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SUPERVISING BANKS DIGITAL TRANSFORMATION: THE SABBMDT MODEL BASED ON THE ECB DIGITALISATION ASSESSMENT FRAMEWORK

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Abstract

This study aims to enhance the supervisory assessment system of banks' digital transformation (DT), given its nascent nature. To elevate the current state-of-the-art assessment system to the level of a scientific model, the study applies theory-building methodology and the bricolage technique.

The scientific novelty of the study is the resulting SABBMDT model, which represents three main improvements over its predecessor, the European Central Bank's (ECB) digitalisation assessment system. First, the ECB's system has been enriched with the findings of the literature review on key success factors of banks' DT. Second, the model became more parsimonious after combining the original 14 criteria into the model's 7 components. Third, the study identifies and explains potential interlinkages among the model's components.

The study's main limitations include the non-systematic nature of the conducted intermediary literature review, the limitations of the bricolage technique, and the rapid pace of DT demanding continuous refinement for the model, as well as judgment-based decisions applied to criteria combinations and interlinkage identification.

Accordingly, future research should include a systematic literature review on key success factors for DT, as well as exploring potential ways to justify the criteria combination and interlinkage identification scientifically.

Keywords: Banking supervision, Digital transformation, ECB, SREP, business model sustainability.

Introduction

Technological innovations are reshaping economic activities and the banking sector is no exception. In recent years, the convergence of finance and technologies (fintech) has led to services, such as the ones offered by Apple Pay, Google Pay, WeChat, Bunq or Revolut, which have become an integral part of daily life. To maintain and enhance their competitive

position in the market, banks are increasingly undergoing digital transformation (DT). DT typically occurs across the entire bank, although customers mainly observe the front-office changes. Banking institutions' DT includes, for example, customers' credit risk assessment through machine learning and alternative data [1] (e.g., could be customers' digital footprint [2]), use of scalable computational capabilities through cloud service providers [3].

Banks' DT strategies, allocated resources and managerial capabilities differ; as a result, some banks may be lagging behind their peers. Particularly, according to a quantitative study, it is small and capital-deficient banks that are more likely to lag behind in the DT race emphasizing the need to allocate adequate resources for DT [4]. It is worth noting that a bank's DT would not necessarily result in a competitive advantage but rather aims to keep pace with the new "market standard", consistent with the Resource-based view (RBV) theory. Although Beccalli's "profitability paradox" is still relevant [5] (the positive linkage of IT (~DT) investments to the bank profitability has not yet been proven empirically), another study found that successful DT at banks improves cost-efficiency since the medium term [6]. Thus, it is important to manage banks' DT efficiently, as the digital divide between banks can lead to significant business implications.

The management of banks' DT takes place at both the bank level and the supervisory level (central bank or a separate supervisory authority), with supervision focusing on the overall financial stability. This study focuses on DT management from the central bank perspective. Generally, central banks manage the banking sector's risks through regulation and supervision. In this regard, banks' DT is more suitable for supervision. In recent years, most high-level supervisory policy documents have highlighted the need for DT supervision. For example, the Basel core principles' updated document (in 2024) mentions digitalisation as a potentially significant risk for banks that can materialize over a longer-term horizon and therefore needs proper risk management processes in place [6]. In addition, a working paper from the Bank of International Settlements mentions that digitalisation in finance gives rise to strategic (business model), operational and financial stability risks [3]. This suggests that strategic risk is the primary transmission channel of digitalisation risks to banks, while operational and financial stability risks (mostly) follow it. Consequently, the DT assessment can inform subsequent operational risk assessment. Finally, the consultation paper on the revised SREP (Supervisory Review and Evaluation Process) guidelines states that digitalisation should be assessed to evaluate the impact on the banks' business strategy, execution capabilities, cost control and revenue generation under business model assessment [7]. Moreover, regarding digitalisation's impact on other SREP pillars, DT assessment insights should be considered when assessing liquidity needs in the short and medium term [7].

Within the SREP methodology, supervisory assessment of banks' DT fits best within business model (BM) sustainability assessment [8]. SREP guidelines have been widely used (especially in Europe) since their introduction in 2014. Supervisors use SREP guidelines to assess banks' risks, which results in scores per risk and, ultimately, the bank's overall score. SREP guidelines include four main pillars: business model, governance and risk management, risks to capital (i.e., credit, market, operational risks), and risks to funding and liquidity. Each

pillar's weight in the overall SREP score can be divided equally (25%) or differentiated: for instance, the Central Bank of Brazil gives 40% weight to BM assessment [9]. Each banking risk is typically divided into two parts: risk level, which includes the quantitative measures, and the risk control, which assesses the governance (management) practices around the given risk. Each part typically involves three phases and is scored from one to four (one indicating low risk and 4 indicating high risk). Phase 1 includes data collection and preliminary assessment without assigning any score to the assessed risk. Phase 2 provides an automated, anchoring score based on predetermined thresholds of selected ratios that reflect most risk areas. During Phase 3, the supervisor conducts an in-depth analysis and assigns the final score, which may deviate from Phase 2's automated score within a restricted range. Regarding the BM assessment, it is divided into the assessment of BM viability (≤1y) and BM sustainability (>1y). Additionally, the SREP guidelines mention that business model (BM) sustainability assessment should also consider potential changes in the banks' operating environment [10]. In this context, fintech developments constitute a large-scale change in the banks' business environment. Moreover, since DT is a major cost and (future) revenue driver, as well as part of the European Central Bank's (ECB) 3-year supervisory priorities since 2020 [11], DT is well-suited for BM sustainability assessment.

