



Facultad de Ciencias Económicas y Empresariales

ICADE

DIGITAL TRANSFORMATION IN INVESTMENT BANKING

Author: Claudia Sáiz Vara

Director: Jorge Aracil Jordá

MADRID | 23rd March 2026

Table of Contents

| | | |
|-----------|---|-----------|
| 1. | Introduction..... | 7 |
| 1.1. | Background and Relevance: The Digital Imperative in Investment Banking..... | 7 |
| 1.2. | Problem Statement and Research Gap | 8 |
| 1.3. | Objectives..... | 9 |
| 1.4. | Research Hypotheses..... | 9 |
| 1.4.1. | Criteria for Validation..... | 10 |
| 1.5. | Scope and Limitations of the Study | 10 |
| 1.5.1. | Thematic Scope..... | 11 |
| 1.5.2. | Geographic Scope (The Funnel Approach) | 11 |
| 1.5.3. | Temporal Scope (Post-Pandemic Focus)..... | 12 |
| 1.5.4. | Methodological Limitations..... | 12 |
| 2. | Literature Review and Theoretical Framework | 13 |
| 2.1. | Defining the Scope: Digitization vs. Digitalization vs. Digital Transformation | 13 |
| 2.1.1. | Strategic Frameworks in Literature | 13 |
| 2.1.2. | Banking-Specific Maturity Models..... | 14 |
| 2.2. | Theoretical Models: Organizational Governance and Digital Maturity..... | 14 |
| 2.2.1. | Rogers’ Strategic Domains: Strategy over Technology..... | 14 |
| 2.2.2. | Kane et al. The Primacy of Organizational Culture..... | 15 |
| 2.2.3. | Westerman’s “Digital Masters”: The Role of Governance..... | 15 |
| 2.2.4. | Synthesis: From Theory to Banking Application | 15 |
| 2.3. | Banking-Specific Frameworks: Review of BCG, Deloitte, and McKinsey Models..... | 16 |
| 2.3.1. | BCG: The Digital Acceleration Index (DAI)..... | 16 |
| 2.3.2. | Deloitte Banking Readiness (DBM)..... | 16 |
| 2.3.3. | McKinsey: The “Digital Case” for Investment Banking | 17 |
| 2.3.4. | Justification for Integration..... | 17 |
| 2.4. | Key Academic Trends: The Convergence of AI, Blockchain, and RegTech | 17 |
| 2.4.1. | Validation of Technological Scope..... | 18 |
| 2.4.2. | The Rise of RegTech as a Strategic Pillar | 18 |
| 2.4.3. | The New Digital Business Model..... | 18 |
| 3. | Methodology | 19 |
| 3.1. | Research Design: Qualitative and Descriptive Approach | 19 |
| 3.1.1. | Methodological Rationale..... | 19 |
| 3.1.2. | Deductive Logic..... | 20 |
| 3.1.3. | Reliance on Secondary Data | 20 |
| 3.2. | Data Collection Strategy: Selection Criteria for Reports (2020-2025)..... | 21 |
| 3.2.1. | Justification for the Use of Grey Literature | 21 |
| 3.2.2. | Quality Control: The Scott Criteria..... | 21 |
| 3.2.3. | Inclusion and Exclusion Criteria..... | 21 |
| 3.2.4. | Primary Data: Qualitative Expert Interviews (Validation Phase)..... | 22 |

