DESIGNING A DIGITAL TRANSFORMATION SUPERVISORY FRAMEWORK FOR BANKS UNDER SREP: THE ARMENIAN CASE[1]

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Introduction

In the aftermath of the global financial crisis, banking supervision and regulation have changed profoundly. Regulators have imposed stricter quantitative standards and introduced a number of principle-based requirements, while many supervisors have shifted from compliance-based to risk-based supervision (RBS), allocating resources according to the materiality of risks posed by each bank and to the financial system as a whole. RBS therefore lets supervisors concentrate on areas of greatest concern rather than apply a uniform checklist.

Stronger regulatory standards and the RBS framework now cover not only traditional banking risks (credit, market, etc.) but also emerging risks linked to penetration of digital technology into finance. Digitalization offers banks wider access, higher efficiency, and better risk management when DT is timely and well executed, yet digitalization also amplifies strategic and operational risks that can threaten financial stability [BCBS, 2024]. The Central Bank (CBA) already treats operational resilience as a forward-looking priority [CBA, 2025a]. Strategic risk arising from digitalization warrants similar attention to further drive banks' progress in DT and strengthen DT governance.

The European Central Bank (ECB) has advanced this agenda by elevating digital transformation (DT) within the business model assessment (BMA) of its supervisory framework. Since 2020 DT has been a multi-year priority aimed at safeguarding business model sustainability [ECB, 2019]. In May 2024 the ECB published its 14 digitalization assessment criteria - clustered into business model and strategy, corporate governance, and operational risk management - thereby clarifying expectations and structuring its dialogue with banks [ECB, 2024a]. Although still nascent, the system is the most transparent benchmark available and can inform other regulators, including the CBA.

Methodology

We first undertook a literature review covering international practices of DT supervision, including central banks' roles regarding the promotion of banks' DT and recent developments like the ECB's integration of DT into SREP. This review established the global

[1] The views expressed are those of the author and do not necessarily reflect the views of any central bank

context and best practices that underpin our framework. Next, we conducted a gap analysis by examining key Armenian banking regulatory documents (Regulations N3, N4, and the banks' prospective development plan's regulation) and comparing their requirements against the identified best practices, which are the ECB's 2024 digitalization assessment criteria. The findings of this analysis are presented in the Results section, where we the main gaps to be addressed in the scope of the proposed supervisory framework. Finally, we conducted document analysis of the Central Bank of Armenia's 2025–2027 strategic objectives to ensure that our proposals are aligned the framework's recommendations (also presented in the *Analysis* section), thus are practical and relevant in the Armenian context.

Literature review

In this paper digitalization denotes technology's penetration into finance, whereas DT refers to firm-level transformations at banks. The terms central bank and regulator are used interchangeably throughout the text.

The management of Banks DT occurs at two levels: the entity level (by individual banks) and the sector level (by the regulator). Our observations show that central banks generally influence DT through supervisory tools rather than binding mandates. This means that there are no rules forcing banks to undergo DT. Central banks' attitude towards promoting digitalization in finance could be prescriptive, supportive, and neutral [BSBC, 2019]. In Armenia the CBA is mainly supportive, sometimes neutral, and occasionally prescriptive (e.g., the QR-payments directive). Supportive measures typically include guidelines, thematic examinations, and governance expectations. In case of Armenia, the CBA's supportive role manifests mostly through DT leadership where financial sector is a key element [CBA, 2025b]. This leadership already shows its results, more specifically, 10 banks and 3 telecoms have founded a joint commercial company ("imID") that will provide e-identification solutions to the private sector [Simonyan, 2025]. As for the regulation, it usually concerns fintech activities, like crypto-assets and AI usage by addressing main issues that rise (e.g., data protection, AI ethics [Manukyan, Parsyan, 2024a].