Currently, the most transparent and advanced assessment system for banks' DT supervision has been published by the ECB in May 2024 and consists of 14 criteria covering DT management practices (risk control) [12]. Risk level assessment is less relevant for DT, since it is hard to find sector-wide, comparable DT metrics and such measures tend to reflect past performance without considering forward-looking information. Not surprisingly, since the ECB is a leader in SREP assessments, the proposed digitalisation assessment system is intended to be integrated into the SREP framework. ECB notes that the current model is not a definitive assessment model but one that will be improved over time, particularly through the addition of profitability indicators of banks' DT projects [13]. While the ultimate responsibility of strategic planning and implementation lies within the bank's board, the banking supervisor should assess its potential risks and raise those questions to the bank's management [10]. Unlike other supervisory authorities that do not disclose digitalisation assessment criteria (apparently due to confidentiality reasons), the ECB's publication serves as supervisory expectations and provides a common ground for dialogue between banks and supervisors. Moreover, a principle-based approach in the supervision of banks' DT is preferable to prescriptive rules, given the rapid pace of fintech developments [14]. To develop the digitalisation assessment criteria, the ECB has made substantial efforts in terms of DT assessment in the last few years, as DT was also among the ECB's supervisory priorities. First, in 2022, the ECB conducted a horizontal assessment (survey) among the European Union's 105 biggest banks to gather market intelligence. Next, in 2022-23, the ECB conducted 21 on-site visits and reviewed its previous DT assessment. Finally, in May 2024, the ECB published its 14 assessment criteria.

Our previous study examined two criteria of the ECB's system and enhanced them by integrating additional tools and insights [15]. In particular, the prior study shows that the recommended SWOT analysis can be further enhanced with other analysis tools, such as

PESTEL, Porter's Five Forces model, and Analytic Hierarchy Process (AHS) [15]. The study also suggested defining "digital strategy" to clarify the supervisory expectations and align with academic terminology [15]. In conclusion, the study proposed a comprehensive refinement of the ECB's system. Also, scientific enhancement can make the current ECB assessment system more grounded for further supervisory actions. In other words, scientific rationale is capable of lowering banks' resistance to new supervisory requirements, which may lead to further supervisory actions (e.g., additional capital requirement as a Pillar 2 add-on). Thus, the gap we identify is that the ECB's system may omit DT-related literature review insights because the ECB framework does not state that the system also considers DT-related academic literature. Moreover, the current system appears too complex to produce a single overall DT score, as it includes 14 criteria, and is better suited to being divided across the SREP pillars. Finally, the ECB system presents the criteria largely as standalone elements rather than interconnected ones.

To make the supervisory assessment system more grounded and rigorous, given the abovementioned gap analysis, this study suggests several improvements. First of all, we take the ECB assessment criteria as an initial point, given its current state-of-the-art nature and aim to enhance it scientifically. The identified main gaps include the absence of scientific findings in the development of the current assessment system and the fact, that the system does not specify how these criteria are related. In addition, the current assessment is largely based on gathered market intelligence, but does not broadly consider the academic insights, which could add value.

This paper is structured in the following order. The Conflict setting section articulates the research motivation and objectives. The subsequent Literature review section identifies the key success factors of banks' DT. In the "Methodology" section, we describe all the methodological steps and logic used to develop the resulting model. Next, in the "Results" section, we present the resulting model, focusing primarily on the model's improvements over its predecessor and on interlinkages among the model's components. After that, in the "Discussion" section, we present the developed model's contribution to the literature. In the end, we conclude by mentioning the study's limitations and by proposing further research areas.

Conflict Setting

This study aims to develop a scientifically grounded model for supervisory assessment of banks' business model digital transformations (hereafter, SABBMDT), which can be integrated within the SREP framework. Specifically, the paper's suggested improvements are threefold compared to its predecessor: the resulting model incorporates insights from academic and grey literature, the assessment model becomes more parsimonious, and highlights potential linkages among the model's components.

Literature review of DT key success factors

To incorporate insights from the literature into the ECB assessment system, we first conduct a literature review on key success factors (KSFs) of digital transformations, focusing

on the banking sector. The literature review is summarized below with the concept matrix logic suggested by Webster and Watson [16]. For simplicity, we represent the identified opposite of banks' challenges as KSFs as well.

The five selected publications consist of three academic papers and two publications from consulting firms. The first academic paper investigates the DT challenges of a European bank [17]. The second paper highlights seven key factors affecting banks' DT through a textual analysis of questionnaires completed by 604 bank employees [18]. The third paper looks into essential components of a successful DT strategy using examples from three non-bank companies [19]. We also include relevant publications from McKinsey and Deloitte [20] [21]. Below we list and elaborate on the KSFs that were identified during our literature review.

