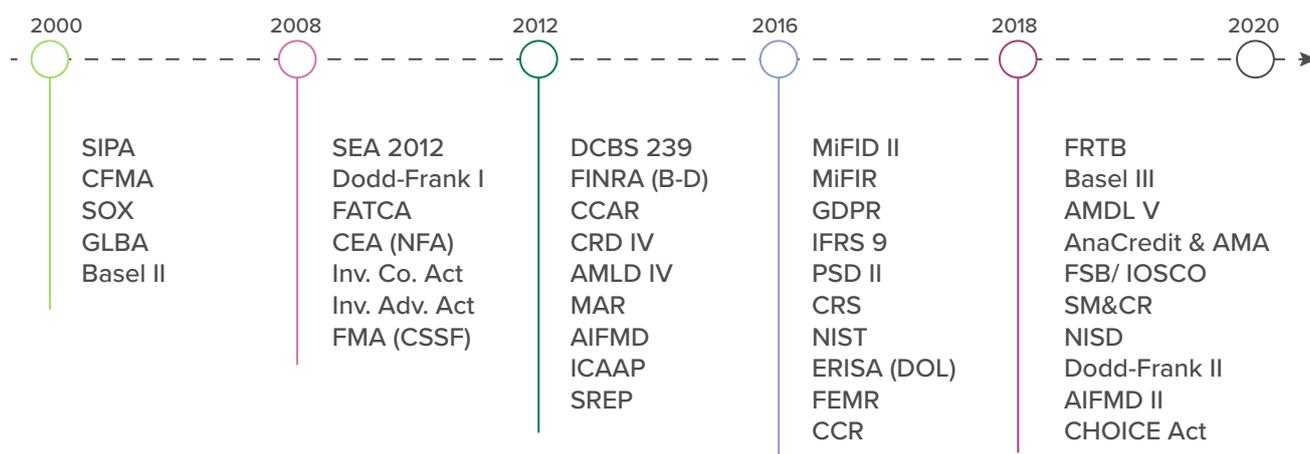


Figure 4. The emergence of key regulation for financial markets around the world

World experience indicates the following key problems that accompany the growth of regulation against the backdrop of insufficiently effective infrastructure in regulated entities for compliance with these regulatory requirements and in regulators for processing reporting data from regulated entities:

- Different stakeholders (including state ones), even within the same country, may have different data collection systems and formats of collected data;
- The presence of a time lag between the date of appearance / change of information reflected in reporting indicators and the moment of providing information to the regulator³, i.e. the situation when insights about crisis phenomena at the beginning of Q4 of the previous year become known to regulators only in the middle of Q1 of the following year. This results in "blind spots" of regulation⁴;
- The emergence of a "regulatory dialectic," when in response to increased market regulation (e.g., due to the unwillingness to repeat certain cases of previous crises), regulated entities try to minimize the volume and cost of compliance with regulatory requirements, which in turn can lead to even greater regulation⁵;
- thanks to the size and new technologies, individual FinTech startups (e.g., neobanks) can quickly become systemically important, despite the fact that regulation has not been introduced for them, and this creates a number of risks (prudential, cyber protection, compliance, etc.)⁶;

- Loss of transparency and understanding by regulators of rapidly evolving financial markets and the technological tools used – hence the risks of untimely and unsuccessful response⁷;
- The issue of the "ethics" of using certain technologies and approaches (e.g., whether artificial intelligence algorithms that are built in scoring models violate consumers' privacy, discriminate against them, mislead them with consulting chatbots, etc.).

Given the above, it becomes clear why banks spent 4% of their revenue on regulatory compliance in 2017^{8,9}, of which approximately 40%–50% was spent on technology, and the rest on personnel¹⁰, with 10% to 15% of financial institutions' employees engaged in compliance and risk management¹¹. There is so much information that analysts at financial institutions spend up to 90% of their time collecting and structuring information and only 10% on analyzing it³.

³ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

⁴ <https://www.adb.org/sites/default/files/publication/820686/regulatory-technology-ecosystems-asia-financial-stability.pdf>

⁵ https://www.esma.europa.eu/sites/default/files/trv_2019_1-regtech_and_suptech_change_for_markets_and_authorities.pdf

⁶ https://aiifl.law.hku.hk/content/uploads/ppt/JFR-Arner_Douglas_ppt.pdf

⁷ <https://www.bis.org/speeches/sp200819.pdf>

⁸ <https://www.infopulse.com/blog/regtech-in-the-financial-industry>

⁹ <https://www.bloomberg.com/professional/blog/rising-compliance-costs-hurting-customers-banks-say/>

¹⁰ <https://www.pwc.in/industries/financial-services/fintech/fintech-insights/regtech-a-new-disruption-in-the-financial-services-space.html>

¹¹ <https://www.oliverwyman.com/content/dam/oliver-wyman/v2/publications/2018/may/RegTech-on-the-Rise.pdf>

Therefore, the evolution of RegTech was driven by increased regulation as a result of crises or the desire to prevent them. However, with the information overload of the last two decades, another incentive has emerged – the desire to extract value from the huge volumes of data.

As stated by Benoît Cœuré, Head of Innovation Hub at the Bank for International Settlements, the future of RegTech is a world where big data architecture is developed using technology stacks that ensure an unprecedented level of granularity, diversity, and data frequency. Uploading and consolidation of data is fully automated through an API. Large data pools, sufficient data warehouse, and increased computing power make it possible to directly analyze data and improve statistical modeling, including predictive analytics. Supplemented by artificial intelligence (AI) solutions or tools, natural language processing (NLP) is used to collect data from the internet/darknet, or machine learning is used to compare and combine heterogeneous datasets, manage parts of the data, and analyze them to inform about authorities' actions.

According to Verified Market Research, in 2022, the RegTech market was estimated at USD 7.74 billion, and is forecast to rise to USD 53.37 billion by 2030, annually increasing by an average of 23.92%. The global leader in terms of the rapid development of the regulatory technology market is the Asia-Pacific region (APAC): Australia, Japan, Singapore, India, China, and New Zealand. Considering only national markets, the key RegTech markets are the United States, the United Kingdom, and Australia.

The crises that threaten the development of technological ecosystems in the world will have a direct impact on the ability of market participants to finance the implementation of new RegTech solutions. However, the growth in the scope of regulation and the tightening of sanctions laws related to Russia's full-scale invasion of Ukraine are only likely to intensify. This means that the key driver for the industry's development will remain in place globally.

In Ukraine, the development of RegTech is undoubtedly impacted by the war: based on the results of a survey of experts presented in the FinTech Trends 2022 report by the Ukrainian Association of FinTech and Innovation Companies (UAFIC), 38% of experts see the war as one of the main obstacles to the development of RegTech. Also, the obstacles highlighted were legislative restrictions (41%) and insufficient financing (21%). In the opinion of the interviewed experts, the following could give an impetus to the development of the FinTech sector, including RegTech:

- the end of the war and Ukraine's victory (29%)
- adapting laws to changes in the FinTech market (26%)
- attracting new investments (21%)
- expanding to the European market (15%).

To understand the current state and prospects of the RegTech market, it is worth assessing the main aspects of its development:

- development drivers
- challenges that restrain the development.

DRIVERS

An analysis of global best practices has shown that a significant incentive for market development is provided by regulators' impact through increased supervision, standardization of supervision, active cooperation with regulated entities, and establishment of regulatory conditions for development, including sandboxes that support innovation. Another important development factor is awareness by financial institutions and their clients of the need for technological solutions ^{12,13,14,15,16}.

¹² <https://www.verifiedmarketresearch.com/product/regtech-market/>

¹³ <https://regtech.blog/filingnews/a-birds-eye-view-of-the-regtech-market>

¹⁴ <https://www.grantthornton.co.uk/services/financial-services-advisory/business-risk-services/data-regtech-and-digital-advisory/regtech/>

¹⁵ <https://thefintechtimes.com/regtech-2-0-a-new-era-of-regtech/>

¹⁶ <https://legal.thomsonreuters.com/en/insights/reports/regtech-the-governance-lifecycle>

Table 2. Drivers of RegTech market development worldwide

Group of drivers	Drivers of RegTech market development worldwide
Regulators' impact	<ul style="list-style-type: none"> ▪ Tightening regulation of the financial market (raising requirements for accuracy and completeness of data, and increasing the frequency of data provision), in part due to instances of money laundering and fraud involving reputable firms ▪ Implementation of supervisory standards ▪ Expanding cooperation between national regulators and financial institutions ▪ Financial market supervision is increasingly relying on regular data (reporting), and regulators are demanding greater depth and frequency of data. A shift is taking place towards digital (human-free) regulatory reporting ▪ Rising costs and workloads associated with regulatory compliance, as well as an increase in the number of fines imposed on large financial institutions ▪ The regulatory sandbox approach to supporting innovation [regulatory sandbox]
Awareness by financial institutions and their clients of the need for technological solutions	<ul style="list-style-type: none"> ▪ The growing need for faster, more secure, and seamless transactions is increasing the volume and complexity of data. As a result, there is a growing demand for technological solutions that can process and analyze this data. ▪ Mounting pressure from financial institution stakeholders to reduce the cost of regulatory compliance ▪ Rising competitive pressure leads to more investment into further improvement of technological maturity (introduction of new technology)

