Multidimensional Analysis of Competitiveness of Systemically Important European Banks: An Original Synthetic Measure Integrating Intellectual Capital and Financial Stability (2019–2024)

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Abstract

The competitiveness of systemically important banks has become a central concern for supervisors and bank management alike, yet it remains conceptually fragmented. Existing research captures it through separate lenses – financial efficiency and profitability, market power, prudential soundness, or, more recently, intellectual capital, and digital maturity – without an instrument that brings these dimensions together into a single, comparable measure. This fragmentation is consequential: a bank may appear highly competitive in terms of profitability while remaining fragile in prudential terms, or stable but lagging in the knowledge-based and digital assets that increasingly determine long-term advantage. For systemically important institutions, whose distress carries system-wide costs, a one-dimensional reading of competitiveness is therefore both incomplete and potentially misleading.

This article addresses that gap by constructing an original multidimensional synthetic measure of competitiveness (SMC) for systemically important European banks and by building a ranking of these institutions on its basis. The measure integrates five layers: economic capital (return on equity, return on risk-adjusted assets, net interest margin, operating costs), prudential stability (total capital ratio, Tier 1 ratio, net stable funding ratio, asset quality, loan-to-deposit ratio) and three layers of intellectual capital – innovativeness, organisational, and institutional, the latter incorporating ESG performance. By treating prudential stability and intellectual capital as components of competitiveness rather than as separate research streams, the study reframes competitiveness as a composite capability that jointly reflects financial performance, resilience, and knowledge-based assets.

The study covers 22 systemically important institutions (G-SIBs and O-SIIs) from ten European countries over the period 2019–2024: Erste Group (Austria); KBC Group (Belgium); Danske Bank (Denmark); BNP Paribas, Crédit Agricole, Groupe BPCE and Société Générale (France); Deutsche Bank, Commerzbank, DZ Bank, BayernLB, and LBBW (Germany); Intesa Sanpaolo and UniCredit (Italy); ING Group and Rabobank (the Netherlands); DNB (Norway); Banco Santander and BBVA (Spain); and Nordea, Swedbank, and SEB (Sweden). The selected time window is deliberate: it captures a period shaped by the normalisation of interest rates, the maturing of ESG and digital-

operational regulation, and renewed supervisory attention to financial stability – conditions under which the relative weight of the competitiveness pillars is most likely to shift.

Methodologically, the measure is built using the linear ordering method with zero-unitarisation of the partial indicators and weighted aggregation across layers. The robustness of the resulting ranking is verified across variants that differ in the normalisation method and the weighting scheme. Drawing on the SMC values, we rank the banks and classify them into competitive groups and then decompose the measure into its constituent layers in order to establish which dimensions most strongly differentiate the leading institutions and what is the relative contribution of prudential stability and intellectual capital to the advantage they build.

The contribution is twofold. Methodologically, the article delivers a transparent and transferable tool for measuring bank competitiveness that integrates prudential and intangible dimensions previously treated in isolation. Empirically, it provides a comparative ranking of Europe's most significant banks, offering supervisors and bank managers an evidence base to understand where the competitive advantage in European banking currently lies.

Keywords: bank competitiveness, intellectual capital, financial stability, synthetic measure, linear ordering, systemically important banks, European Union

JEL classification: G21, G28, C43

1. Introduction

Contemporary bank competitiveness cannot be equated with profitability, financial efficiency or current market position alone. Banking research approaches these phenomena from different perspectives – competition and market power, efficiency, financial performance, prudential soundness and, increasingly, digital transformation, intellectual capital, ESG and resilience. A one-dimensional assessment may therefore be misleading: high profitability does not ensure loss-absorption capacity, while strong capitalisation does not automatically imply an ability to innovate, reconfigure processes and maintain stakeholder relationships. This is particularly important for systemically important banks, whose distress may generate negative externalities for the financial system (Beltratti & Stulz, 2012; Berger & Bouwman, 2013; Angilella et al., 2024; Llorent-Jurado et al., 2024; Dedeloudis et al., 2025).

Systemically important banks are institutions whose size, importance for the economy, complexity and interconnectedness make their distress potentially relevant for financial stability. European prudential architecture distinguishes global systemically important institutions/banks (G-SIIs/G-SIBs) and other systemically important institutions (O-SIIs), identified under harmonised criteria supplemented by supervisory judgement. The EBA identifies size, importance, complexity

and interconnectedness as the core assessment dimensions; its 2026 update identified 172 O-SIIs, subject to systemic buffers ranging from 0.25% to 3% (EBA, 2026). Systemic importance therefore strengthens the case for analysing competitiveness jointly with soundness and continuity of critical financial functions.

A necessary starting point is the distinction between competition, efficiency and competitiveness. Competition describes market structure and rivalry and is commonly assessed with concentration measures, the Lerner index or the Boone indicator. Efficiency concerns the ability to transform inputs into outputs. Competitiveness, by contrast, is an institution-level capability to mobilise, develop and reconfigure resources so as to build, maintain and renew advantage in a changing environment. This dynamic interpretation is consistent with multicriteria bank assessment, the dynamic-capabilities literature and systemic approaches to competitiveness (Doumpos & Zopounidis, 2010; Ali et al., 2021; Angilella et al., 2024; Rosińska-Bukowska, 2017; Anielak-Sobczak, 2023).

For systemically important banks, two dimensions are foundational. Economic performance determines the capacity to create value, control costs and finance development; prudential stability – capital, liquidity, asset quality and funding structure – determines the capacity to absorb losses and continue core functions. The competition-stability literature shows that the relationship between profitability, risk and stability is contextual rather than mechanical (López-Penabad et al., 2021; Tran, 2024; Skvarciany, 2025; Dedeloudis et al., 2025). Zielińska-Lont (2020) reaches a compatible conclusion for European banks: tighter capital and liquidity requirements can reduce failure risk while imposing costs on profitability. Competitive advantage in a SIB therefore cannot be built at the expense of prudential capacity.

On this foundation, intangible assets have become increasingly important. Knowledge, employee capabilities, technology, processes, relationships and reputation shape the way financial and physical assets are used. Recent banking studies connect intellectual capital and digital capabilities with productivity, performance and competitive advantage, while also stressing complementarity and organisational implementation (Phan & Le, 2024; Rong et al., 2025; Fayad et al., 2025; Pilatin & Pelenk, 2026). Intangibles are therefore treated not as substitutes for economic and prudential resources, but as multipliers that can improve productivity, scalability, adaptation and stakeholder relationships.

The study operationalises intellectual capital through three interdependent subsystems – innovative, organisational and institutional capital – with human capital treated as the integrating foundation that permeates all three. This follows the systemic framework developed by Rosińska-Bukowska (2019, 2020, 2022) and applied to banking by Anielak-Sobczak (2023), but remains

functionally compatible with the dominant human-structural-relational tradition: human knowledge is converted into innovation and organisational routines, while external relationships and reputation form the institutional dimension. This functional decomposition is particularly suitable for a bank-level synthetic measure because it distinguishes adaptation, organisational scaling and institutional legitimacy without creating an artificial fourth empirical layer for human capital.

Accordingly, multidimensional bank competitiveness is represented by five SMC layers: economic performance, prudential stability, innovative capital, organisational capital and institutional capital. The last three are empirical manifestations of intellectual capital rather than categories independent of it. Each layer performs a different function - value generation, loss absorption, adaptation, resource reconfiguration and trust/legitimacy – and their interaction provides a basis for resilience. Resilience is not introduced as a sixth SMC layer; it is interpreted as the realised ability to deploy this multidimensional competitive base under disruption. A high SMC does not mechanically guarantee resilience, but a diversified and complementary competitive configuration can provide a stronger foundation for absorption, adaptation and recovery.

The article aims to assess the multidimensional competitiveness of systemically important European banks in 2019-2024 using an original synthetic measure of competitiveness (SMC). The analysis combines three weighting scenarios, Spearman rank correlations and a cross-scenario consensus ranking. The contribution is methodological – integrating economic, prudential and intangible dimensions in one replicable framework – and empirical, by showing how the ranking of major European banks changes when the relative importance of these dimensions is altered.

On this basis, the study formulates research hypothesis H1: the competitiveness of European systemically important banks is multidimensional, and a persistently high competitive position is associated with the complementary coexistence of economic performance, prudential stability and intellectual-capital components, which together provide a foundation for building bank resilience. In the framework adopted here, resilience is not a separate sixth dimension of competitiveness, but a capability developed on the basis of interaction between economic, prudential and intangible sources of advantage. The empirical assessment of H1 focuses on the complementarity of these dimensions, the persistence of banks' positions over 2019–2024 and the robustness of advantage to alternative measurement assumptions; the resilience interpretation indicates that such a configuration strengthens the conditions supporting shock absorption, adaptation and recovery.

H2. The competitive position of systemically important banks is sensitive to the weighting structure assigned to individual dimensions of competitiveness; however, banks with the most

balanced competitive profile maintain a relatively high position irrespective of the adopted weighting scenario.