We have grouped the observed KSFs into three main groups, namely Strategic Management, Employees and Technology. The remaining important elements have been attributed to the Other category. This arbitrary grouping has an objective to position the KSFs among themselves.

The first seven KSFs come together to make the Strategic Management group. The KSF 1 suggests that having a clear understanding of the DT framework and ensuring its alignment with business strategy helps to achieve successful DT [17] [19] [20] [21]. In addition, it encourages to have roadmap (action plan) and a strategy that is centered around customers. The KSF 2 highlights the importance of top management support [17]. The KSF 3 demands to recognize data as the organization's top priority asset as well as to have an optimal data architecture, and data governance policies and tools to derive insights from the data [19] [21]. Next, the KSF 4 relates to the flexible and innovation-driven working environment by smoothing the organization chart and investing in change management [17] [21]. Such bank-wide changes have the potential to lower the organizational level for decision-making, thus, bringing the customer feedback closer to the decision-making process and encouraging data-driven decisions. The KSF 5 suggests clearly defining the scope of responsibility for the implementation of DT: for instance, the bank can have a team of high-level management as the DT responsible body (instead of one person), as well as a supervisory body (or a committee) [17] [18] [20] [21]. The KSF 6 underlines the significance of having KPI (key performance indicators) systems in place to evaluate DT progress [20] [21]. Finally, the KSF 7 stresses the importance of ensuring effective communication in the workplace as a key driver for successful DT [18].

The next group of KSFs – Employees – consists of the KSF 8 and the KSF 9. To begin with, the KSF 8 suggests recruiting specialists with technical knowledge, as in-house developments are crucial for successful DT, as opposed to the outsourcing of the technical tasks [20] [17]. KSF 9 highlights the importance of developing and trigger employees' ability to sense and materialize opportunities. Additionally, it underlines the importance of the Chief Data Officer (CDO), which can catalyze considerable changes when assigned properly defined responsibilities [17] [19].

The KSF 10 and the KSF 11 make up the third group, named Technology. The KSF 10 demands ensuring interoperability between existing systems and reviewing business processes

[17] [19] [20]. The APIs (application programming interfaces) may play a crucial role in this regard. Regarding the KSF 11, it encourages providing the necessary technical tools and managing employees' expectations [18].

As mentioned above, all the remaining important elements have been combined under the KSF 12, which does not fall under previous categories, but forms a new one – Other. It includes leadership, project management skills, cooperation with experienced companies in DT and having not very slow changes [20] [17] [21] [19].

Finally, juxtaposing the ECB's assessment system with the literature review on KSFs of banks' DT aims to develop a comprehensive framework in which additional insights from the literature are integrated, while overlapping points support the robustness of the ECB framework and diverging points require reconsideration.

Methodology

It is worth mentioning that our study adopts a relativist ontology and a social constructionist epistemology as the study's philosophical assumptions. According to relativism, there is no single reality or truth; instead, multiple perspectives exist, because different observers may have different viewpoints [22]. This is consistent with our study because the desired model is to be used by banking supervisors to assess a bank's DT. Secondly, regarding the epistemology, our research adheres to social constructionism. This also fits the nature of our study area - the interpretation of the overall governance around banks' DT, which can be described with words rather than with numbers and tested by questions rather than by hypotheses.

First, to address the mentioned gaps between the ECB assessment system and scientific model characteristics, we apply the methodological steps of theory-building in management studies, which have been summarized by Shepherd and Suddaby [23]. While some management scientists have broadly defined the most important principles for theory qualification (e.g., Bacharach mentions falsifiability and utility as key criteria [24]), the boundary after which the work can be considered as a theory is not clear [25].

The same is also true for models in management studies. In contrast to theories, models represent less robust concepts that aim to measure and analyze some areas to support decision making rather than explaining the relationship between constructs. For instance, Porter's Five Forces model helps analyze a product's market to assess its competition pressure and potential profit rather than explaining the interplay among the model's five forces. In short, we justify the use of theory-building methodology for a model, given that theory-building approaches typically apply stricter evaluation criteria than model development.

According to Shepherd's and Suddaby's literature review of theory building in management science, the theory-building approach includes five key elements: conflict, character, setting, sequence, and plot and arc [23]. The conflict (challenging the value of an existing system) has been discussed in the introduction. Next, to distinguish our model from other frameworks in management research, we name it SABBMDT, which stands for Supervisory Assessment Model for Banks' Business Model's Digital Transformation.

Regarding time, we acknowledge that the developed model will require periodic updates as new insights emerge.

From the spatial perspective, even though our model is designed to function universally, it builds upon the ECB's system designed for the SREP framework. Hence, it fits better to the SREP adopted countries. Finally, we apply the bricolage technique, combining the starting ECB assessment system with a literature review on key success factors of banks' DT. The bricolage technique aims to combine various existing concepts from sufficiently diverse sources in a sensible way to create a theory. In our study, we acknowledge the immense work behind the ECB's assessment system; thus, we rely on it instead of starting from scratch. Next, we aim to combine it with sufficiently diverse sources. It should be noted that both the ECB's system and our intended model aim to assess how successful a bank's DT will be from a forward-looking perspective.