For the Ukrainian market, additional drivers can be identified. Especially noteworthy are strategic priorities of the National Bank of Ukraine regarding compliance with sanctions policy and zero tolerance for use by financial service providers of software that originates from hostile countries.

Table 3. Additional drivers of RegTech market development in Ukraine

Group of drivers	Additional drivers of RegTech market development in Ukraine
Regulators' impact	<ul style="list-style-type: none"> ▪ The rising relevance of implementing European legislation (which requires compliance with an increasing number and complexity of regulatory requirements, including those already adopted by the EU but not yet adapted in Ukraine, as well as those still in the process of development) ▪ Raising standards in the area of sanctions restrictions ▪ Tightening requirements for combating cyberattacks ▪ Jurisdictional compliance¹⁷ as a separate niche for institutions that are considering entering foreign markets and scaling up operations and/or that must meet the requirements of foreign regulators (U.S., Asian countries) ▪ Future compliance by financial market participants involved in the distribution of international donor aid ▪ Significant IT expertise and qualifications of Ukrainian solution vendors
Specific features of the Ukrainian financial market's technological development	<ul style="list-style-type: none"> ▪ Presence in the Ukrainian market of russian and belarusian ERP and CRM systems, which are gradually being withdrawn from the market¹⁸ ▪ Introducing open banking and banking data disclosure via API

¹⁷ <https://www.cbinsights.com/research/regtech-trends-fintech/>

¹⁸ <https://tech.liga.net/ua/technology/article/rossiyskie-crm-sistemy-do-sih-por-na-rynke-ukrainy-pochemu-eto-sluchilos-i-kak-otkazatsya>

CHALLENGES

Challenges faced by any institution wishing to implement RegTech solutions, and by RegTech providers, typically include limited technological capabilities and data security, cost assessment, evaluation of RegTech solutions, limited experience and competence in RegTech and system collaboration (see Table 4).

Table 4. Challenges for RegTech market development around the globe^{19,20,21}

Group of challenges	for financial institutions	for RegTech providers	Potential area of regulator's impact
Technological capabilities and security	The implementation and support of RegTech is made impossible or significantly more difficult due to use by financial institutions of software with limited interoperability.		Tightening requirements for technological solutions
	Issues related to proprietary data (quality, privacy, security, lack of data integration, data availability, absence of data standardization and harmonization) and cybersecurity threats exacerbated by the interconnectedness of different RegTech solutions and obsolete systems in use	Privacy and data protection regulations may limit data sharing between financial institutions and RegTech providers. Not all RegTech providers are able to implement the necessary security measures into their companies and solutions	
	When switching between vendors, historical data often cannot be transferred from old to new software.		
Features of regulation	<ul style="list-style-type: none"> Changes in national and international regulation Conflict of legislative and regulatory requirements (or of different regulators) Insufficiently clear requirements, in particular for data exchange 		Lowering regulatory barriers
Estimated costs	High costs of implementing and supporting RegTech solutions and a lengthy procurement process	High cost of customer acquisition (financial institutions), especially for newly established and small RegTech providers	
	Risk of underinvesting in RegTech solutions, as they are often seen as part of the cost of improving back-office functions, which are usually low priority. It is also sometimes difficult to measure the effect of such expenses to justify them		
Perception of RegTech solutions	RegTech solutions are often assessed as generic and not adapted to the specific needs of financial institutions. They believe that no solutions with the level of maturity they need are available	Financial institutions lack an understanding of the possibilities of applying RegTech solutions, and are not sufficiently aware of their potential	Promoting RegTech literacy

¹⁹ https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1015484/EBA%20analysis%20of%20RegTech%20in%20the%20EU%20financial%20sector.pdf

²⁰ <https://regtechconference.co.uk/2022-agenda/>

²¹ GFIN REGTECH & SUPTECH SHOWCASE REGULATORY REPORTING SPECIAL UNIT © GLOBAL FINANCIAL INNOVATION NETWORK | Financial Conduct Authority, 2022.