| | | |
|-------------|---|-----------|
| 3.3. | Analytical Frameworks..... | 23 |
| 3.3.1. | Macro-Environmental Analysis (PESTEL) | 23 |
| 3.3.2. | Internal Strategic Analysis (SWOT)..... | 24 |
| 3.3.3. | Comparative Benchmarking Variables | 24 |
| 4. | Sector Analysis: The Strategic Context of Investment Banking | 25 |
| 4.1. | The "Dual Pressure" Environment: PESTEL Analysis..... | 25 |
| 4.1.1. | Regulatory Pressure (PSD2, MiFID II, DORA) | 26 |
| 4.1.2. | Competitive Pressure (FinTech and BigTech Entrants) | 27 |
| 4.2. | Current State of Digital Maturity: The Gap Between Strategy and Execution | 28 |
| 4.2.1. | The "Innovation Illusion": Quantitative Assessment | 28 |
| 4.2.2. | Front-to-Back Asymmetry | 28 |
| 4.3. | Comparison: Traditional Banks vs. Digitally Native Challengers | 29 |
| 4.3.1. | Synthesis: From Theory to Banking Application | 30 |
| 4.4. | Barriers to Change: Organizational Culture and Legacy Infrastructure | 30 |
| 4.4.1. | The Burden of Legacy Systems (Technical Debt)..... | 30 |
| 4.4.2. | Cultural Resistance and Silos..... | 31 |
| 4.4.3. | Empirical Validation: Expert Insights on Structural Barriers..... | 31 |
| 5. | Key Disruptive Technologies (Refined to focus on the "Big 3" + Enablers)..... | 33 |
| 5.1. | Artificial Intelligence (AI) and Machine Learning: From Trading to Risk Management | 33 |
| 5.1.1. | The Evolution: From Stochastic Models to Generative AI | 33 |
| 5.1.2. | Application in Front Office: The Search for "Alpha" | 34 |
| 5.1.3. | Application in Risk & Compliance: The "Regulatory Shield" | 34 |
| 5.2. | Cloud Computing: The Foundation of Scalability | 34 |
| 5.2.1. | From "Fortress" to "Ecosystem": The API Economy | 34 |
| 5.2.2. | The Resilience Challenge: DORA and Cloud Concentration..... | 35 |
| 5.3. | Blockchain and DLT: Transforming Transaction Transparency | 35 |
| 5.3.1. | Tokenization of Real-World Assets (RWA)..... | 35 |
| 5.3.2. | Efficiency in post-trading | 35 |
| 5.4. | Enabling Technologies: Big Data Analytics, RPA, and Cybersecurity | 35 |
| 5.4.1. | Big Data Analytics: The Fuel of Transformation | 36 |
| 5.4.2. | Robotic Process Automation (RPA): The "Digital Workforce" | 36 |
| 5.4.3. | Cybersecurity: The Prerequisite for Trust..... | 36 |
| 6. | Benchmarking and Case Studies | 38 |
| 6.1. | Methodology for Comparison: The Digital Maturity Matrix | 38 |
| 6.2. | Global Leaders: Analysis of JPMorgan Chase and Goldman Sachs | 38 |
| 6.2.1. | JPMorgan Chase: The "Tech Company with a Banking License" | 38 |
| 6.2.2. | Goldman Sachs: The Platform Strategy..... | 39 |
| 6.3. | European Application: Analysis of Santander CIB and BBVA | 39 |
| 6.3.1. | Santander CIB: The Cloud Migration ("Gravity")..... | 39 |