Hence, their criteria essentially describe the KSF of banks' DT. Thus, we conclude that a literature review on KSF of banks' DT would generate important insights for integrating the literature into the model. Given the absence of such a literature review, we conduct it as an intermediary step for our study. For the literature review, we include grey literature, in particular, relevant publications of reputable consulting firms, given the lack of relevant academic sources.

The conducted literature review on KSFs of banks' DT partly draws on the methodological steps suggested by Annarelli et al. [26], and builds upon five relevant sources. Our inclusion criteria for choosing academic papers were to be in English, to appear in "Web of Science" (ensuring high-quality content), and to be relevant for the banks' DT (based on the author's judgement). The literature review has been summarized with the logic of the concept matrix following Webster and Watson [16], and its main points are compared against and combined with the initial ECB assessment system.

For simplicity, the opposites of banks' challenges are represented as KSF. Finally, juxtaposing the ECB's assessment system with the literature review on KSFs of banks' DT aims to develop a comprehensive model, where the literature review's additional insights are integrated into the model, while overlapping points support the ECB framework and suggest areas for refinement.

Second, to make our model more parsimonious, we use scientific abstraction and combine the original 14 assessment criteria into the SABBMDT model's 7 components. Usually, when invited to improve things, people systematically default to searching for additive transformations, and consequently overlook subtractive transformations, unless reminded firmly about the latter [27].

Subtractive transformations can also help to make the model more parsimonious. As Bacharach states, the theory's purpose of a theory is to organize parsimoniously and communicate clearly [24]. To decrease the complexity of the ECB's system, we rearrange the criteria, resulting in model components' reduction. This rearrangement considers that SABBMDT is designed for BM sustainability assessment integration, contrary to its predecessor (divided across BM, governance (SREP's 2nd element) and risk management (SREP's 3rd element)) [12]. Here, scientific abstraction does not remove the initial criteria, but

makes the model's components more compact. This approach can be interpreted as shifting complexity to the lower levels of assessment. This makes the model parsimonious while allowing expandability when needed.

During this process, three components of the SABBMDT model retained the original criteria, while the other four components hosted two original criteria and the last component combined five of them. By default, such combinations lower the combined criteria's weight in contrast to non-combined ones (non-combined criteria's weight increases from 1/14 to 1/7, while combined ones' weight either stays the same or decreases depending on how many initial criteria were combined). However, since the SREP framework takes into account the stringency of discovered shortcomings, a serious shortcoming can still materially affect the final score regardless of combinations.

Third, we explore and articulate the SABBMDT model's components' interlinkages as part of model development and in line with SREP. Although models are not always expected to explain (or prove empirically) the relationships among the model's components, the identification of interlinkages and their interplay is crucial. Moreover, the guidelines of SREP support the idea of making use of interlinkages by stating that the outcome of the BM assessment should support the assessment of all other elements of the SREP [28]. In the current study, however, we focus on interlinkages within the model rather than interlinkages across all SREP elements. We present the linkages in a matrix form with directional arrows.

Research Results

In this section, we juxtapose the intermediary literature review with the ECB assessment system to include important missing elements, then present the SABBMDT model's components and lastly, present and explain the interlinkages among the model's components. The resulting SABBMDT model's high-level structure is presented in Table 1, where the first column exhibits the seven components of the model, while the second and third columns show, respectively, the underlying ECB criteria and the main additions stemming from DT KSF's literature review. We did not observe any contradicting points against the ECB model. Meanwhile, many KSFs from the literature review align with the original ECB assessment system proving the latter's robustness. The color-coding of the second column is according to the ECB's criteria, divided into 3 groups: business model and strategy (bleached almond), governance (peach bud) and risk management (pale blue).

The intersections between the literature review insights and the ECB's system are discussed in the descriptions below. Since the original ECB's system is approximately 16 pages long, we will not reproduce it here. Instead, we will mention the resulting SABBMDT model's each component, the ECB criteria on which they are based and the key implications from the combination of the ECB's system with the literature review's KSFs (i.e., additions, contradictions and consistence). For the first component, we incorporate findings from our previous research.

The SABBMDT model's first component is "Business environment analysis and banks' digital maturity" and is based on the ECB's "Business environment" criterion. ECB explains that it is based on both external factor analysis and internal capability assessment; hence, we

add digital maturity in the title to emphasize its equal importance. Moreover, KSF 10 highlights the importance of reviewing existing business processes and assessing the interoperability of current systems for the internal capability assessment.

The second component, "DT strategy formulation and definition" combines the ECB criteria "digital strategy formulation and definition" and "data governance framework". The combination is justified because the DT strategy should be both customer-centric and data-centric (KSF 3).