Competence	Lack of necessary skills, experience, and training to research, evaluate, use, and support RegTech solutions, particularly among data scientists and engineers	Lack (or inadequacy) of knowledge regarding the organization and management of compliance with regulatory requirements by financial institutions	
Systemic cooperation	<ul style="list-style-type: none"> There is no generally accepted vision for the development of the RegTech market No regular cooperation between financial institutions, RegTech providers, and regulators 		Promoting systemic cooperation

Global challenges may also be relevant for the Ukrainian market. In addition to those mentioned, other features are also indicative (see Table 5).

Table 5. Additional challenges for the development of the RegTech market in Ukraine²²

Group of challenges	for financial institutions	for RegTech providers	Potential area of regulator's impact
Opportunities to tap into international markets	When Ukrainian institutions enter foreign markets, compliance costs rise due to differences in regulations	More expensive scaling of certain (e.g., NLP-based) RegTech solutions to international markets due to the need to adjust them to the laws of different jurisdictions	Integration of EU directives
Technological capabilities	systems are heterogeneous, and financial institutions do not always have a say in the choice of systems (having to use the same systems as their parent companies)		
War in Ukraine	The full-scale invasion into Ukraine by Russia is one of the main obstacles to RegTech development, as the associated risks of destruction or seizure of assets, damage to infrastructure, force majeure leading to failure to make payments, etc. reduce the investment attractiveness of Ukraine.		

Potential tools for RegTech market development

Financial market participants play a crucial role in the implementation of RegTech solutions, but this process is facilitated entirely by regulators. Continuous communication and cooperation of the regulator with regulated entities and RegTech providers is a prerequisite for putting together a common vision on the use of RegTech and for determination by participants of their priorities and roles in the implementation of relevant technologies.

Collaboration between market participants and the regulator contributes to faster testing and scaling of solutions with reduced costs and risks. For example, the Asian Development Bank identifies four key principles for any RegTech development policy²³:

- commitment to the Digital First approach: at every level of regulation, a unified approach to digital solutions in government agencies (for example, the Government-as-a-Service model through the Smart Nation initiative where a single data strategy unites data sources in government agencies through the MyInfo²⁴ service);
- introduction of approaches and regulatory technical conditions (any regulations) that ensure the interconnection of ecosystems at the national, regional, and international levels;
- establishment of flexible data management and data standardization structures;
- supporting the creation and development of a local innovation ecosystem that extends beyond financial market supervision and encompasses startups and academia.

²² <https://www.planetcompliance.com/wp-content/uploads/2018/04/PlanetCompliance-GDPR-RegTech-eBook.pdf>

²³ <https://www.adb.org/sites/default/files/publication/820686/regulatory-technology-ecosystems-asia-financial-stability.pdf>

²⁴ <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

At the same time, regarding different instruments, system participants and regulators can make a mixed, hybrid contribution to the development of the RegTech market. In addition, regulators and RegTech market

participants are free to use the full range of tools to develop RegTech. Table 6^{25,26,27} presents a few examples.

Table 6. Possible tools for RegTech development

Instrument	Definitive role	
	of RegTech market participants	of regulators
Preparation of White Papers, Rulebooks, and Guidance	✓	✓
Activities/establishment of associations/consortia of market participants for the development of RegTech	✓	
Monitoring RegTech development indicators	✓	✓
Conducting events to popularize RegTech, to exchange experience, and to stimulate the development of new RegTech solutions [hackathons, boot camps, data competition, accelerators, Data dive/jam, TechSprint competition, and more.]	✓	Promotion, participation
RegTech knowledge center	✓	✓
Talent development	✓	Promotion, participation
RegTech solutions database	✓	✓
API marketplaces (online space where developers offer their APIs for sale and other developers can purchase access to APIs) and API platforms (environments for testing APIs) to help develop RegTech solutions, including those that need to be integrated into the regulator's system	✓	Promotion, participation
Development and testing of common RegTech solutions for market participants	✓	Promotion, participation
Regulatory sandboxes	Participation	✓
Business ontology and/or glossary standardization	✓	✓
Standardization of requirements for data collection, processing, and analysis, including BigData	✓	✓
Effective SupTech solutions		✓
Creating machine-readable regulation (MRR) and machine-executable regulation (MER)	✓	✓