| | | |
|-------------|--|-----------|
| 6.3.2. | BBVA: The Pioneer of Open Banking | 39 |
| 6.4. | Comparative Findings: Global Best Practices vs. European Constraints | 40 |
| 6.4.1. | The "Scale Gap" and Regulatory Friction | 40 |
| 7. | Proposed Strategic Framework and Roadmap..... | 41 |
| 7.1. | The "Integrated Strategic Model for Digital Transformation (METD-BI)..... | 41 |
| 7.2. | Phased Implementation Roadmap..... | 41 |
| 7.2.1. | Horizon 1: Foundation and Regulatory Compliance (0–12 Months) | 42 |
| 7.2.2. | Horizon 2: Integration and Process Automation (1–3 Years)..... | 42 |
| 7.2.3. | Horizon 3: Innovation and Ecosystem Expansion (3–5 Years) | 42 |
| 7.3. | Key Performance Indicators (KPIs) and Success Metrics | 43 |
| 7.4. | Limitations and Scope of Validity of the Framework..... | 44 |
| 8. | Impact Analysis..... | 45 |
| 8.1. | Operational Efficiency and Cost-Benefit Analysis..... | 45 |
| 8.1.1. | The “Zero-Ops” Ambition | 45 |
| 8.1.2. | Cost of Implementation vs. Long-term Savings | 45 |
| 8.2. | Impact on Client Experience and Engagement | 46 |
| 8.2.1. | From Reactive to Predictive Advisory..... | 46 |
| 8.2.2. | Hyper-Personalization at Scale..... | 46 |
| 8.3. | Risk Reduction and Regulatory Compliance Improvement | 47 |
| 8.3.1. | Automated Compliance (RegTech) | 47 |
| 8.3.2. | Reduction of Model Risk | 47 |
| 9. | Conclusions and Recommendations..... | 48 |
| 9.1. | Synthesis of Findings and Objective Achievement | 48 |
| 9.1.1. | Impact of “Third Wave” Technologies on Efficiency (Secondary Objective 1) | 48 |
| 9.1.2. | Diagnosis of Structural and Cultural Barriers (Secondary Objective 2)..... | 48 |
| 9.1.3. | The Regulatory Paradox and the METD-BI Model (Secondary Objective 3)..... | 49 |
| 9.2. | Final Reflections: The “Autopilot Metaphor” | 49 |
| | Declaration of Use of Generative Artificial Intelligence Tools in Bachelor's Thesis | 50 |
| 10. | Bibliography | 51 |
| 11. | Appendixes | 55 |

Abstract

This dissertation analyses the digital transformation of investment banking, focusing on a European context. It argues that digitalization is no longer an optional modernization process, but a strategic imperative driven by competitive pressure, regulatory demands, and the need to improve operational efficiency within the improvement of the client experience. The study identifies a strategy-execution gap in European investment banks, where access to advanced technologies coexists with difficulties in implementing them caused by regulatory complexity and organizational inertia.

Methodologically, the research adopts a qualitative-descriptive approach based on deductive logic, relying on secondary data published between the years 2020 and 2025, and complemented by an expert validation through an interview. The analysis is structured through theoretical frameworks on digital maturity and governance, together with practical banking models developed by leading consulting firms. This allows the dissertation to assess both external pressures, such as MiFID II, PSD2 and DORA, and internal barriers, such as legacy systems, data silos and cultural resistance.

The findings show that AI, cloud computing and blockchain constitute the main technological drivers of transformation, while organizational culture remains the most significant obstacle to be digitally matured. The thesis concludes that the regulation in the European investment banking sector acts not only as a constraint but also as a catalyst for modernization, generating a compliance-driven innovation model. As its main contribution, the study proposes the METD-BI framework, a strategic model that combines technological capability, cultural adaptation and regulatory resilience. Ultimately, it argues that successful digital transformation in investment banking depends on balancing innovation, human adaptability and compliance, in a coherent strategic roadmap.

Keywords: Digital transformation; Investment banking; Artificial intelligence; Blockchain; Regulatory compliance; Organizational culture; Digital maturity.

Resumen

Este Trabajo de Fin de Grado analiza la transformación digital de la banca de inversión, con un enfoque particular en el contexto europeo. Sostiene que la transformación digital ya no es un proceso opcional de modernización, sino una obligación impulsada por la presión competitiva, las exigencias regulatorias y la necesidad de mejorar la eficiencia operativa y la experiencia del cliente. El estudio identifica una brecha persistente entre estrategia y ejecución en los bancos de inversión europeos, donde el acceso a tecnologías avanzadas coexiste con las dificultades en su implementación causadas por la complejidad regulatoria y la inercia organizativa. Desde un punto de vista metodológico, la investigación adopta un enfoque cualitativo y descriptivo basado en una lógica deductiva, apoyándose en datos secundarios publicados entre 2020 y 2025 y complementados mediante validación experta a través de entrevistas semiestructuradas. El análisis se estructura a partir de marcos teóricos sobre madurez digital y gobernanza, junto con modelos bancarios prácticos desarrollados por las principales firmas de consultoría. Esto permite evaluar tanto las presiones externas, MiFID II, PSD2 y DORA, como las barreras internas, tales como los sistemas heredados, los silos de datos y la resistencia cultural.