Many jurisdictions now apply RBS, which defines supervisory objectives, priorities, and methods. The ECB operationalizes RBS through the Supervisory Review and Evaluation Process (SREP), later adopted elsewhere. SREP entails an annual four-pillar review – business model and strategy, governance, risks to capital, and liquidity/funding, which are scored on a 1-4 scale (where 1 is a low risk, and 4 is the score for unacceptable) [EBA, 2022]. Assessment proceeds in three phases: (i) data collection; (ii) automated inherent risk scoring based on ratios; and (iii) comprehensive assessment covering risk's main areas. Each risk is usually assessed first from the risk level side (inherent risk) and then from the risk control side (management practices around the risk). Afterward, the inherent risk and risk control result in the residual risk for which the given risk is given its final score. The business model sustainability, in particular, examines whether the bank's forward-looking strategy can maintain profitability and sustainability not only in the short term but also in both mid-term and long-term horizon. Since DT has become a widespread phenomenon in the banking industry worldwide DT is a major cost and revenue driver - a critical component for the BMA, where the efficiency gains emerge only starting from the medium term [Kriebel, Debener, 2019].

Since 2020 the ECB has embedded DT as a supervisory priority within SREP under BMA. In May 2024, ECB published its 14 digitalization assessment criteria, grouped into business model and strategy, corporate governance, and operational risk management, complemented by examples of sound practice which aim to aspiring banks.

A persistent challenge is the absence of standardized metrics to assess bank's current "digital maturity". Unlike credit risk ratios, DT indicators vary across banks and cover only partly the bank's DT focusing mainly on front-office activity. For supervisory purposes the metrics must be simple, comparable, and consistent, which is not always the case with the IT metrics [Manukyan, Parsyan, 2024b]. Based on international digital maturity reports by consulting firms, common candidate metrics could include the proportion of digital customers, share of online loans, deposits, online sales (issuance of cards or accounts), as well as IT investments or spending as a percentage of operating income [Zamaslo et al., 2021]. Until robust quantitative benchmarks emerge, qualitative appraisal of banks' managerial processes (strategy, governance, and risk management) around DT processes remains indispensable. Still, as the ECB noted, their framework is in an early stage and will need refinement.

Finally, the CBA's 2025-27 strategy explicitly mentions its objective to be a "leading central bank" through research excellence and innovative solutions [CBA, 2024]. On the supervisory side, the strategy envisions a "risk-based, forward-looking, exemplary, modern and accountable" supervisory system that improves bank governance processes, reduces banks' reporting costs, and ensures high-quality and innovative financial services to consumers. These principles guided the design of the framework so that it reinforces and does not contradict the CBA's strategic direction.

Scientific novelty

This study is the first to propose an integrated supervisory framework for banks' DT tailored to the Armenian context (emerging market). It synthesizes international best practices by incorporating the ECB's 2024 digitalization assessment criteria with insights from current academic research on digital maturity into the currently applicable SREP framework. By bridging the local regulatory practice and best practice, this paper fills a gap in the literature on risk-based supervision of banks' DT and shows the most essential points before introducing a new supervisory framework.

Analysis

The CBA's approach to digital transformation is largely supportive, thus it encourages innovation through guidance and collaborative initiatives (like the imID digital ID project [Simonyan, 2025]), and stresses the importance of operational resilience [CBA, 2025a]. The international best practice with the example of ECB shows that DT supervision incorporates not only operational risk, but also strategic (business model) and governance. To implement its DT supervisory framework the ECB had based its criteria on its existing regulations and guidelines, particularly the SREP [ECB, 2024b]. The gap between Armenia's current regulatory stance and global best practice underscores needs to be addressed for effective implementation of DT supervisory framework. In the case of Armenia, the DT supervisory framework would likely to be grounded in the following banking regulations: Regulation N4, N3 reporting N20 prospective development plans regulation. These documents contain both rule-based and principle-based requirements. A comparative analysis of these regulations may help identify key blind spots in the implementation of DT supervision within the national context, specifically for Armenia.