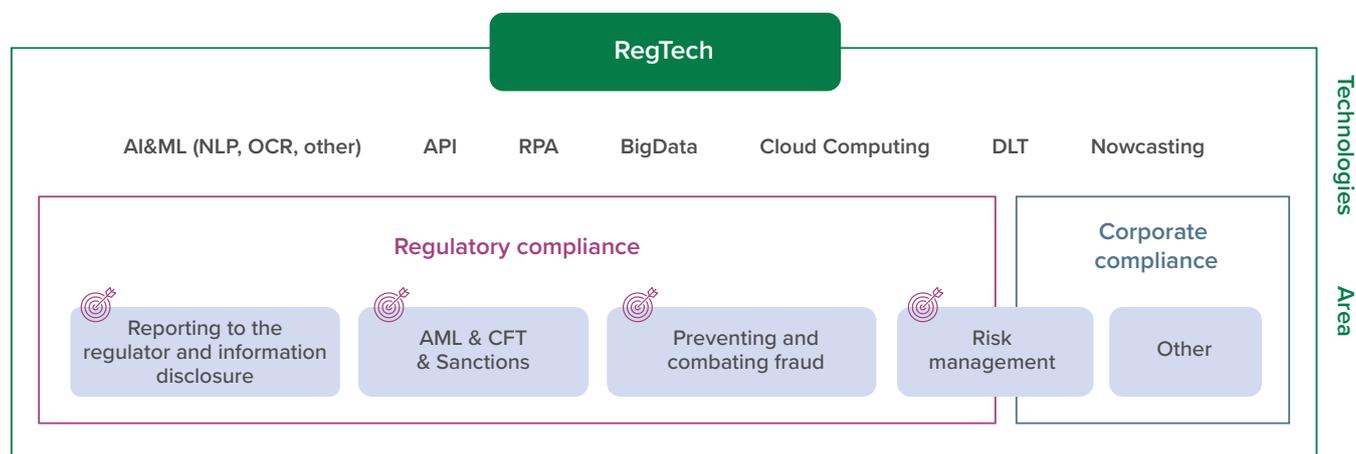
²⁵ https://ccaf.io/suptechlab/_nuxt/b708236873d20ec91023769420d64c9d.pdf

²⁶ <https://www.bis.org/speeches/sp200819.pdf>

²⁷ <https://www.isda.org/a/33PgE/Digital-Regulatory-Reporting-Market-and-Regulatory-Initiatives.pdf>

NBU's Vision and Role in RegTech Market Development

In the NBU's view, the main efforts to implement RegTech and ensure regulatory compliance in the provision of financial services by banks and the NFSM participants should be directed towards the following areas:



Banks and the NFSM participants effectively comply with regulatory requirements, in particular, through:

- implementing RegTech in all areas
- implementing RegTech with all its functionalities
- understanding the benefits of RegTech
- keeping informed about RegTech solutions in the market and their positive evaluation
- using RegTech solutions with cutting-edge technologies
- addressing internal factors restraining the implementation and use of RegTech
- financial resources for the implementation of RegTech are regularly allocated
- internal rules and operational processes for stress testing IT systems are in place
- sufficient skills to implement and maintain RegTech solutions, including the ability to conduct a qualitative assessment of the risks of implementing systems and ensuring the subsequent ongoing monitoring of their reliability, are available
- training formats that involve external experts are available
- there is a high willingness of employees to implement new technological solutions
- full-time employees are regularly appointed to implement RegTech development initiatives
- there is the regular allocation of resources for cooperation with other market participants for RegTech development.

RegTech solution providers comply with regulatory requirements for technological solutions and actively develop, implement, and maintain RegTech solutions. Specifically:

- they introduce and maintain RegTech solutions in all areas
- their solutions cover all possible RegTech functionalities
- the proposed RegTech solutions meet all the requirements of the regulator, in particular, they do not rely on software originating in the Russian Federation or the Republic of Belarus
- they overcome internal restraining factors
- they provide RegTech solutions to all customers
- they regularly allocate financial resources to implement initiatives aimed at developing the RegTech market
- they regularly allocate resources for cooperation with other market participants on the RegTech development
- they possess sufficient skills to implement RegTech
- they offer training formats that involve external experts
- they demonstrate a high willingness to implement new technological solutions.