Table 1

SABBMDT model, underlying the ECB's digitalisation assessment criteria and main additions based on the conducted literature review

SABBMDT model components	ECB's digitalisation assessment criteria (May 2024)	Additions based on the literature review on KSFs of banks' DT and previous research
1. Business environment and bank's digital maturity	1. Business environment	1. Integration of PESTEL, AHS, and Porter's Five Forces [15] 2. Business process review and check on existing systems' interoperability (KSF 1)
2. Digital Transformation (DT) strategy formulation and definition	2. Digital strategy formulation and definition	3. Chief Data Officer with clearly defined responsibilities (KSF 9) 4. Having a Roadmap (KSF 1) 5. Top Management support (KSF 2) 6. Cooperation with DT experienced companies and not very slow changes (KSF 12)
	12. Data governance framework	
3. Execution Capabilities	3. Execution Capabilities	7. Recruitment of technical knowledge staff instead of outsourcing (KSF 8)
4. KPI system	4. KPI system	-
5. Coordinating and Communicating of DT strategy implementation	5. Coordination and steering of digital initiatives	1. Investment needs in corporate culture change to develop the DT mindset (KSF 4) 2. Develop and trigger employees' ability to sense and materialize opportunities (KSF 9) 3. Leadership (KSF 12)
	9. Digitalisation risk culture	
4. Monitoring and Reporting	6. Monitoring and Reporting	-
	7. The management body in its supervisory function/non-executives' capacity to challenge	
5. Involvement of internal control functions	8. Internal control functions' involvement in decision-making on digitalisation	-
	10. Assessment of critical dependencies	
	11. Risk identification	
	13. Risk modelling	
	14. Update of the risk appetite framework, the risk management framework and key risk indicators	

In terms of alignment, KSF 1's requirement for the DT strategy to be aligned with the business strategy matches the ECB's explanation. In addition, KSF 9 suggests that having a CDO with clear responsibilities is important for successful DT. Moreover, KSF 1 recommends that the DT strategy should have a defined roadmap, and KSF 2 adds the importance of top management support, which can be added to the second component, given that DT starts from the strategy formulation. Lastly, KSF 12 suggests that the DT strategy should avoid overly slow changes and cooperation with companies that have successful DT experience.

The third component, "Execution capabilities" builds upon the ECB's eponymous criterion. KSF 5 highlights the importance of rationalized and justified cost planning, given that DT expenses tend to surpass initial levels, which supports the ECB's suggestion to have a cost-benefit analysis as a rationale for budgeting the costs. Moreover, conducting a cost-benefit analysis for DT projects will help identify more profitable projects and facilitate the prioritization process.

Such cost planning should, in principle, include the remuneration of staff with technical knowledge, who, according to KSF 8, are recommended to be recruited rather than outsourced. Additionally, a clear allocation of resources can be observed through the separation of Information Technology (IT) and DT budgets. Such a distinction can signify that the bank has a clear view on cost planning as IT expenses tend to be "to-run" costs, while DT requires "to-change" costs.

Next, the fourth component, "KPI system" largely relies on the ECB's criterion with the same name. It aligns with KSF 6. Moreover, it serves as a bridge between DT strategy formulation, execution, monitoring and reporting; therefore, it is no surprise that this particular component is highly linked with other components (discussed later in the section).

The fifth component "Coordination and communication of DT strategy implementation" builds upon ECB's criteria "coordination and steering of digital initiatives" and "digitalisation risk culture".

Regarding this component, the literature review focuses on changes in corporate culture. First, KSF 4 highlights the importance of investments changing the corporate culture to develop a DT mindset and to make the organizational structure flatter to push the decision-making to lower levels, where decisions would be supported by data. KSF 7 is in line with the ECB's elaboration on the importance of effective communication. At the same time, KSF 9 suggests that corporate culture should encourage employees to sense and materialize opportunities (innovations). Moreover, according to KSF 11, the bank should manage employees' expectations and equip them with the necessary technical tools. Lastly, KSF 12 highlights the importance of leadership and project management skills, which are relevant for the coordination of DT.

The last two components do not intersect with the literature review, but do combine in seven original criteria at once. In particular, the sixth component "Monitoring and Reporting" combines the ECB's "Monitoring and Reporting" and "The management body in its supervisory function/non-executives' capacity to challenge" criteria. And finally, the seventh

component "Involvement of internal control functions" combines the internal control function-related five criteria (see Table 1).

These combinations are justified given their overall purpose: the challenging follows the reporting and monitoring procedure, while the remaining criteria directly assess the internal control functions' participation in a bank's DT. Even though such a combination might decrease the contribution of internal control assessment to the overall DT score, this approach is justified for two reasons.

Table 2

The interlinkages within the SABBMDT model

	1	2	3	4	5	6	7
1							
2	↓ DT objectives						
3	↓ The rationale for a cost-benefit analysis	Bringing rationale for innovative projects ↑					
4		↓ KPIs and remuneration policies					
5				Involvement in KPI development ↕			
6		↓ data governance policies	↓ clearly defined budget and projects	↕ to include the KPI system	↓ assigning responsibilities		
7		identification of DT risk ↑		Involvement of KRIs ↕			

First, SABBMDT is integrated into the BM sustainability assessment and should be broadly aligned with the performance of risk management functions, which is assessed in more depth under the SREP elements "corporate governance" and "risks to capital". Second, depending on the severity of the identified issues, the supervisor can always adjust the component's weight in the overall DT score.