2. Literature review

The literature on bank competitiveness has long focused on market rivalry and financial outcomes. Competition studies focus on market concentration and market power, while institution-level performance studies commonly rely on ROA, ROE, NIM and cost measures (Bikker & Bos, 2008; Claessens, 2009; Mirzaei & Moore, 2014; Vives, 2016). The global financial crisis demonstrated, however, that pre-shock profitability does not necessarily imply durable strength: capitalisation, funding and balance-sheet structure materially affect banks' capacity to perform during stress (Beltratti & Stulz, 2012; Demirgüç-Kunt et al., 2013; Berger & Bouwman, 2013).

A growing body of work supports a multidimensional approach. Multicriteria studies show that bank condition cannot be credibly reduced to a single ratio because performance, capital, liquidity, asset quality and risk jointly matter (Doumpos & Zopounidis, 2010; Angilella et al., 2024; Llorent-Jurado et al., 2024). Research on composite indicators further demonstrates that rankings of complex phenomena depend on pillar selection, aggregation and weighting (Nečadová, 2020; Gudemann & Münnich, 2023). Bibliometric evidence further confirms that the underlying concepts of bank efficiency and competition remain fragmented across the literature, reinforcing the case for an integrative measurement approach (Doku & Nabieu, 2024), while recent hybrid methodologies combining Data Envelopment Analysis with machine learning and explainable-AI techniques illustrate a broader shift toward multidimensional, data-intensive competitiveness assessment (Zhao, 2025). The systemic competitiveness approach developed by Rosińska-Bukowska (2017) and applied to banking by Anielak-Sobczak (2023) is consistent with this broader evidence: competitiveness is interpreted as a configuration of resources, capabilities and outcomes rather than a static annual result.

Economic performance remains the first foundation. Profit generation, margins and cost control create resources for investment, development and post-shock recovery, but financial performance is not a complete equivalent of competitive performance. Klimontowicz and Majewska (2022) treat the two as connected but distinct outcomes, while Phan and Le (2024) show that bank performance in a knowledge-intensive sector depends not only on financial resources and labour but also on the use of knowledge, processes and technology.

Prudential stability forms the second foundation. Tier 1 capital, NSFR, funding structure and asset quality determine loss-absorption capacity and the continuity of intermediation. López-Penabad et al. (2021), Tran (2024), Skvarciany (2025) and Dedeloudis et al. (2025) document the importance of capital, liquidity and asset quality for bank stability and resilience. Zielińska-Lont (2020) provides

a directly relevant European composite measure combining profitability, loss-covering capacity and liquidity, showing that prudential tightening may lower failure risk while simultaneously affecting profitability. These streams justify keeping economic performance and prudential stability as separate but complementary SMC layers.

A third stream concerns intangible assets and intellectual capital. Banks are information- and trust-intensive organisations in which employee knowledge, organisational systems, technology, customer relationships and reputation have direct implications for productivity and service quality. Oppong and Pattanayak (2019), Rehman et al. (2022), Nawaz and Ohlrogge (2023), Phan and Le (2024), Rong et al. (2025), Anielak-Sobczak and Florczak (2026), and Pilatin and Pelenk (2026) show that IC adds explanatory information beyond conventional financial ratios.

Innovative capital is understood not as the simple number of technologies but as the ability to identify, absorb, implement and scale new solutions. Kolodiziev et al. (2021) link digital transformation to bank competitiveness; Fayad et al. (2025) demonstrate the productivity relevance of software and digital capability; and Alfhaili et al. (2026), Mutiara (2025) and Sudirman et al. (2026) underline that technological investment creates value only when organisationally embedded. Milojević and Redžepagić (2021) reach a compatible conclusion for risk management, showing that artificial intelligence and machine learning are becoming embedded across credit, market, liquidity and operational risk functions and therefore should be understood as an organisationally diffused competence rather than a stand-alone tool. Pilatin and Pelenk (2026) provide particularly recent evidence that innovation performance and big-data capabilities strengthen the transformation of intellectual capital into competitive advantage in banking.

Organisational capital captures the conversion of knowledge, employees, infrastructure and technology into repeatable and scalable processes. Indicators based on branches and employment therefore require contextual interpretation: reductions may signal efficiency-enhancing digital migration, but they may also represent lost organisational capacity if not accompanied by process redesign and customer migration. Mohammad et al. (2024), using employees from 22 banks, show that organisational learning is positively associated with innovation and that employee resilience and work engagement mediate this relationship.

Institutional capital comprises trust, reputation, stakeholder relations and the ability to respond to institutional expectations. In the SMC it is proxied by an ESG score and a Weighted Reward Index (WRI). ESG is not treated as competitiveness itself: Chen et al. (2025) and Zarea et al. (2026) report heterogeneous relationships between ESG dimensions and bank outcomes; a European study by Bătae et al. (2021) similarly finds that environmental and social performance relate to bank financial outcomes less consistently than governance quality, further justifying the treatment of ESG as a

reputational rather than a directly performance-determining signal. WRI is interpreted as external reputational validation rather than evidence of profitability or prudential soundness.

Taken together, these streams provide a functional interpretation of resilience. Economic performance creates and replenishes resources; prudential stability absorbs losses and supports continuity; innovative capital supports adaptation; organisational capital mobilises and reconfigures resources; and institutional capital helps preserve trust and legitimacy. Resilience is therefore interpreted as the realised deployment of multidimensional competitiveness under disruption, not as an additional sixth dimension of the measure.

Table 1. Conceptual justification of the five SMC layers

SMC layer	Theoretical role	Function for competitiveness and resilience	Selected literature
Economic performance	Economic base	Value generation; resources for development and recovery	Klimontowicz & Majewska (2022); Llorent-Jurado et al. (2024)
Prudential stability	Prudential base	Capital, liquidity, asset quality; loss absorption and continuity	López-Penabad et al. (2021); Tran (2024); Dedeloudis et al. (2025)
Innovative capital	IC component	Technology absorption, implementation and adaptation	Lee & Wang (2023); Fayad et al. (2025); Pilatin & Pelenk (2026)
Organisational capital	IC component	Scaling knowledge and resources; productivity and reconfiguration	Mohammad et al. (2024); Rong et al. (2025)
Institutional capital	IC component	Trust, reputation and legitimacy; ESG/WRI signals	Chen et al. (2025); Zarea et al. (2026)

Note: innovative, organisational and institutional capital are empirical representations of intellectual capital in the SMC; human capital is treated as the foundation permeating all three.

3. Data and methodology

The dataset was constructed specifically for this study from multiple sources. Financial and prudential data were obtained primarily from LSEG Data & Analytics and cross-checked against annual reports, financial statements, Pillar 3 disclosures and investor-relations materials. Several indicators were calculated by the authors rather than taken directly from bank disclosures: ROE and NIM were recalculated under a uniform procedure, Loan Quality was derived as the share of non-performing loans in the gross customer-loan portfolio, and a uniform historical NSFR approximation was applied because reported NSFR values were not consistently available for the full period. Data for innovative, organisational and institutional capital required additional manual collection from annual and sustainability reports, strategic presentations, press releases, industry sources and individual bank websites. The Weighted Reward Index was particularly data-intensive: awards were identified and verified separately for each bank and year and then coded under a common weighting

hierarchy. Consequently, a substantial part of the dataset – especially non-financial variables and derived indicators – is author-constructed rather than downloaded from a single database.

A uniform search and coding protocol was applied to the non-financial variables. Information was identified separately for each bank and year, assigned to the relevant category using the same criteria and then checked against available primary and industry sources. For the WRI, an award had to be confirmed and assigned to a predefined weight class; repeated references to the same award were not treated as separate observations. Similarly, the innovation layer is based on publicly disclosed activity and therefore captures observable intensity of implementations and communicated projects rather than the bank's entire unobservable stock of innovativeness. This procedure improves replicability while avoiding the assumption that non-disclosure is equivalent to absence of the underlying capability.

The study compares systemically important European banks over 2019-2024 using a dedicated synthetic measure built on five layers: economic performance, prudential stability, innovative capital, organisational capital and institutional capital. The procedure retains the original indicator selection, correlation-based reduction, standardisation, normalisation and three weighting scenarios, while extending conventional economic-prudential assessments with three empirical representations of intellectual capital.

- Economic performance initially includes Return on Equity (ROE), Return on Risk-Weighted Assets (RoRWA), Net Interest Margin (NIM) and operating costs. To improve comparability, ROE and NIM are calculated uniformly for all banks rather than copied mechanically from disclosed ratios. This layer represents the economic base of competitiveness: value creation, cost control and the capacity to finance development and recovery.
- Prudential stability – this category includes Tier 1 ratio, Net Stable Funding Ratio (NSFR), Credit/Deposit ratio and Loan Quality ratio. Loan quality ratio was calculated as a share of loans qualified as non-performing by the bank in a given year, compared to the gross value of customer loan portfolio in that year. Since NSFR values were not available for all the years of the analysis, an approximation of this indicator was calculated for the entire sample, as follows:

$$NSFR = \frac{C_D * w_1 + L_{TF} * w_2 + O_F * w_3 + P * w_4 + E * w_5}{L_C * w_6 + L_B * w_7 + D * w_8 + O_S * w_9 + F_A * w_{10}}$$

where:

C_D – customer deposits

L_{TF} – long-term funding

O_F – other funding

P – provisions

E – equity

L_C – loans to customers

L_B – loans to banks

D – derivatives

O_S – other securities

F_A – fixed & non-earning assets

w_x – weight applied to each component

The approach follows a similar approximation proposed by Gobat et. al.[1] This also required applying the following weights to the components – a summary of the weights applied has been presented in annex 1.