The NBU has been taking measures to provide conditions for the development of RegTech solutions in the Ukrainian financial market, taking into account the defined strategic goals and the function of ensuring financial stability, including through:

- reducing regulatory obstacles (if any) to the development of the RegTech market
- integrating EU directives and regulations
- promoting systemic cooperation
- introducing requirements for technological solutions that can be used by banks and NBFIs, and developing supervision over technological risks
- strengthening requirements for business continuity and cybersecurity, including the gradual withdrawal of (primarily critical) software related to the Russian Federation or the Republic of Belarus in order to minimize risks and their impact on the operation of automated systems of banks and NBFIs
- implementing requirements for IT outsourcing
- improving systems for monitoring payment transactions, indicators of fraudulent and abnormal transactions, and blocking such transactions
- improving operational risk and incident management systems when creating new payment products and services.

Regulatory obstacles should be understood as specific provisions of NBU regulations that can hinder the implementation of RegTech solutions, including ambiguity in the interpretation of requirements for automating the monitoring of compliance, as well as prohibitions or restrictions affecting the ability to fully implement relevant RegTech solutions.

The integration of EU directives will aid the application of best practices in the Ukrainian market and make it easier for Ukrainian companies to scale up their activities in international markets.

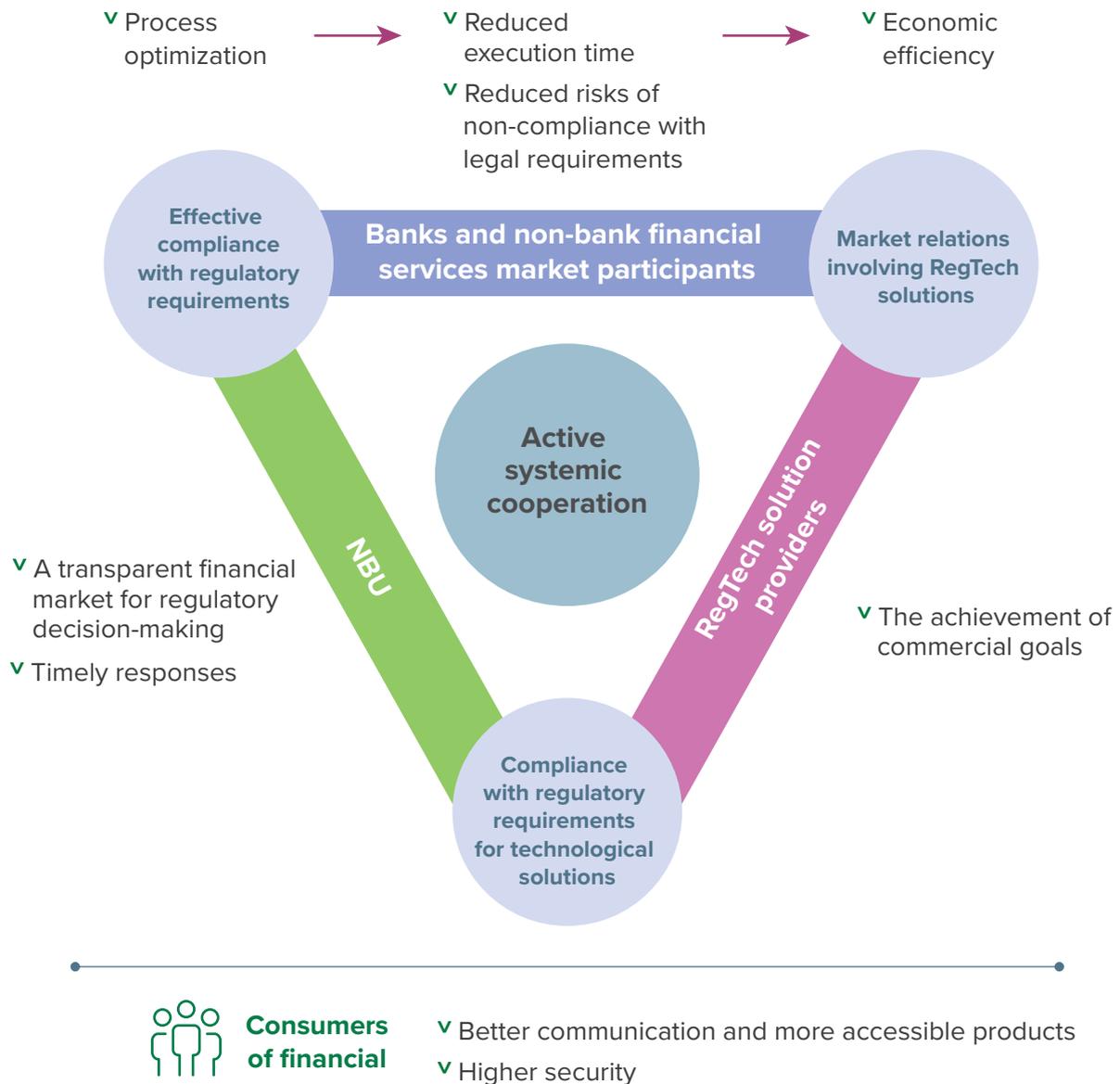
Systemic cooperation in the RegTech market refers to regular communication, joint events, and the use of other tools for the development of RegTech by key players, such as the NBU, financial market participants regulated by the NBU, and RegTech solution providers. Implementation of IT outsourcing requirements refers to setting up processes and systems to determine the criticality levels of third parties involved in outsourcing, and the ability of banks and non-bank financial service providers to render services and meet regulatory requirements.