Finally, after the integration of literature review insights in the model and making it parsimonious, we explore the interlinkages of the model's components. The latter are depicted in Table 2, where the "down" arrow means that an issue in the header row translates into (influences) the intersecting row's component. An arrow "up" means that the given row's component influences the header row's component.

In some cases, where components are likely to influence each other, we use two-sided arrows. For simplicity, we write the components' order number (consistent with Table 1's ordering) instead of their names. It is to be noted that the presented interlinkages do not include the influence of DT assessment on overall SREP elements and do not comprise an exhaustive list of all potential linkages, but an attempt to capture the most prominent linkages through reasoning.

First, shortcomings in the first component are likely to cause problems for the second and the third components. This is because the DT strategy and cost-benefit analysis largely rely on the business environment analysis and the bank's internal capabilities. Next, the issues in the second component, "DT strategy formulation and definition" will carry over to the KPI system (component 4) and related remuneration policies, as the KPI system should be entirely based on and interconnected with the strategy. Moreover, the data governance policies are likely to influence the monitoring and reporting capabilities of the bank (component 6). At the same time, the robustness of cost-benefit analysis influences prioritization and, therefore, the coherence of the DT strategy. Also, the DT risk identification assessed under component 7 influences the formulation of the DT strategy (component 2). Third, issues in DT projects' operational plans (component 3) will negatively affect the monitoring and reporting (component 6). Regarding the KPI system (component 4), it is closely linked to both DT strategy coordination (component 5), monitoring and reporting (component 6), as well as risk indicators (component 7), where the first two use the progress or profitability tracking KPIs, while the third one provides additional measures from a DT risk perspective. Lastly, DT strategy coordination influences the Monitoring procedure by assigning reporting responsibilities.

Discussion

In this study, we enhance the existing state-of-the-art supervisory assessment system of banks' DT by applying the steps and principles of theory-building methodology in management studies. We aim to extend the academic discussion around the supervision of banks' DT started by our prior study, considering its importance, evolving nature of the topic (DT), as well as the applied scientific technique (bricolage).

This study's main contribution to the literature is the SABBMDT model, which is scientifically more grounded than its predecessor. First, we apply the theory-building methodology proposed by Shepherd and Suddaby and enhance the existing assessment system with an intermediary literature review on KSFs of banks' DT using the bricolage technique. Second, we make the model more parsimonious by combining the original ECB assessment criteria into the model's components, thus lowering the model's high-level complexity. Third, we articulate potential linkages among the model's components.

This study has three main limitations. The main limitation concerns the conducted intermediary literature review. Ideally, the model enhancement would require a systematic literature review on the topic; however, given the study's primary interest, the conducted literature review was deemed sufficient for the purpose of the study. Nevertheless, we can notice that the conducted literature review didn't cover all components of the model, indicating areas for further improvement. The second limitation is due to the applied bricolage technique, which does not produce a definitive model. In addition, the rapid pace of fintech developments requires continuous updating. Finally, the third limitation concerns the judgment-based changes applied to the model and the exploration of interlinkages among the model's components, because the criteria grouping and the identification of interlinkages were conducted by a single researcher.

Conclusion

This study contributes to enhancing the supervisory assessment of banks' DT. More specifically, the study explores the key success factors and challenges during banks' DT and incorporates them into the existing state-of-the-art assessment system suggested by the ECB. Given the importance of the topic and the fast-changing nature of fintech developments, future research is needed to refine the model.

Therefore, we propose the following research agenda. First, given the growing importance of DT, we suggest conducting a systematic literature review on key success factors and/or challenges of digital transformation, which can later be applied to different sectors, including the banking sector. Second, we propose exploring ways to provide a more rigorous justification for the grouping of assessment criteria into model components, as well as the identification and explanation of interlinkages among the model's components.

References

1. Gambacorta, L., Huang, Y., Li, Z., Qiu, H., & Chen, S. (2023). Data versus Collateral // Review of Finance, 27(2), 369–398. https://doi.org/10.1093/rof/rfac022
2. Berg, Tobias and Burg, Valentin and Gombović, Ana and Puri, Manju, On the Rise of FinTechs – Credit Scoring Using Digital Footprints (July 15, 2019) // Michael J. Brennan Irish Finance Working Paper Series, Research Paper No. 18-12, Available at SSRN: https://ssrn.com/abstract=3163781 or http://dx.doi.org/10.2139/ssrn.3163781
3. Basel Committee of Banking Supervision. (2024). Digitalisation of finance. https://www.bis.org/bcbs/publ/d575.pdf
4. Can A, Huizinga H. Digital transformation: Why do some significant banks fall behind? Brussels: Economic Governance Support Unit, European Parliament; 2021. Availablefrom:https://www.europarl.europa.eu/RegData/etudes/IDAN/2021/689440/IPOL_IDA(2021)689440_EN.pdf
5. Beccalli, E. (2007). Does IT investment improve bank performance? Evidence from Europe // Journal of Banking & Finance 31(7), 2205–2230.