- Innovativeness – here, the score is calculated as the bank's share of publicly disclosed innovation activity of banks in a given year.
- Organisational capacity – this category reflects the operational efficiency of each institution, reflected through three indicators: the total number of customers per branch in a given year, the total number of customers per employee in the given year and income per employee.
- Institutional capital is proxied by the published ESG score for the parent entity, transformed to a 1-10 scale, and the Weighted Reward Index (WRI). WRI reflects the number and significance of awards received by each institution, using weights of 1 for global/regional awards, 0.75 for major national awards, 0.5 for themed awards and 0.25 for local or subsidiary-level distinctions. ESG is interpreted as a proxy for institutional/reputational alignment and WRI as external reputational validation; neither is treated as competitiveness in itself.

The full dataset covered the years 2019 to 2024. It was collected for 22 credit institutions that are, or have been over the years in question, included on the European Banking Authority's list of systemically important credit institutions. Following the data collection process, a decision was

[1] J. Gobat, M. Yanase, J. Maloney (2014), *The Net Stable Funding Ratio: Impact and Issues for Consideration*, IMF Working Paper, WP/14/106.

taken to remove four entities from further analyses due to incomplete or inconsistent publication of the necessary information[2].

Before the synthetic measure could be constructed, correlation matrices were calculated to eliminate indicators that carried very similar information, which could lead to double counting. Since ROE and RoRWA were very strongly correlated, RoRWA was removed from further analyses as a less popular indicator, the value of which could not be verified against publicly disclosed data. In the second iteration, strongest correlation was found between ROE and Income per employee, justifying the need to remove the latter from further analyses.

The final correlation matrix still included a relatively strong correlation of -0,598 between NSFR and Credit/Deposit ratio, but the decision was to retain both indicators in subsequent analysis. This was motivated by the fact that effectively they shared only 35,7% of their variance, suggesting that the risk of double counting is remote. It should also be noted that the negative correlation confirms the logic of the relationship between the indicators – considering that a high credit/deposit ratio suggests stronger reliance on less stable funding, NSFR can be expected to be lower. Finally, it deserves to be noted that the credit/deposit ratio provides a narrow measure of the extent to which customer lending is covered by customer deposits, whereas the NSFR is a broader regulatory measure incorporating the maturity and stability of funding sources.

The remaining set of 12 indicators was then categorised into stimulants (indicators, higher values of which are favoured) destimulants (indicators, lower values of which are favoured) and nominants (indicators, value of which should fall within a predefined range). The bulk of the indicators were identified as stimulants, with the exception of two destimulants (operating costs and loan quality) and one nominant, credit/deposit ratio, the desired range of which was defined as <80%;120%> following the more recent analyses of the indicator suggesting that above 100% ratio can still be deemed acceptable for banks with sophisticated liquidity management frameworks and a healthy loan portfolio[3].

[2] Excluded institutions were French BPCE and three German banks: BayernLB, DZ Bank and LBBW.

[3] **Visbanking (2025),** ***The Hidden Truth About Bank Loan-to-Deposit Ratios in Crisis*****, https://visbanking.com/the-hidden-truth-about-bank-loan-to-deposit-ratios-in-crisis.**

Categorisation of the components of the synthetic measure supports the process of standardisation and normalisation of the calculated values, which will enable their additivity into a single value. Standardisation was performed according to the following formula:

- for stimulants $s_{ij} = \frac{x_{ij} - \overline{x_j}}{\sigma_j}$
- for destimulants $s_{ij} = \frac{\overline{x_j} - x_{ij}}{\sigma_j}$
- for nominant $s_{ij} = \begin{cases} \frac{x}{0,8} if\ x < 0,8 \\ 1 if\ 0,8 \leq x \leq 1,6 \\ \frac{1,6}{x}\ if\ x > 1,6 \end{cases}$

where:

$\overline{x_j}$ – mean value of the variable over the analysed period

σ_j – standard deviation of the variable over the analysed period

s_{ij} – standardised value of the variable

Normalisation of standardised values was performed according to the following formula:

$$n_{ij} = \frac{s_{ij} - \min(s_j)}{\max(s_j) - \min(s_j)}$$

where:

$\max(s_j)$ represents the maximum value of the variable over the analysed period

$\min(s_j)$ represents the minimum value of the variable over the analysed period

Normalised values of each component of the synthetic measure fall within the range <0,1>, which makes them additive and allows calculating the synthetic measure for each credit institution analysed. For the baseline scenario analysed, individual normalised values of the indicators were summarised into the synthetic measure.

For an in-depth analysis, synthetic measures for the selected banks have been calculated under three variants:

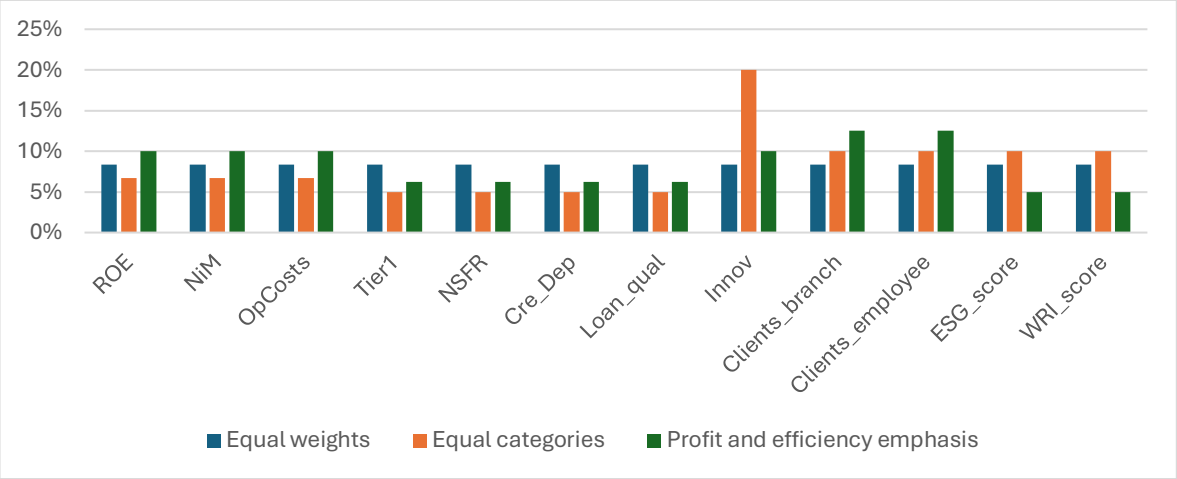
- The **baseline scenario,** as described above, is naturally in favour of credit institutions with a good relative position in terms of economic performance and prudential stability, as all the indicators used carried the same weight and these categories were largest. Effectively, under the baseline scenario prudential category carries a weight of 33,33% and economic

performance accounts for 25%. To address this potential problem, the following scenarios were also considered:

- **Equal categories scenario** – the weights are adapted to ensure each category of indicator carries the same cumulative weight of 20%
- **Profit and efficiency emphasis scenario** – 30% weight is attributed to economic performance, 25% is attributed to prudential and organisational categories, 10% to innovation and institutional categories.

Individual weights for each indicator under the scenarios are presented in Figure 1.

Figure **1. Overview of the weights applied to indicators under each scenario**



Source: own elaboration.

For each scenario, the formula for calculating the synthetic value for each bank in a given year is as follows:

$$SM_i = \sum_{j=1}^{12} w_j * n_{ij}$$

where w_j reflects the weight attributed to the normalised value of indicator n under a given scenario. Synthetic measure values calculated for each scenario have been included in the annex 2.

To better interpret and depict the results, the synthetic measure values for each scenario were used to create bank rankings for each year of the analysis. The results have been discussed in the next section. Full rankings calculated for each scenario have been included in the annex.

4. Results

Under the baseline scenario, the leading group consists primarily of ING, Swedbank, SEB and DNB, followed by Crédit Agricole, Nordea and Santander. This is not merely a group of highly profitable banks. Their common feature is the combination of strong economic performance with sizeable capital buffers and sound asset quality, sustained digitalisation, customer orientation, and the integration of technological and sustainability transformation into business strategy. Their position is therefore less dependent on a single source of advantage and remains relatively high when the weights assigned to individual SMC layers change. This result directly supports the part of H1 concerning complementarity of competitiveness sources; from the resilience perspective, it also indicates that the leaders possess a more diversified base of resources and capabilities that can be mobilised under disruption.

ING is the most consistent leader. Its 'Growing the difference' strategy combines accelerated growth, superior customer value, scale benefits and sustainability at the heart of the business. In 2024, mobile primary customers increased by 1.1 million to 14.4 million, core lending by EUR 28 billion and deposits by EUR 47 billion; ROE reached 13.0%, CET1 13.6%, while risk costs remained below the through-the-cycle average, reflecting strong asset quality (ING, 2024, 2025). The coexistence of customer expansion, balance-sheet growth and prudential strength indicates that digitalisation was not pursued at the expense of financial safety. Santander illustrates a similar logic from a different starting point. It moved from sixth place in 2019 to first in 2024 while implementing the 'digital bank with branches' model and the One Santander transformation, focused on product simplification, process automation and common technology platforms. In 2024, the customer base increased by approximately 8 million to 173 million, the efficiency ratio improved to 41.8%, cost of risk was 1.15%, RoTE 16.3% and fully-loaded CET1 12.8% (Santander, 2025). Strong growth and profitability were thus supported by risk and capital discipline, while the Think Customer principle linked technological transformation directly to customer experience and loyalty.