Los hallazgos muestran que la inteligencia artificial, la computación en la nube y el blockchain constituyen los principales motores tecnológicos de la transformación, mientras que la cultura organizativa sigue siendo el obstáculo más significativo para la madurez digital. En particular, concluye que la regulación en el sector europeo de la banca de inversión actúa no solo como una limitación, sino también como un catalizador de la modernización, generando un modelo de innovación impulsado por el cumplimiento normativo. Como principal aportación, el estudio propone el marco METD-BI, un modelo estratégico integrado que combina capacidad tecnológica, adaptación cultural y resiliencia regulatoria. En última instancia, sostiene que una transformación digital exitosa en la banca de inversión depende de equilibrar la innovación, la adopción humana y el cumplimiento normativo dentro de una hoja de ruta estratégica coherente.

Palabras clave: Transformación digital; Banca de inversión; Inteligencia artificial; Blockchain; Cumplimiento normativo; Cultura organizativa; Madurez digital.

1. Introduction

1.1. Background and Relevance: The Digital Imperative in Investment Banking

In recent years, investment banking has faced a deep shift driven by the adoption of digital technologies, marking digital transformation not merely as an option, but as a strategic imperative to sustain competitiveness and operational excellence (Diener & Pacek, 2021; Osei et al., 2023). This transformation encompasses the integration of advanced technologies such as artificial intelligence (AI), big data analytics, cloud computing, and blockchain to reinvent business models and client engagement strategies (Feyen et al., 2021; Osei et al., 2023).

The sector is currently witnessing a “dual pressure”. On one hand, there is a need to optimize complex capital market operations through automation; for instance, AI-powered trading and risk management tools enable banks to detect market trends and risks with greater precision and speed than conventional systems (Feyen et al., 2021). On the other hand, client-centricity lies at the centre of this evolution, as investment banks leverage digital platforms and open banking frameworks to deliver personalized advisory services and seamless multi-channel interactions (Diener & Pacek, 2021; Osei et al., 2023).

The urgency of this transformation has been compounded by external shocks. The COVID-19 pandemic notably accelerated digital adoption, with banks pivoting to virtual client interactions and digital deal execution to sustain operations under mobility constraints and market disruptions (Osei et al., 2023; Zhou, 2022). Simultaneously, the intensifying competitive landscape challenges traditional investment banks, which are now confronted by nimble fintech startups and technology giants offering innovative financial solutions (Feyen et al., 2021; Osei et al., 2023). In response, leading institutions like JPMorgan Chase have engaged in strategic collaborations and fintech acquisitions to maintain market relevance and client service excellence (Zhou, 2022). Furthermore, this transformation is indispensable not only for competitive positioning but also for embedding sustainability and ESG (Environmental, Social, and Governance) objectives into a rapidly evolving global financial ecosystem (Osei et al., 2023; Zhou, 2022).

1.2. Problem Statement and Research Gap

While digital transformation is universally acknowledged as a strategic imperative, the investment banking sector faces unique structural impediments that sever the link between intent and execution. This study identifies a specific "Strategy-Execution Gap" driven by two opposing forces: the external rigidity of the European regulatory environment and the internal inertia of organizational culture.

The Regulatory Paradox

Externally, the transition is hindered by the sheer density of compliance mandates. Frameworks such as the Revised Payment Services Directive (PSD2) have transformed regulation from a governance mechanism into an operational constraint, necessitating complex "RegTech" integrations to ensure adherence while maintaining operational agility (Diener & Pacek, 2021; Feyen et al., 2021). For European institutions, embedding digital logic into anti-money laundering (AML) and risk protocols creates a layer of complexity significantly higher than that faced by their global peers.

The Cultural Bottleneck

Internally, the primary barrier is human rather than technical. Legacy banking cultures often lack the agility required for digital adoption. Although institutions are attempting to mitigate this by appointing Chief Digital Officers (CDOs) and launching innovation hubs to cultivate agility, these measures often fail to penetrate the core workforce (Diener & Pacek, 2021; Zhou, 2022). Without a fundamental shift in mindset, technological investments remain superficial "digital theater" rather than genuine transformation.