Our review of Armenian regulation and supervisory practices reveals the following gaps in the supervision of bank DT, which the proposed framework seeks to close:

1. Although the CBA already treats operational resilience as a supervisory priority, expanding the framework to cover strategic risks stemming from digitalization would further support banks' transformation efforts and long-term business model sustainability. This is also due to the fact that digital transformation is indeed a significant driver of both revenues and costs, given its widespread adoption in the banking sector. Accordingly, without a strong emphasis on DT assessment, a bank's business model evaluation is likely to omit a critical component. This objective is consistent with the CBA's 2025-27 supervisory priorities and would help banks to move along the market trends and keep their competitive power by minimizing strategic risk materialization.
2. Without operational-level guidance, supervisory judgements on banks' DT risk becoming subjective which is a known challenge under RBS and SREP. This is due to the fact that, in the absence of clear benchmarks, different bank supervisors may assess a bank's digital progress inconsistently, thereby undermining the principles of a risk-based supervisory approach. Adopting a formal assessment methodology, based on the ECB's publicly available digitalization assessment criteria and enriched by other academic research, would give banking supervisors will standardize evaluations by providing a consistent set of objective benchmarks.
3. Our observation of the Armenian banking regulation N3 concludes that the existing reporting templates offer limited coverage of DT indicators, providing an opportunity for enhancement. Although the regulatory reporting form N20 covers some related information, it is at least partially outdated (includes, for example, SMS-banking and WAP banking transactions' data). Expanding the reporting framework to capture up-to-date digital

usage and investment ratios will enable simple, transparent monitoring of digital progress across banks.

4. The comparative gap analysis between the Armenian banking regulation and the best international practice regarding banks' DT supervision (ECB digitalization assessment system) reveals that only a few requirements are covered by the existing regulations, such as periodic analysis of external business environment and the governance of outsourced services However, most assessment criteria are either covered at the principle-level (e.g., defining a digitalization strategy, the frequency of the reporting to the Board, customer-centricity) or addressed partially (e.g., internal digital maturity assessment, defining the operational plan of digitalization projects). Principle-based requirements would need further supervisory explanation in the light of digitalization. There are also some criteria elements that are not covered at all by the current banking regulation, such as having established KPI framework or an robust budgeting processes.

5. A final gap identified is that Armenia lacks some specific fintech-related regulations, which could inadvertently hinder innovation by leaving banks uncertain about boundaries. For example, regulations around open banking and cloud outsourcing are still nascent or missing. These unclarified requirements around open banking and cloud outsourcing may deter proactive adoption or leave risk-management practices uneven. To address the identified gaps, we propose the following measures for the CBA:

1. To address strategic risk arising from digitalization, senior management within the Supervision directorate should first recognize DT strategic risk as a distinct supervisory focus. Such recognition would anchor clear objectives, priorities, and approaches within the RBS framework. The approaches could include methodology designing and approval process (which divisions are set to develop the assessment methodology), how should be communicated the supervisory expectations regarding the regulatory gaps between current and adapted ECB system as well as international collaborations with the leaders of the field, like ECB, etc. Moreover, prioritizing some areas within the DT's strategic risk and/or including this strategic risk in CBA supervisory priorities would require deeper research into the risk areas and impacts.

2. Given that the CBA is practicing RBS and has formally adapted SREP methodology [IMF, 2023] as well as that DT assessment fits the best to the business model sustainability assessment, we propose to integrate the DT supervisory framework into SREP's BMA. Following the logic and steps of SREP methodology, the new assessment should also comprise inherent risk and risk control parts. Regarding the Phase 1, the high-level decisions will take care of the approaches how and from which sources to gather relevant data for DT analysis. In particular, CBA would update reporting form N20 to collect key DT ratios, such as the share of active digital customers, the volume of online loans, and the ratio of IT spending to operating income (commonly used in international practice), without materially increasing reporting costs. This would give banking supervisors concrete quantitative evidence of a bank's digital engagement level and serve as basis for DT inherent risk assessment. Moreover, this approach does not contradict the CBA strategy.

It will further improve the data quality at the CBA by introducing data on which business usage is higher. Phase 2 would translate those ratios into an initial inherent risk score, for which we propose the following automated and reasonable scheme: firstly, the ratios of digital customers and the online loans (or deposits) could be combined. Later the resulting score can be adjusted in case the IT investments are assessed unacceptable, meaning that the bank apparently does not invest sufficiently in DT. The CBA would also need to define thresholds for each ratio participating in the automated score-setting in order to assess each bank's results. Afterward, the initial inherent score will be adjusted in the phase 3 analysis. However, given current quantitative data constraints, the qualitative assessment should carry more weight, thus the risk control part should get more supervisory resources. Thus, regarding the assessment of management practices, apparently, the main issue in the case of Armenia is the gap between current regulatory requirements and the proposed digitalization assessment system. The gaps could be closed primarily through supervisory guidance and dialogue, rather than by introducing new prescriptive requirements, which are basically more resource-intensive and less adequate for rapidly developing risk areas such as digitalization.