The Nordic banks form a second distinct cluster. Swedbank delivered an ROE of 17.1%, a cost-to-income ratio of 0.34 and CET1 of 19.8% in 2024, while maintaining very strong credit quality. It accelerated investment in an advisory platform, a cloud-based communication platform and an improved end-to-end lending process, consistent with its customer promise of a 'simpler financial life'. At the same time, assets qualifying under the Sustainable Funding Framework increased by 70%, and 36% of bonds arranged by the bank were sustainable (Swedbank, 2025). SEB combines a corporate-banking and wealth-management-oriented relationship model with a particularly strong

capital profile: in 2024 ROE was 16.2% and CET1 17.6%, alongside an explicit emphasis on strong liquidity and financial stability. Its 2030 strategic direction stresses future-proofing customer relationships, new technologies, transition advisory, sustainability integration, data protection, cybersecurity and financial-crime prevention (SEB, 2025). SEB's strong position therefore reflects a qualitative, relationship-based architecture of advantage rather than retail scale alone.

DNB and Nordea further demonstrate how prudential strength can coexist with innovation. DNB ended 2024 with a CET1 ratio of 19.4%, 2.8 percentage points above the supervisory expectation, while pursuing its strategic ambition 'The customer chooses us'. The bank introduced fully digital credit processes for selected corporate customers, allowing a credit-line decision and disbursement within seconds, and expanded the use of AI in customer service, programming and fraud detection; its Aino chatbot handled 60% of chat enquiries and understood more than 100 languages (DNB, 2025). Nordea, following the repositioning initiated in 2019, combines high profitability and efficiency with a mature digital model. More than five million customers actively used its app and online bank, with 1.5 billion digital logins in 2024. Over the preceding three years, Nordea facilitated approximately EUR 185 billion of sustainable financing, while financed emissions in its lending portfolio were 36% below the 2019 level (Nordea, 2025). In both cases, capital strength coexists with intensive use of data, digital channels and ESG objectives, matching the multidimensional logic of the SMC.

Crédit Agricole completes the leadership profile through a different business architecture – a decentralised universal-banking model based on long-term customer relationships and complementarities between retail banking, insurance, asset management and CIB. In 2024, the Group reported a phased-in CET1 ratio of 17.2%, and all financial targets of its Ambitions 2025 plan were exceeded one year ahead of schedule (Crédit Agricole, 2025a). Its Customer Project delivered record levels of customer experience, with the Group ranking in the top three for NPS across almost all markets and attracting on average around 1.9 million new customers per year since 2022. The Group also developed BforBank, digital solutions for professionals, experiments in quantum computing and tokenisation, while reinforcing its energy-transition commitments (Crédit Agricole, 2025b). Its high SMC is therefore not driven by one technological differentiator but by a broad capability architecture in which scale, customer relationships, capital strength, innovation and ESG reinforce one another.

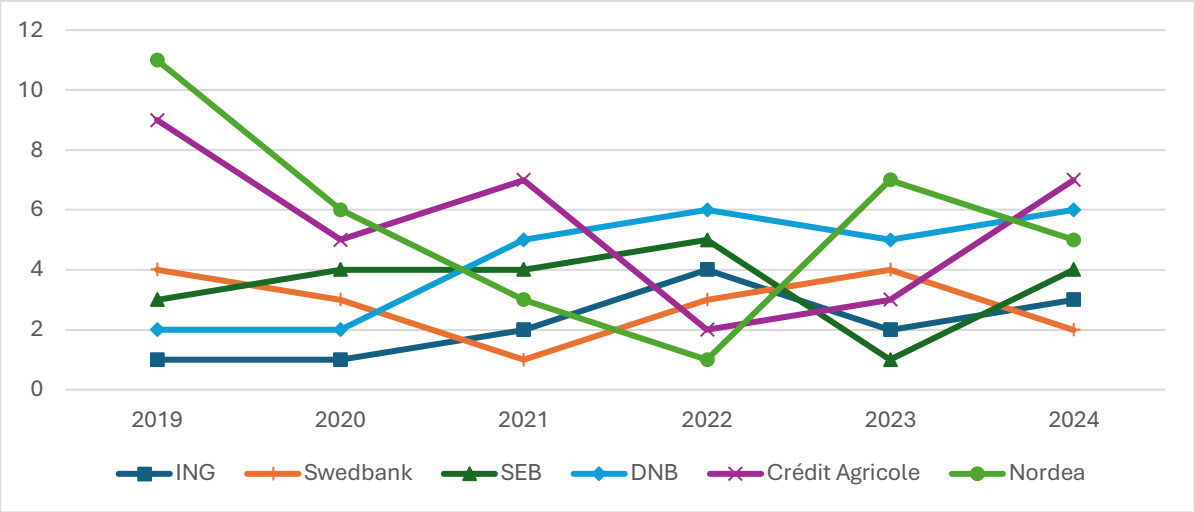
Table 2. Ranking according to the baseline scenario

Bank	2019	2020	2021	2022	2023	2024	Average rank	Rank change 2019→2024	Times in top 5
ING	1	1	2	4	2	3	2	(2)	6
Swedbank	4	3	1	3	4	2	3	2	6
SEB	3	4	4	5	1	4	4	(1)	6
DNB	2	2	5	6	5	6	4	(4)	4
Crédit Agricole	9	5	7	2	3	7	6	2	3
Nordea	11	6	3	1	7	5	6	6	3
Santander	6	8	6	7	6	1	6	5	1
Erste Bank	7	7	8	9	9	14	9	(7)	0
Danske Bank	5	13	12	15	8	8	10	(3)	1
BBVA	10	10	16	8	10	10	11	0	0
Intesa Sanpaolo	17	11	10	14	11	13	13	4	0
KBC	8	9	13	16	15	17	13	(9)	0
Unicredit	16	14	14	11	13	11	13	5	0
Commerzbank	12	18	9	10	16	15	13	(3)	0
Rabobank	18	16	11	12	14	12	14	6	0
BNP Paribas	13	17	15	18	12	9	14	4	0
Deutsche Bank	14	12	17	13	17	16	15	(2)	0
Société Générale	15	15	18	17	18	18	17	(3)	0

Source: own elaboration based on LSEG Data & Analytics.

The improvement of Santander and Nordea illustrates how strategy and market conditions interact with the SMC, while the detailed profiles above show that leadership is produced by different strategic configurations rather than a single business model. Conversely, rank deterioration should not automatically be interpreted as absolute deterioration: the measure is relative, so a bank may improve its own performance and still lose positions when competitors improve faster. This distinction is essential when interpreting restructuring banks such as Deutsche Bank, Société Générale or Erste.

Figure **2. Top performing banks under the baseline scenario**



Source: own elaboration based on LSEG Data & Analytics.

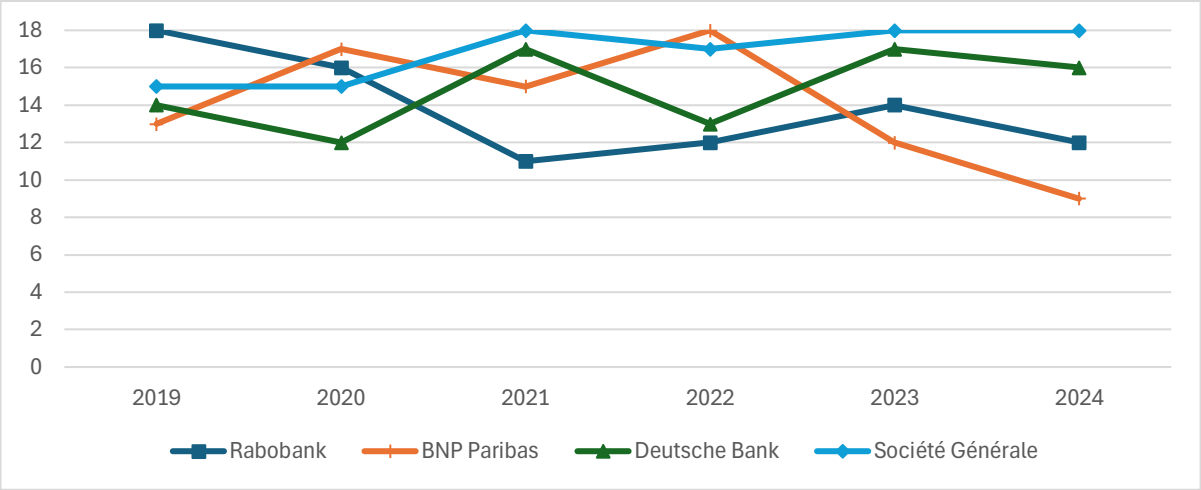
The worst-performing banks under the baseline scenario are presented in Figure 3. The largest deteriorations are identified for KBC group (rank 17 in 2024 versus 8 in 2019) and Erste Bank (from 7th to 14th bank in the analysis). KBC was experiencing deterioration of its return on equity during the pandemic and recovered more slowly than its competitors, which has affected its relative position in the ranking. In addition, it has noted reduced organisational efficiency in spite of reducing employment over the analysed period. The bank's loan-to-deposit ratio also fell below the expected minimum 80% in the last three years. It is also interesting to note the consistently bad relative performance of Société Générale and Deutsche Bank. Interestingly, the bottom of the ranks includes two out of France's three largest credit institutions, whereas Crédit Agricole is among the best performers.