Consequently, existing literature exhibits a significant limitation: while technical reports abound, there is a scarcity of academic work that synthesizes these regulatory and cultural constraints into a unified strategic framework. This dissertation addresses this void by proposing a cohesive roadmap specifically tailored to the European investment banking context. Therefore, the central research question guiding this dissertation is: Why, despite possessing advanced technologies, do European investment banks exhibit a persistent gap between digital strategy and execution?

It is important to note that this study does not aim to empirically validate the effectiveness of the proposed model through longitudinal implementation. Instead, it aims to offer an descriptive and conceptual proposal, grounded in contrasted secondary evidence and expert validation, serving as a foundational framework for future research or professional application.

1.3. Objectives

- **Main Objective:** To conceptually propose a strategic framework (METD-BI) that guides traditional investment banks in Europe through their digital transformation journey.
- **Secondary Objective 1:** To analyze the impact of "Third Wave" technologies on operational efficiency to validate Proposition 1 (Efficiency Driver).
- **Secondary Objective 2:** To diagnose structural and cultural barriers to validate Proposition 2 (The Cultural Barrier).
- **Secondary Objective 3:** To synthesize technological drivers with European regulatory requirements (DORA) into the METD-BI model, validating Proposition 3 (The Regulatory Paradox).

The primary objective of this dissertation is to conceptually propose a strategic framework that guides traditional investment banks in Europe through their digital transformation journey, analyzing the gap between global technological availability and local regulatory implementation.

1.4. Research Hypotheses

Given the qualitative and descriptive nature of this study, rather than statistical hypotheses requiring econometric validation, this research tests three analytical propositions. These propositions serve as the guiding thread for the literature review, the sectoral analysis, and the expert validation phase.

- **Proposition 1 (The Efficiency Driver):** The integration of Artificial Intelligence (AI) and Machine Learning into core trading and risk workflows is the primary determinant of operational efficiency gains, though its impact is currently limited by data fragmentation in legacy institutions.
- **Proposition 2 (The Cultural Barrier):** As suggested by organizational theory (Kane et al., 2019), legacy organizational culture and rigid governance structures constitute a more significant structural barrier to digital maturity than the lack of technological infrastructure or budget availability.

- **Proposition 3 (The Regulatory Paradox):** In the European investment banking context, regulatory compliance (specifically DORA and MiFID II) acts as the primary catalyst for digital modernization, creating a distinct "compliance-driven" innovation cycle that differs from the market-driven model observed in the US.

1.4.1. Criteria for Validation

To ensure methodological rigor without primary quantitative data, these propositions will be contrasted using a triangulation strategy, mapping academic theory against sectoral evidence and applied cases:

Table 1. Evidence Matrix: Theoretical Framework and Practical Validation of Propositions

| Proposition | Academic Source (Theory) | Sectoral Evidence (Practice) | Applied Case / Validation |
|---|---|---|---|
| P1: AI-Driven Operational Efficiency | Kane et al. (2019): Concepts of digital maturity and human-AI augmentation. | BCG (2025): Value Gap Report on GenAI ROI in the banking sector. | Expert Interview: Insights on efficiency gains in Portfolio Management. |
| P2: Culture as a Digital Enabler | Westerman et al. (2014): Research on "Digital Mastery" and leadership over tech. | McKinsey / Capgemini: Reports on failure rates due to organizational resistance. | Comparative Analysis: Digital transformation of BBVA vs. FinTech entrants. |
| P3: Regulatory Compliance Drivers | DiMaggio & Powell (1983): Theory of institutional isomorphism in financial services. | PwC (2024): Implementation guide for the DORA regulation and resilience. | Case Study: Infrastructure adaptation at Santander CIB. |

1.5. Scope and Limitations of the Study

To ensure a rigorous analysis of the digital transformation in investment banking, this study adopts a defined scope across thematic, geographic, and temporal dimensions, while acknowledging specific methodological limitations.