Conclusion

We have researched areas like Armenian banking regulation and supervisory practices, and based on that we have researched RBS, SREP methodology, international best practices around banks' DT supervision both isolated and from their intersections and potential contradictions. The evidence indicates that the CBA's stance on technological innovation is fundamentally supportive, as shown by its leadership role in Armenia's wider DT agenda with the inclusion of banking sector. Building on this foundation, we argue that the CBA can further strengthen that role by adopting a more structured DT supervisory framework grounded in international experience and academic research. Such a framework would encourage banks to undergo DT responsibly and to embed sound governance around their transformation initiatives, thereby safeguarding their business model sustainability.

The research limitations concern the Armenian context to which the framework should be further fitted. First, our gap analysis focused on regulatory requirements and did not quantify the system-wide impact of digitalization on financial stability. Measuring that impact would clarify whether DT-related strategic risk should become an explicit supervisory priority. Second, Armenian banks differ in size, leverage and business model types, implying heterogeneous vulnerability (sensitivity) to digitalization. Mapping this heterogeneity would help the CBA allocate supervisory resources and tools (e.g., Suptech solutions) proportionately. Third, although the ECB's digitalization assessment criteria currently provide most transparent and advanced benchmark, they too must evolve with market practice and academic findings. Therefore, the proposed supervisory framework would require periodic refinement and adaptation to local conditions. Therefore, we suggest the following three main areas for future research that can improve the implementation of the DT supervisory framework in a specific country.

- Examination of DT developments on a bigger scale (financial sector or country-wide) to conclude the current positioning, the dynamics of developments, potential threats, and opportunities linked to digitalization.
- The relevance of DT to the bank level will serve as input to the resource allocation under the RBS concept. Given that there are 17 banks in Armenia and their size differences, our initial assumption could be that there are differences within banks' DT preparedness which can stem from both their size, leverage (and respective investment capabilities) [Can, Huizinga, 2021] and also from their business model sensitivity to digitalization developments.
- Enhancing the ECB digitalization assessment criteria and sound practices by integrating academic findings (i.e., further continuing currently available research that covers only ECB's first 2 criteria [Manukyan, 2024]) and stressing the most critical points according to their relevance to the given (Armenian) context by using scientific abstraction.

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Digitalization in finance introduces strategic and operational risks that traditional supervisory tools do not fully capture. This study proposes a structured framework for supervising banks' digital transformation (DT) within the risk-based Supervisory Review and Evaluation Process (SREP), tailored to Armenia. Using a qualitative approach, the research reviews international DT-supervision practices, compares Armenian banking regulations with the European Central Bank's (ECB) 2024 digitalization assessment criteria, and aligns its recommendations with the Central Bank of Armenia's (CBA) strategic objectives. The analysis identifies three principal gaps: (i) the international SREP methodological guidelines lack an explicit focus on digitalization-driven strategic risk, limiting the rigor of banks' DT assessments; (ii) current regulatory reporting in Armenia does not include key "digital maturity" metrics; and (iii) some of the existing regulatory requirements require additional supervisory clarification in light of digitalization. To address these shortcomings, the paper recommends embedding DT assessment into the SREP's business model assessment, revising regulatory reporting form N20 to include simple and comparable DT indicators (e.g., share of digital customers, volume of online transactions, and IT expenditure), and introducing a formal qualitative assessment of banks' DT based on the ECB's assessment criteria. Implementing this framework will reinforce the CBA's supportive role in fostering technological innovation, by underlining DT's importance for business model sustainability, and by ensuring sound managerial practices around banks' DT initiatives. The study concludes by outlining three future research directions that could further refine and adapt the proposed DT supervisory framework to specific country contexts.