For Société Générale, the overall score reflects relatively weak profitability, especially versus the top performers. This is attributed both to the pandemic-related shock, but also disposal of the Russia-based operations in 2022, resulting in a net loss of 3,2 bln EUR[4]. These effects coincide with a notable increase in operating costs, while organisational efficiency-related indicators are close to stagnation. Deutsche Bank's position is negatively affected from the outset, as 2019 was a year of a

[4] **Société Générale (2022),** ***Société Générale has closed the sale of Rosbank and its Russian insurance subsidiaries*****, Press Release,** https://www.societegenerale.com/en/news/press-release/closing-sale-rosbank-and-its-subsidiaries

major restructuring, when the net loss per employee exceeded sixty thousand euro [5]. It deserves to be noted that the move has allowed the bank to become profitable again, but the rate of return remained relatively modest compared to other institutions in the ranking. Deutsche Bank's position also suffers from the fact that its loan-to-deposit ratio falls below the desired threshold throughout the analysis. Finally, the bank's deteriorating quality of receivables over the years deserves to be highlighted.

Figure **3. Worst performing banks under the baseline scenario**



Source: own elaboration based on LSEG Data & Analytics.

Under the equal-categories scenario, the relative importance of the three intellectual-capital layers increases. ING remains the leader, while Santander, Crédit Agricole and BNP Paribas benefit more visibly. This movement is consistent with H1: banks that complement financial and prudential strength with developed innovative, organisational and institutional capabilities are less dependent on one source of advantage. BNP Paribas benefits from its increasing emphasis on data and AI, including the expansion of cooperation with Mistral AI, while Crédit Agricole benefits from its broad group model, specialised capabilities and customer-centred digital transformation. SEB reacts differently: its strong economic and prudential position is partly offset by organisational indicators that naturally favour mass retail models more than corporate banking and wealth management. Changes in weights therefore reveal a different architecture of competitive advantage rather than simply reshuffling the ranking.

[5] **Deutsche Bank (2019),** ***Deutsche Bank outlines significant strategic transformation and restructuring plans*****, Press Release,** https://www.db.com/news/detail/20190707-deutsche-bank-outlines-significant-strategic-transformation-and-restructuring-plans?language_id=1

Table 3. Ranking according to the equal-categories scenario

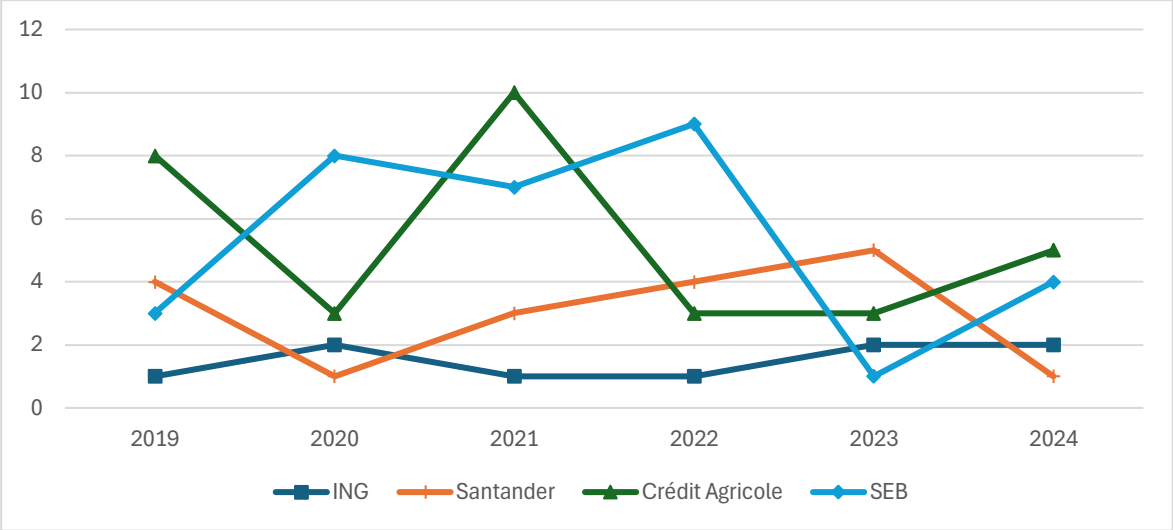
Bank	2019	2020	2021	2022	2023	2024	Average rank	Rank change 2019→2024	Top-5 years
ING	1	2	1	1	2	2	2	(1)	6
Santander	4	1	3	4	5	1	3	3	6
Crédit Agricole	8	3	10	3	3	5	5	3	4
SEB	3	8	7	9	1	4	5	(1)	3
Swedbank	6	6	5	6	8	3	6	3	2
DNB	2	4	6	8	9	9	6	(7)	2
Nordea	12	5	2	2	10	7	6	5	3
BBVA	5	10	14	5	7	10	9	(5)	2
Erste Bank	7	7	9	11	6	16	9	(9)	0
BNP Paribas	14	15	4	7	12	8	10	6	1
Danske Bank	10	17	15	13	4	6	11	4	1
Commerzbank	11	16	8	10	14	11	12		0
Unicredit	15	13	11	14	13	12	13	3	0
KBC	9	9	16	12	15	17	13	(8)	0
Intesa Sanpaolo	17	14	13	17	11	14	14	3	0
Deutsche Bank	13	11	18	16	17	15	15	(2)	0
Société Générale	16	12	12	18	18	18	16	(2)	0
Rabobank	18	18	17	15	16	13	16	5	0

Source: own elaboration based on LSEG Data & Analytics.

The ranks of the four top-performing banks in this scenario are shown in Figure 4. Despite the expected volatility increase, the dominance of ING in the ranking is more pronounced here than under the previous scenario. This stems from the bank's consistently good economic performance, notably in the last two years of the analysis. The bank's prudential stability indicators are robust; organisational performance is noticeably higher than its competitors in the panel. Finally, the bank's score benefits considerably from the additional significance of innovativeness indicator. Similarly, the average performance of Santander group is notably better than under the previous scenario and is now among top 5 institutions throughout the analysis. This is largely due to reduced significance of the prudential indicators, an area which was Santander's weak point in this comparison.

Innovativeness score of the bank reinforces its position as the second best performer under this scenario.

Figure **4. Top performing banks under the equal categories scenario**



Source: own elaboration based on LSEG Data & Analytics.

Like under the previous scenario, the group of top performers still includes Crédit Agricole and SEB. Crédit Agricole also benefitted from revised weights, largely due to its strategic focus on innovation, but the effect was weakened by lower weight assigned to its financial stability performance[6]. SEB, on the other hand, is the one bank in this group who has been weakened by the change in indicator weights. The bank's strength is its robust financial position and good level of prudential capital, while its operational performance appears weaker in this comparison, as the bank specialises in corporate banking and wealth management, rather than in extensive retail banking operations[7].

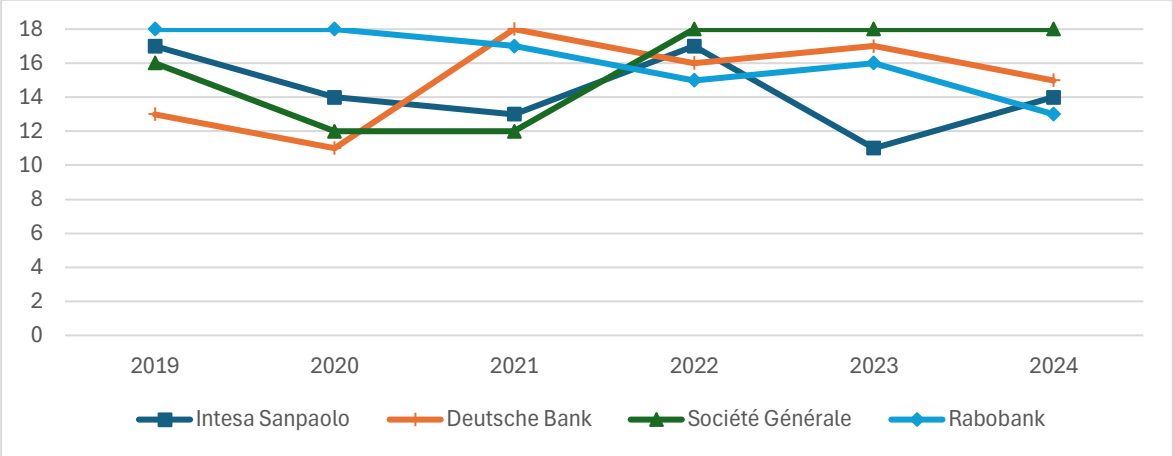
The composition of the laggers group under the equal-categories scenario is similar to that in the baseline, although BNP Paribas is replaced by Intesa Sanpaolo (see Figure 5). BNP Paribas proves to be one of the largest beneficiaries of equalising the weights of each indicator category, with its improving technology adoption score driving the change. Like Crédit Agricole, BNP Paribas

[6] Crédit Agricole (2020), *Results for the fourth quarter and full year 2019*, https://www.credit-agricole.com/en/pdfPreview/179619

[7] SEB (2020), *Fact Book January – March 2020*, Stockholm, pp. 4-6.

emphasises innovation as one of the main sources of its competitive advantage [8]. Concurrently, and similarly to SEB, Intesa Sanpaolo is one of the banks losing out on lower weight assignation to prudential stability indicators. During the analysed period, the bank has concluded the acquisition of UBI Banca, which has gradually improved the group performance but had a negative effect on organisational performance during the process[9].