6. Kriebel, Johannes and Debener, Jörn, The Effect of Digital Transformation on Bank Performance (September 30, 2019). Available at SSRN: https://ssrn.com/abstract=3461594 or http://dx.doi.org/10.2139/ssrn.3461594
7. European Banking Authority. (2025). Consultation paper on draft guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP) and supervisory stress testing under Directive 2013/36/EU (EBA/CP/2025/21). European Banking Authority.
8. Manukyan, H. (2025). Designing a digital transformation supervisory framework for banks under SREP: The Armenian case // Alternative, 165–172. https://doi.org/10.55528/18292828-2025.2-165
9. Coelho, R., Monteil, A., Pozdyshev, V., & Svoronos, J.-P. (2022). Supervisory practices for assessing the sustainability of banks' business models (FSI Insights on Policy Implementation No. 40). Bank for International Settlements.
10. Basel Committee on Banking Supervision. (2024). Core principles for effective banking supervision. Bank for International Settlements.
11. European Central Bank. (2019). SSM supervisory priorities 2020. https://www.bankingsupervision.europa.eu/framework/priorities/html/ssm.supervisory_priorities2020~b67449d936.en.html
12. ECB. (2024). Digitalisation: key assessment criteria and collection of sound practices. Retrieved May 1, 2025. https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.reportondigitalisation_202407~3f4de7a771.en.pdf
13. ECB. (2024). A key step in assessing SSM banks' digitalization journey and related risk. https://www.bankingsupervision.europa.eu/press/blog/2024/html/ssm.blog240711~db8cfa5ca6.en.html
14. Pritchard S. (Financial Conduct Authority). (2024, June 13). Toronto Innovation Centre opening ceremony: Panel on open finance and innovation [Video]. YouTube. Retrieved May 1, 2025, from https://www.youtube.com/watch?v=3Q1PgDiCaug
15. Manukyan, H. (2024). Toward effective digital transformation supervision: A managerial perspective based on ECB criteria // Armenian Journal of Public Administration (2), 97–110. https://doi.org/10.55490/18290167-2024.2-97
16. Webster, J., & Watson, R. T. (2002). Analyzing the Past to Prepare for the Future: Writing a Literature Review // MIS Quarterly (Vol. 26, Issue 2).
17. Mctaggart, V., & Loonam, J. (2024). Exploring Top Management Support for Digital Transformation: A Case Study of a European Financial Services Organization // IEEE Transactions on Engineering Management, 71, 13787–13801. https://doi.org/10.1109/TEM.2023.3299033
18. Rodrigues, L. F., Oliveira, A., & Rodrigues, H. (2023). Technology management has a significant impact on digital transformation in the banking sector // International Review of Economics and Finance, 88, 1375–1388. https://doi.org/10.1016/j.iref.2023.07.040

19. Correani, A., de Massis, A., Frattini, F., Petruzzelli, A. M., & Natalicchio, A. (2020). Implementing a Digital Strategy: Learning from the Experience of Three Digital Transformation Projects // California Management Review, 62(4), 37–56. https://doi.org/10.1177/0008125620934864
20. McKinsey & Company, Inc. (2023). Why most digital banking transformations fail—and how to flip the odds, https://www.mckinsey.com/capabilities/mckinsey-digital/our-insights/tech-forward/why-most-digital-banking-transformations-fail-and-how-to-flip-the-odds
21. Deloitte, (2024). Navigating tech-enabled transformation of core banking processes. Part 1-5. https://www.deloitte.com/ch/en/Industries/financial-services/blogs/navigating-tech-enabled-transformation-of-core-banking-processes-part-1.html
22. Easterby-Smith, M., Thorpe, R., Jackson, P.R., & Jaspersen, L.J. 2018 // Management & Business Research (6th edition). Thousand Oaks, CA: Sage.
23. Shepherd, D. A., & Suddaby, R. (2016). Theory Building: A Review and Integration // Journal of Management, 43(1), 59-86. https://doi.org/10.1177/0149206316647102
24. Bacharach, S. B. 1989. Organizational theories: Some criteria for evaluation // Academy of Management Review, 14: 496-515.
25. Whetten, D. A. 1989. What constitutes a theoretical contribution? // Academy of Management Review, 14(4): 490-495.
26. Annarelli, A., Battistella, C., Nonino, F., Parida, V., & Pessot, E. (2021). Literature review on digitalization capabilities: Co-citation analysis of antecedents, conceptualization and consequences // Technological Forecasting and Social Change, https://doi.org/10.1016/j.techfore.2021.120635
27. Adams, G. S., Converse, B. A., Hales, A. H., & Klotz, L. E. (2021). People systematically overlook subtractive changes /// Nature, 592(7853), 258–261. https://doi.org/10.1038/s41586-021-03380-y
28. European Banking Authority. (2022). Final report on amending Guidelines on common procedures and methodologies for SREP and supervisory stress testing. https://www.eba.europa.eu/activities/single-rulebook/regulatory-activities/supervisory-review-and-evaluation-process-srep-4