1.5.1. Thematic Scope

The research focuses exclusively on the Investment Banking sector, distinguishing it from retail or commercial banking. While retail banking digitization focuses on high-volume transactions, this study analyzes high-value, low-volume complex operations such as M&A, underwriting, and institutional trading.

Thematically, the analysis is centered on the “Third Wave” of digital transformation, characterized by the integration of disruptive technologies rather than mere digitization of analog processes. Drawing on the framework by Westerman et al. (2014), the scope includes the transformation of customer experience, operational processes, and business models. Specifically, the study investigates the impact of Artificial Intelligence (AI), Cloud Computing, and Blockchain, as identified by Osei et al. (2023) as the critical technological drivers for the sector.

1.5.2. Geographic Scope (The Funnel Approach)

To address the varied maturity levels of global markets, this study utilizes a “funnel” approach to geographic analysis:

- **Global Level (Technological Trends):** The analysis of technological capabilities (e.g., Generative AI, Quantum Computing) and the definition of “Digital Maturity” benchmarks are based on global data, primarily driven by US-based Tier 1 banks (e.g., JPMorgan, Goldman Sachs), which currently set the industry standard (Kane et al., 2019)
- **European Level (Regulatory Framework):** The analysis of the operating environment is strictly bound the European Union context. It examines the unique constraints imposed by EU-specific regulations, specifically MiFID II, PSD2, and the Digital Operational Resilience Act (DORA), which create a distinct competitive landscape compared to the US or Asian markets (Feyen et al., 2021).
- **Spanish Level (Application):** Practical recommendations and specific case applicability are tailored to the Spanish banking sector (e.g., Santander CIB, BBVA), analyzing how global trends and European regulations converge in this specific market.

1.5.3. Temporal Scope (Post-Pandemic Focus)

The study prioritizes data and literature published in the post-pandemic era (2020-2025). As noted by Zhou (2022) and Rogers (2016), the COVID-19 pandemic acted as a catalyst that rendered many pre-2020 digital strategies obsolete. Therefore, pre-2020 literature is used solely for historical context, while strategic analysis relies on recent evidence.

1.5.4. Methodological Limitations

To ensure academic transparency, the following limitations are acknowledged:

- **Sample Size of Primary Data:** While this study incorporates a qualitative validation phase through expert interviews (e.g., Singular Bank), the sample size is intentionally limited to "Elite Informants." Therefore, the findings from these interviews should be interpreted as illustrative validation of the proposed model rather than statistically significant evidence representative of the entire banking sector.
- **Data Confidentiality:** Due to the proprietary nature of algorithmic trading strategies, direct observation of "live" trading floors or access to internal banking code is restricted. Consequently, the analysis of technological stacks relies on triangulation of secondary data (Consulting Reports 2020-2025) and expert disclosures, rather than direct technical auditing.
- **Rapid Technological Obsolescence:** Given the exponential rate of change in Generative AI, specific technical specifications analyzed (e.g., current LLM capabilities) represent a "snapshot" of the 2024-2025 period and may evolve during the academic assessment cycle.

2. Literature Review and Theoretical Framework

2.1. Defining the Scope: Digitization vs. Digitalization vs. Digital Transformation

Digital transformation in banking represents a profound, holistic process that transcends mere technology adoption. It entails the integration of digital technologies into all areas of the bank's operations, fundamentally reshaping how value is created and delivered to customers, while simultaneously affecting regulatory compliance and competitive dynamics (Diener & Pacek, 2021; Osei et al., 2023).

To establish a precise theoretical baseline, this study adopts hierarchical distinction between three often-confused terms, as recommended by recent literature:

- **Digitization:** The conversion of analogue information into digital formats (e.g., paperless statements) without changing the process itself (Diener & Pacek, 2021).
- **Digitalization:** The use of digital technologies to streamline existing business processes (e.g., online loan applications), focusing on efficiency (Matt et al., 2015).
- **Digital Transformation (DT):** A deep, strategic change in business models, organizational culture, and operational paradigms. It is not an IT upgrade but a strategic overhaul where technology is the enabler, not the goal (Rogers, 2016; Westerman et al., 2014)

2.1.1. Strategic Frameworks in Literature

Conceptually, digital transformation is multi-dimensional. Matt et al. (2015) define it as encompassing changes in value creation, structural shifts, and the adoption of financial technologies. However, purely technological views are insufficient. Rogers (2016) argues that digital transformation is fundamentally a strategy problem, not a technology problem, identifying five domains of strategy: customers, competition, data, innovation, and value.