Figure **5. Worst performing banks under the equal categories scenario**



Source: own elaboration based on LSEG Data & Analytics.

ING remains the undisputed leader under the profit-and-efficiency emphasis scenario, while Swedbank, Santander, DNB, SEB, Nordea and Crédit Agricole retain high positions. The strong Nordic representation reflects a combination of high profitability with substantial capital buffers, sound asset quality and mature digital models. In 2024, CET1 reached 19.8% at Swedbank, 19.4% at DNB and 17.6% at SEB, while these banks continued to invest in digital customer service, automation and technology security (Swedbank, 2025; DNB, 2025; SEB, 2025). The post-2022 improvement in profitability must, of course, be interpreted in the context of the higher interest-rate environment, which supported NIM and ROE across the sector. The ranking therefore captures the relative ability to exploit this environment without sacrificing capital strength and asset quality. The coexistence of performance and prudential stability, rather than interest-margin expansion alone, is what distinguishes the more stable leaders from banks whose position is more cyclical.

[8] **BNP Paribas (2025), *Data & Artificial Intelligence*, https://group.bnpparibas/en/our-commitments/innovation/data-artificial-intelligence**

[9] Intesa Sanpaolo (2022), *Consolidated Results as at 30 September 2021*, https://group.intesasanpaolo.com/en/investor-relations/press-releases/2021/11/20211103-ris-3q21-uk

Table 4. Ranking according to the profit-and-efficiency scenario

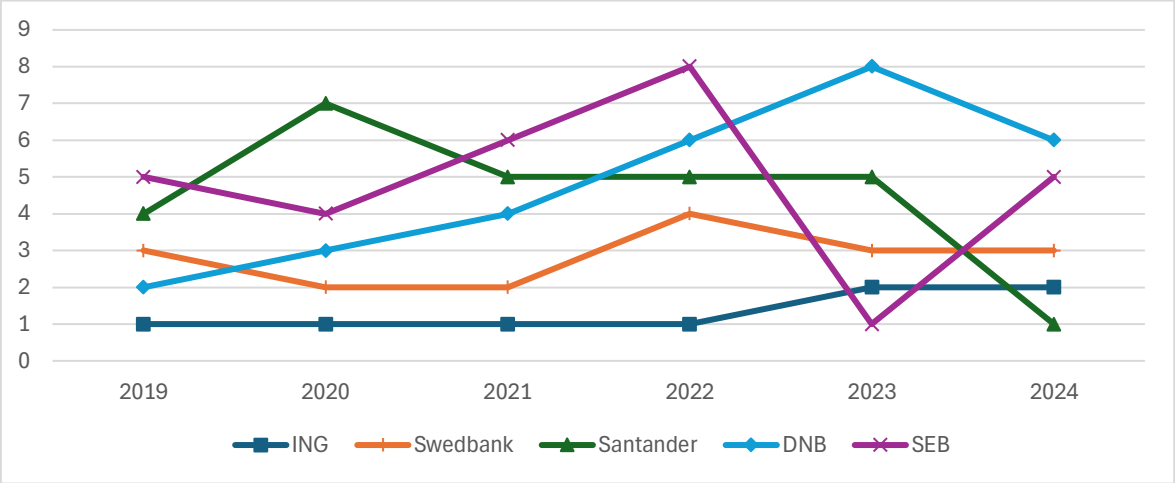
Bank	2019	2020	2021	2022	2023	2024	Average rank	Rank change 2019→2024	Top-5 years
ING	1	1	1	1	2	2	1	(1)	6
Swedbank	3	2	2	4	3	3	3	0	6
Santander	4	7	5	5	5	1	5	3	5
DNB	2	3	4	6	8	6	5	(4)	3
SEB	5	4	6	8	1	5	5	0	4
Nordea	11	5	3	2	7	4	5	7	4
Crédit Agricole	9	6	7	3	4	8	6	1	2
BBVA	7	10	11	7	9	10	9	(3)	0
Danske Bank	6	12	12	13	6	7	9	(1)	0
Erste Bank	8	8	9	10	10	15	10	(7)	0
Rabobank	15	13	8	9	11	9	11	6	0
Commerzbank	12	16	10	11	12	11	12	1	0
KBC	10	9	13	12	14	16	12	(6)	0
Deutsche Bank	13	11	15	14	17	17	15	(4)	0
BNP Paribas	14	18	14	16	16	13	15	1	0
Unicredit	16	17	17	15	15	12	15	4	0
Intesa Sanpaolo	18	14	18	17	13	14	16	4	0
Société Générale	17	15	16	18	18	18	17	(1)	0

Source: own elaboration based on LSEG Data & Analytics.

Analysis of the top 5 performers under this scenario highlights strong representation of banks from the Nordic countries: Swedish SEB and Swedbank and Norwegian DNB (Figure 6). Under this scenario Swedbank stands out as a clear runner-up, ranking as one of top three banks in 5 out of 6 years of the analysis. SEB's relative performance is far less stable, moving between 8th and 1st position between 2022 and 2023, due to an over 20% increase in income, even in spite of

unfavourable changes to the exchange rates[10]. DNB sees a gradual deterioration of its rank over the years, although this is largely due to a change in relative position versus its competitors rather than outright negative changes to profitability or efficiency, with the latter falling only marginally in the last years of the analysis.

Figure **6. Top performing banks under the profit and efficiency scenario**



Source: own elaboration based on LSEG Data & Analytics.

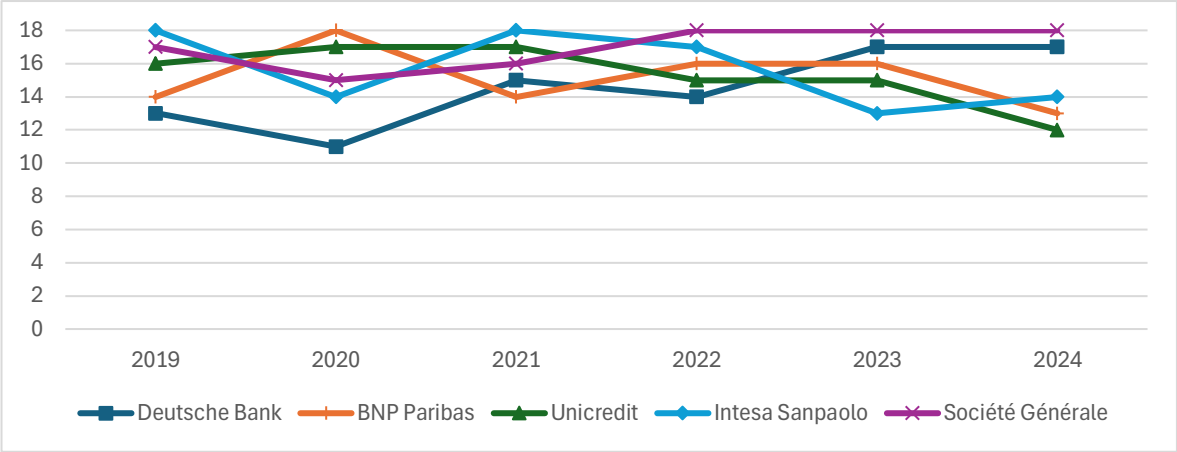
Under the profitability and efficiency scenario, for the first time, the group of worst-performing banks includes Italy's Unicredit group (see Figure 7). Here, the changes in ranks are less pronounced, although Deutsche Bank stands out as the institution that fell to the second-worst position over the last two years of the analysis. This can be explained by the bank's long-standing profitability problem, which remained relatively modest following successful restructuring in 2020, affected also by the need to establish major litigation provisions in 2024[11]. Unicredit appears on this list largely due to its weak position in the first years of the analysis – a legacy of a major 'Transform 2019' restructuring programme aimed at reinforcing the group's capital and cutting operational costs[12]. Conversely, Société Générale once again appears as the worst performer in the group, confirming its structurally weak position among the analysed institutions.

[10] SEB (2024), *2023 Full-Year Results* Paris, p.7.

[11] **Fitch Ratings (2025),** ***Litigation Costs Overshadow Deutsche Bank's Satisfactory Performance***
https://www.fitchratings.com/research/banks/litigation-costs-overshadow-deutsche-bank-satisfactory-performance-04-02-2025

[12] J. P. Mustier (2019), *One Bank, One UniCredit Transform 2019*, London.

Figure **7. Worst performing banks under the profit and efficiency scenario**



Source: own elaboration based on LSEG Data & Analytics.