H.H. Manukyan

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ԲԱՆԿԵՐԻ ԹՎԱՅԻՆ ՓՈԽԱԿԵՐՊՄԱՆ ՎԵՐԱՀՍԿՈՂՈՒԹՅՈՒՆ. ԵԿԲ-Ի ԹՎԱՅՆԱՑՄԱՆ ԳՆԱՀԱՏՄԱՆ ՉԱՓԱՆԻՇՆԵՐԻ ՎՐԱ ՀԻՄՆՎԱԾ ԲԲՄԹՓՎԳ ՄՈԴԵԼԸ

Հ.Հ. Մանուկյան

ՀՀ պետական կառավարման ակադեմիա

Տվյալ հետազոտությունը նպատակ ունի բարելավել բանկերի թվային փոխակերպման (ԹՓ) վերահսկողական գնահատման համակարգը՝ հաշվի առնելով վերջինիս նոր բնույթը: Առկա ամենաառաջադեմ գնահատման համակարգը գիտական մոդելի վերածելու նպատակով կիրառվել են տեսության մշակման մեթոդաբանություն և բրիկոլաժի տեխնիկա:

Հետազոտության գիտական նորույթը ստացված ԲԲՄԹՓՎԳ մոդելն է, որը ենթադրում է երեք հիմնական բարելավումներ Եվրոպական կենտրոնական բանկի՝ (ԵԿԲ) թվայնացման գնահատման համակարգի նկատմամբ: Նախ, ԵԿԲ-ի գնահատման համակարգը հարստացվել է բանկերի ԹՓ հաջողության գործոնների գրականության ակնարկի բացահայտումներով: Այնուհետև մոդելի բարդությունը նվազեցվել է՝ սկզբնական 14 չափանիշները մոդելի յոթ բաղադրիչներում ներառելու միջոցով: Վերջում բացահայտվում և մեկնաբանվում են մոդելի բաղադրիչների միջև հնարավոր կապերը:

Հետազոտության հիմնական սահմանափակումները պայմանավորված են իրականացված միջանկյալ գրականության ակնարկի ոչ համակարգային լինելով, կիրառված բրիլոկաժի տեխնիկայի սահմանափակումներով, ուսումնասիրվող ԹՓ ոլորտի արագ փոփոխվող բնույթով, ինչպես նաև մոդելի պարզեցման և կապերի բացահայտման դատողական մոտեցմամբ: Հետևաբար, որպես ապագա հետազոտական ուղղություններ առաջարկվում են ԹՓ գործընթացների հաջողության գործոնների շուրջ համակարգային գրականության ակնարկի իրականացումը, ինչպես նաև մոդելի տարրերի միավորումների և կապերի բացահայտման՝ գիտականորեն հիմնավոր մեթոդական քայլերի ուսումնասիրությունը:

Բանալի բառեր. բանկային վերահսկողություն, թվային փոխակերպում, ԵԿԲ, SREP, բիզնես մոդելի կայունություն:

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SUPERVISING BANKS DIGITAL TRANSFORMATION: THE SABBMDT MODEL BASED ON THE ECB DIGITALISATION ASSESSMENT FRAMEWORK

НАДЗОР ЗА ЦИФРОВОЙ ТРАНСФОРМАЦИЕЙ БАНКОВ: МОДЕЛЬ SABBMDT, ОСНОВАННАЯ НА СИСТЕМЕ ОЦЕНКИ ЦИФРОВИЗАЦИИ ЕЦБ

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Целью настоящего исследования является совершенствование системы надзорной оценки цифровой трансформации банков с учетом ее новизны. Для того чтобы поднять существующую систему оценки до уровня научной модели, в исследовании применяется методология построения теории и метод бриколажа.

Научная новизна исследования заключается в полученной модели SABBMDT, которая представляет собой три основных улучшения по сравнению со своей предшественницей - системой оценки цифровизации Европейского центрального банка (ЕЦБ). Во-первых, система ЕЦБ была обогащена результатами обзора литературы по ключевым факторам успеха цифровой трансформации банков. Во-вторых, модель стала более лаконичной после объединения исходных 14 критериев в 7 компонентов модели. В-третьих, исследование выявляет и объясняет потенциальные взаимосвязи между компонентами модели.

Основные ограничения исследования включают несистематический характер проведенного промежуточного обзора литературы, ограничения метода бриколажа и быстрые темпы цифровой трансформации, требующие постоянного совершенствования модели, а также принятие решений на основе экспертной оценки при сочетании критериев и выявлении взаимосвязей. Таким образом, будущие исследования должны включать систематический обзор литературы по ключевым факторам успеха цифровой трансформации, а также изучение потенциальных способов научного обоснования сочетания критериев и выявления взаимосвязей.

Ключевые слова: банковский надзор, цифровая трансформация, ЕЦБ, SREP, устойчивость бизнес-модели.

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