The NBU's main contribution to the development of RegTech includes promoting sustainability, ensuring control, and increasing the competitiveness of the financial sector by bringing the regulatory compliance process to a new, high-tech level that is aligned with the automation of the NBU's supervisory processes.

Thus, taking into account the global experience and specifics of the Ukrainian financial market, the factors behind the successful development of the RegTech market in Ukraine in the coming years should include:

- the proactivity of financial institutions and suppliers in implementing RegTech solutions;
- comprehensive assistance from the NBU in creating conditions for the development of the RegTech market.

The NBU's vision for the development of the RegTech market in terms of interaction and effects for the main participants can be summarized as follows:



Taking into account the vision outlined in this document, the NBU will initiate communication with stakeholders in the near term to outline current issues involving RegTech development in Ukraine. The results of this cooperation will form the basis of a roadmap for the development of the RegTech market in Ukraine, which the NBU plans to design.

Further cooperation

With this Green Paper, the NBU aims to communicate to RegTech market participants the regulator's vision of the development of RegTech in Ukraine, and to emphasize the importance of the proper assessment of the implementation of such technologies by financial institutions.

The regulator's vision will be improved as a result of discussions with experts and market participants to determine the most effective paths for the development

of RegTech. The NBU invites market participants and other stakeholders to take an active part in the RegTech events and communications organized by the regulator.

If you have any comments or suggestions on the development of the RegTech market in Ukraine, please send them to regtechnbu@bank.gov.ua

Annex 1

Examples of coverage and content of areas of process automation with RegTech

Frequently cited RegTech segmentations¹

Source	Segment
Alvarez & Marsal (2018)	Regulatory compliance; risk management; financial crime prevention; identity management
ARCognizance (2018)	Risk management; identity management and control; regulatory reporting; transaction monitoring
Bafin (2018)	Compliance management; risk management; customer verification; fraud detection
CB Insights (2017)	AML/KYC; blockchain/bitcoin; corporate risk management; operational risk management; portfolio risk management; quantitative analysis; reporting; tax management; trade reporting
EY and Medici (2018)	Regulatory reporting; transaction monitoring; risk management; compliance: governance and identity control
FINRA (2018)	Surveillance and monitoring; customer identification and anti-money laundering compliance; regulatory intelligence; reporting and risk management; investor risk assessment
RegTech Analyst (2019)	Compliance management; registration confirmation; reporting; transaction monitoring; communications monitoring; risk management; cybersecurity/information security; capital expenditure planning/stress testing
RegTech Associates (2019)	Cybersecurity/data confidentiality/identification; regulatory data and information management; financial crime; regulatory change; regulatory risk analytics; market integrity and transparency; regulatory reporting; general compliance; other
Swisscom (2019)	Authentication; AML/KYC; data verification; cross-border and tax solutions; corporate risk management/ fraud detection; investment risk management/quantitative analytics; regulatory compliance mapping
Toronto Centre (2017)	Compliance; identity management and control; risk management; regulatory reporting; transaction monitoring; trading

¹ <https://www.jbs.cam.ac.uk/wp-content/uploads/2020/08/2019-12-ccaf-global-regtech-benchmarking-report.pdf>

KPMG's review of RegTech² implementation areas



² <https://www.hkma.gov.hk/media/eng/doc/key-information/press-release/2020/20201102e3a1.pdf>

Thank you
and we look forward
to your feedback!