1. Robustness check

To verify the robustness of the results presented, they have been analysed across the three weighting scenarios. A pair-wise comparison between the baseline and equal categories scenarios should allow analysing the impact of the number of indicators assigned to each category, whereas baseline's comparison to profit and efficiency scenario is to emphasise the impact of prioritising performance on bank's evaluation.

To begin with, Spearman's rank correlation coefficient was calculated for the entire period, indicating very strong correlation of 0,929 between baseline and profit and efficiency scenarios and 0,853 between baseline and equal categories scenario. Correlation between equal categories and profit-emphasising scenario was calculated at 0,851, giving an average correlation across the three scenarios of 0,878. The results therefore suggest that weights emphasising profit and efficiency indicators largely reinforce the ranking structure established under the baseline scenario. Conversely, equalising the importance of each category changes the 'default' balance stemming from the number of indicators in each group.

To further verify the analysis results, a cross-scenario consensus ranking was developed to assess the validity of the conclusions drawn from each institution's position (Table 5).

Table 5. Cross-scenario consensus ranking

Bank	Average rank (equal weights)	Average rank (equal categories)	Average rank (profit & efficiency)	Average
ING	2,17	1,50	1,33	1,67
Swedbank	2,83	5,67	2,83	3,78
Santander	5,67	3,00	4,50	4,39
SEB	3,50	5,33	4,83	4,56
DNB	4,33	6,33	4,83	5,17
Crédit Agricole	5,50	5,33	6,17	5,67
Nordea	5,50	6,33	5,33	5,72
BBVA	10,67	8,50	9,00	9,39
Erste Bank	9,00	9,33	10,00	9,44
Danske Bank	10,17	10,83	9,33	10,11
Commerzbank	13,33	11,67	12,00	12,33
KBC	13,00	13,00	12,33	12,78
BNP Paribas	14,00	10,00	15,17	13,06
Rabobank	13,83	16,17	10,83	13,61
Unicredit	13,17	13,00	15,33	13,83
Intesa Sanpaolo	12,67	14,33	15,67	14,22
Deutsche Bank	14,83	15,00	14,50	14,78
Société Générale	16,83	15,67	17,00	16,50

Source: own elaboration based on LSEG Data & Analytics.

The consensus ranking identifies a clear core of seven leaders: ING, Swedbank, Santander, SEB, DNB, Crédit Agricole and Nordea. Their common denominator is not a single business model – the group includes universal, retail-oriented and strongly corporate banks – but the capacity to sustain more than one source of advantage at the same time. The leaders combine profitability and efficiency with strong capitalisation, digital customer engagement, continuous process modernisation, and institutional/ESG credibility. Important differences remain: Swedbank loses some relative ground when category weights are equalised, Santander benefits when intellectual-capital layers receive more weight, and SEB is less favoured by organisational indicators designed around mass retail

activity. Nevertheless, the leadership core remains stable. This supports H1: a more complementary architecture of advantages produces a competitive position that is more robust to changes in the measurement assumptions.

Comparison of the results for each year signals that the scenarios are also quite consistent in identifying the leading credit institution. Table 6 shows that results are perfectly consistent in 2019, 2023 and 2024, pointing to the dominance of ING, SEB and Santander respectively. Years 2020 to 2022 therefore prove to be more prone to the attribution of weights to different indicators, which supports the conclusions stemming from literature studies, pointing to distortions associated with different types of government intervention and gradual structural changes to the way the banking sector operates[13].

Table 6. Leading credit institutions under different scenarios

Year	Equal weights	Equal categories	Profit & efficiency
2019	ING	ING	ING
2020	ING	Santander	ING
2021	Swedbank	ING	ING
2022	Nordea	ING	ING
2023	SEB	SEB	SEB
2024	Santander	Santander	Santander

Source: own elaboration based on LSEG Data & Analytics.

Overall, the cross-scenario analysis confirms a stable competitive core while revealing different architectures of advantage. ING remains dominant across weight structures; Santander benefits when intangible-capital layers receive more weight, whereas banks such as Rabobank and BNP Paribas show greater sensitivity to the weighting system. These shifts are substantively informative

[13] see e.g. A. Acheampong, N. Ibeji, A. Danso (2024), *COVID-19 and credit risk variation across banks: International insights*, *Managerial and Decision Economics, vol 45 (7)*, pp. 4415–4431, https://doi.org/10.1002/mde.4271; A. Alhaddab, M. K. Hassan, R. Hasan, (2025), *Impact of COVID-19 on bank performance: a comparison between Islamic vs conventional banks in OIC countries*, *Accounting Research Journal*, vol. 38 (3-4), pp. 409-423, https://doi.org/10.1108/ARJ-10-2024-0346; A. Resti (2021), *Did the pandemic lead to structural changes in the banking sector?*, European Parliament, Brussels.

rather than merely methodological: they indicate whether a bank's relative position is broad-based or concentrated in selected dimensions.

5. Discussion

The results support treating systemically important bank competitiveness as a multidimensional construct. High rank correlations reveal a relatively stable core of advantages, while bank-specific movements after changing weights expose different competitive configurations. This is consistent with multicriteria and composite-indicator research showing that bank assessment requires several distinct dimensions and that rankings depend on the architecture of pillars and weights (Gudemann & Münnich, 2023; Angilella et al., 2024; Llorent-Jurado et al., 2024). The systemic framework used in this article provides an interpretative structure for these results, but the multidimensional logic is supported by a broader international literature rather than by one conceptual tradition alone.

Economic performance remains indispensable, as shown by the close relationship between the baseline and profit-and-efficiency scenarios. Yet it is not sufficient: similar profitability can coexist with different prudential buffers and different capacities for innovation and organisational adaptation. Prudential stability therefore functions as strategic capacity rather than compliance alone. Capital, liquidity and asset quality determine the room available to continue lending and investing under stress, a conclusion consistent with the post-crisis and resilience literature (Berger & Bouwman, 2013; López-Penabad et al., 2021; Tran, 2024; Dedeloudis et al., 2025).

Intellectual capital differentiates the way banks convert their economic and prudential bases into advantage. The three-layer operationalisation helps identify different functions: innovative capital supports technological adaptation, organisational capital scales and reconfigures resources, and institutional capital preserves trust and legitimacy. This interpretation is reinforced by recent evidence that organisational learning and employee resilience support innovation (Mohammad et al., 2024) and that innovation performance and big-data capabilities strengthen the transformation of intellectual capital into competitive advantage in banking (Pilatin & Pelenk, 2026).

The strategic evidence from individual banks further supports a configuration-based interpretation. ING combines strong economic and prudential results with an explicitly scale- and digital-oriented strategy; Santander's rise accompanies platform standardisation, automation and digital-customer growth; Erste continues to invest in the George platform despite a weaker relative rank; and Deutsche Bank and Société Générale illustrate how restructuring costs can depress relative positions while strategic reconfiguration is still underway. SMC should therefore be read together with annual reports and strategic disclosures, not as a context-free league table.

The central contribution is therefore not the ranking itself, but the evidence that relatively persistent advantage in a systemically important bank is associated with a configuration of complementary capabilities rather than dominance in a single dimension. The SMC shows how different capabilities jointly shape a bank's relative position and how sensitive that position is to alternative weighting schemes. The stability of the leadership core across scenarios is consequently the study's key empirical result and supports an interpretation of competitiveness as a configuration of capabilities rather than a simple sum of indicators.

This is where competitiveness connects to resilience, which constitutes the central interpretive proposition of the article. Economic performance creates and replenishes resources; prudential stability supports loss absorption and continuity; innovative capital enables adaptation; organisational capital supports mobilisation and reconfiguration; and institutional capital sustains trust and legitimacy. Resilience is not a sixth SMC layer, but a capability whose development is supported by the interaction of these dimensions and which becomes relevant under disruption. The stable leadership core - particularly ING and the Nordic banks – indicates that a strong position can be maintained across changing conditions when competitive advantage is not one-dimensional. In this sense, the findings support H1 with respect to complementarity and persistence of competitive position: the coexistence of profitability and efficiency, adequate safety buffers, and innovative, organisational and institutional capabilities creates a more diversified base for shock absorption, adaptation and recovery. This interpretation is consistent with the literature on digitalisation, FinTech and dynamic capabilities (Kasri et al., 2022; Yudaruddin et al., 2023; Lee & Wang, 2023; Mohammad et al., 2024). The results do not imply that competitiveness automatically determines resilience; rather, they indicate that a multidimensional and balanced competitive configuration strengthens the foundations on which resilience can be built.

The study has several limitations. First, the SMC is a relative measure: rank deterioration may reflect slower improvement than competitors rather than an absolute weakening of a bank. Second, disclosure bias is material for intangible-capital indicators because banks differ in how consistently they report innovations, digital customers, organisational data, ESG information and awards. Third, four institutions – BPCE, BayernLB, DZ Bank and LBBW – were excluded because a sufficiently complete and comparable series could not be constructed for all layers. Finally, additive aggregation permits partial compensation between dimensions, even though the theoretical interpretation does not assume full substitutability.

6. Conclusions

The study developed a multidimensional synthetic measure of competitiveness for systemically important European banks, integrating economic performance, prudential stability and three components of intellectual capital: innovative, organisational and institutional capital. The underlying premise is that competitiveness is neither a synonym for profitability nor a simple sum of independent strengths; it emerges from the interaction of capabilities that perform different economic functions.

The empirical results identify a relatively stable leading group, with ING as the most consistent performer across scenarios. Swedbank, Santander, SEB, DNB, Crédit Agricole and Nordea also form the competitive core. At the same time, shifts in Santander, BNP Paribas, Rabobank and other banks after changing weights demonstrate that intellectual-capital dimensions provide information not visible in an assessment dominated by economic and prudential ratios.

Interpretation requires the exceptional 2019-2024 context to be taken into account. The pandemic, accelerated digitalisation, the interest-rate reversal, branch-network redesign, M&A, asset disposals and successive regulatory changes affected SMC layers simultaneously. Bank rankings are therefore outcomes of both own strategic choices and the pace of change among competitors.

The main conclusion returns directly to H1. The results support the part of the hypothesis concerning multidimensionality and complementarity: persistent advantage in a systemically important bank does not arise from maximising a single component, but from the coexistence of economic performance, prudential stability and intellectual capital. The ranking leaders are strategically heterogeneous, yet they share the ability to generate results, preserve capital and liquidity safety, deepen customer relationships, implement innovation and respond to ESG expectations at the same time. This configuration makes their positions relatively more robust to changes in SMC weights. With regard to resilience, the conclusion is interpretive: multidimensional competitiveness strengthens the foundations of resilience because it provides a more diversified set of resources and capabilities for shock absorption, adaptation and recovery. Direct assessment of the strength of this relationship requires separate resilience measures and remains a direction for further research.

With regard to H2, the scenario analysis shows that changes in the weighting structure affect the positions of some institutions but do not eliminate the advantage of banks with the most balanced competitive profiles. Leaders' ability to retain relatively high ranks under alternative weighting schemes supports H2 and confirms the methodological rationale of the multidimensional SMC: a persistent competitive position is not an artefact of a single weighting scheme or one dominant indicator. At the same time, the shifts observed for banks such as BNP Paribas and Rabobank show

that sensitivity analysis is not merely a technical check but also reveals more concentrated profiles of advantage.

Future research should extend the panel beyond 2024, reintroduce excluded institutions when comparable disclosures become available, and enrich the intangible layers with more direct proxies such as IT expenditure, AI and cloud adoption, digital sales, skill structures, NPS, complaints, governance and supervisory sanctions. A particularly important next step is a direct empirical test of the competitiveness-resilience relationship using deposit stability, lending continuity, profitability and asset-quality changes during shocks, use of prudential buffers and speed of recovery.

The SMC should therefore be treated as a developing analytical framework. Its core logic is that the competitiveness of a modern systemically important bank is a multidimensional capability built on an economic base of value creation, a prudential capacity for loss absorption, and intellectual capital represented by innovative, organisational and institutional capital. Resilience is treated as a distinct outcome of the bank's ability to mobilise this configuration under disruption; the present study indicates that a more balanced competitive base strengthens the conditions under which resilience can be built.

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Annex 1. Detailed annual rankings and scenario charts

The complete annual rankings for the baseline, equal-categories and profit-and-efficiency scenarios are reported in Tables 2-4 and Figures 1-7 in the empirical section above. They are retained in full to ensure transparency of the annual bank positions and the sensitivity analysis.

Annex 2. Weights applied to NSFR components

NSFR component weights			
Customer loans (w_6)	1	Customer deposits (w_1)	0,85
Loans to banks (w_7)	0,35	Long-term funding (w_2)	1
Derivatives (w_8)	0,3	Other funding (w_3)	1
Other securities & other earning assets (w_9)	0,3	Loan-loss provisions (w_4)	1
Fixed &non-earning assets (w_{10})	1	Equity (w_5)	1

Source: own elaboration.

Annex 3. Synthetic measure values calculated for the three scenarios analysed

Baseline scenario	2019	2020	2021	2022	2023	2024
Synthetic score_Erste Bank	0,43	0,43	0,45	0,45	0,47	0,42
Synthetic score_KBC	0,42	0,42	0,41	0,40	0,41	0,39
Synthetic score_Danske Bank	0,45	0,38	0,41	0,40	0,49	0,48
Synthetic score_BNP Paribas	0,39	0,34	0,40	0,37	0,45	0,47
Synthetic score_Crédit Agricole	0,42	0,47	0,46	0,52	0,51	0,49
Synthetic score_Société Générale	0,37	0,36	0,39	0,37	0,32	0,35
Synthetic score_Deutsche Bank	0,39	0,39	0,40	0,41	0,39	0,39
Synthetic score_Commerzbank	0,40	0,33	0,45	0,43	0,41	0,41
Synthetic score_Intesa Sanpaolo	0,34	0,39	0,42	0,40	0,45	0,44
Synthetic score_Unicredit	0,36	0,36	0,40	0,41	0,44	0,46
Synthetic score_ING	0,50	0,48	0,52	0,51	0,52	0,52
Synthetic score_Rabobank	0,33	0,35	0,41	0,41	0,42	0,44
Synthetic score_DNB	0,49	0,48	0,50	0,49	0,50	0,49
Synthetic score_Santander	0,44	0,43	0,48	0,47	0,50	0,59
Synthetic score_BBVA	0,41	0,40	0,40	0,47	0,47	0,46
Synthetic score_Nordea	0,40	0,47	0,52	0,52	0,49	0,50
Synthetic score_Swedbank	0,47	0,48	0,53	0,51	0,51	0,55
Synthetic score_SEB	0,48	0,47	0,52	0,49	0,55	0,51

Source: own elaboration based on LSEG Data & Analytics.

Equal categories scenario	2019	2020	2021	2022	2023	2024
Synthetic score_Erste Bank	0,37	0,37	0,38	0,38	0,43	0,34
Synthetic score_KBC	0,35	0,36	0,33	0,35	0,35	0,32
Synthetic score_Danske Bank	0,34	0,28	0,33	0,34	0,47	0,43

Equal categories scenario	2019	2020	2021	2022	2023	2024
Synthetic score_BNP Paribas	0,32	0,29	0,43	0,41	0,37	0,42
Synthetic score_Crédit Agricole	0,37	0,40	0,38	0,45	0,47	0,45
Synthetic score_Société Générale	0,31	0,31	0,35	0,30	0,25	0,30
Synthetic score_Deutsche Bank	0,32	0,32	0,33	0,32	0,31	0,36
Synthetic score_Commerzbank	0,33	0,29	0,41	0,38	0,36	0,39
Synthetic score_Intesa Sanpaolo	0,26	0,30	0,34	0,32	0,39	0,38
Synthetic score_Unicredit	0,31	0,30	0,37	0,33	0,36	0,39
Synthetic score_ING	0,45	0,43	0,48	0,48	0,50	0,52
Synthetic score_Rabobank	0,25	0,27	0,33	0,33	0,34	0,39
Synthetic score_DNB	0,44	0,39	0,42	0,40	0,41	0,42
Synthetic score_Santander	0,40	0,44	0,44	0,43	0,45	0,65
Synthetic score_BBVA	0,39	0,35	0,34	0,42	0,42	0,42
Synthetic score_Nordea	0,33	0,39	0,46	0,46	0,40	0,42
Synthetic score_Swedbank	0,38	0,38	0,43	0,42	0,41	0,48
Synthetic score_SEB	0,41	0,36	0,42	0,39	0,55	0,46

Source: own elaboration based on LSEG Data & Analytics.

Profit & efficiency scenario	2019	2020	2021	2022	2023	2024
Synthetic score_Erste Bank	0,41	0,41	0,43	0,43	0,45	0,39
Synthetic score_KBC	0,40	0,40	0,39	0,40	0,40	0,37
Synthetic score_Danske Bank	0,42	0,36	0,40	0,38	0,49	0,47
Synthetic score_BNP Paribas	0,35	0,30	0,37	0,35	0,37	0,40
Synthetic score_Crédit Agricole	0,41	0,44	0,44	0,50	0,50	0,47
Synthetic score_Société Générale	0,32	0,32	0,36	0,32	0,27	0,30
Synthetic score_Deutsche Bank	0,35	0,36	0,37	0,38	0,37	0,37

Profit & efficiency scenario	2019	2020	2021	2022	2023	2024
Synthetic score_Commerzbank	0,38	0,32	0,42	0,42	0,40	0,42
Synthetic score_Intesa Sanpaolo	0,30	0,34	0,36	0,35	0,40	0,39
Synthetic score_Unicredit	0,33	0,30	0,36	0,36	0,39	0,41
Synthetic score_ING	0,52	0,48	0,53	0,52	0,53	0,55
Synthetic score_Rabobank	0,34	0,35	0,43	0,43	0,44	0,47
Synthetic score_DNB	0,50	0,47	0,49	0,48	0,48	0,48
Synthetic score_Santander	0,46	0,44	0,49	0,49	0,49	0,61
Synthetic score_BBVA	0,42	0,40	0,41	0,47	0,46	0,46
Synthetic score_Nordea	0,40	0,44	0,50	0,50	0,48	0,49
Synthetic score_Swedbank	0,48	0,47	0,51	0,50	0,50	0,54
Synthetic score_SEB	0,46	0,44	0,48	0,47	0,54	0,48

Source: own elaboration based on LSEG Data & Analytics.