Similarly, Kane et al. (2019), through the MIT Digital Maturity Model, emphasize that “digital maturity” is driven by organizational culture and talent rather than infrastructure alone. This aligns with Westerman, Bonnet, and McAfee (2014), who highlight that “Digital Masters” excel in two dimensions: Digital Capabilities (the “what”) and Leadership Capabilities (the “how”), including governance and vision.

2.1.2. Banking-Specific Maturity Models

While academic models provide the strategic base, the investment banking sector requires specialised frameworks to measure operational readiness. This study integrates widely accepted industry models to bridge the gap between theory and practice:

- **The BCG Digital Acceleration Index (DAI):** This model assesses banks across 36 categories, focusing heavily on how data analytics and AI are embedded into core decision-making processes (BCG, 2021).
- **Deloitte's Digital Banking Readiness Model:** This framework focuses on the ecosystem aspect, evaluating a bank's ability to integrate with third parties (FinTechs) via Open Banking APIs (Deloitte, 2022).

These innovations enable banks to improve operational efficiency, develop customer-centric products, enhance risk management, and foster agility in a fast-evolving financial ecosystem (Feyen et al., 2021; Stefanelli et al., 2022). Furthermore, the emergence of RegTech leverages technology specifically to optimize regulatory compliance, a critical dimension for European institutions (Osei et al., 2023).

2.2. Theoretical Models: Organizational Governance and Digital Maturity

To address the limitations of purely technological perspectives, this study grounds its analysis in established academic frameworks that prioritize strategy, culture and governance. This approach responds to the critique that digital transformation in banking is often hampered not by a lack of technology, but by rigid organizational structures and undefined strategies.

2.2.1. Rogers' Strategic Domains: Strategy over Technology

Contrary to the view that digital transformation is an IT function, Rogers (2016) posits that it is fundamentally a strategy problem. His framework argues that digital transformation requires rethinking five core domains of strategy: customers, competition, data, innovation, and value.

For investment banks, this shift is critical. Traditional banking models viewed data as a siloed record-keeping tool. Rogers' framework suggests that in the digital era, data must be treated as a strategic asset for value creation, a concept that directly supports the integration of Big Data Analytics discussed later in this study. This strategic pivot aligns with the view that transformation must reshape how value is delivered to customers.

2.2.2. Kane et al. The Primacy of Organizational Culture

While technology acts as the enabler, Kane et al. (2019), through the MIT Digital Maturity Model, establish that organizational culture is the strongest predictor of digital maturity. Their research indicates that “maturing” digital organizations differ from “early” stages ones not just in tech usage, but in their tolerance risk, rapid experimentation, and collaborative (non-hierarchical) structures.

This theoretical lens explains the “Cultural Barrier” hypothesis (H2) of this dissertation. It elucidates why legacy investment banks, characterized by risk-averse and hierarchical governance, struggle to compete with agile FinTechs despite having larger capital reserves.

2.2.3. Westerman’s “Digital Masters”: The Role of Governance

To achieve sustainable transformation, banks must excel in two dimensions: Digital Capabilities (the “what”) and Leadership Capabilities (the “how”). Westerman, Bonnet, and McAfee (2014) define “Digital Masters” as firms that integrate these two dimensions through strong Digital Governance.

Westerman’s framework highlights nine essential elements of transformation, including customer experience, operational processes, and business models. Crucially, it argues that without “Digital Governance”, mechanisms to steer, coordinate, and prioritize digital initiatives across the enterprise, banks risk “Digital Fashion”, where they adopt trendy technologies without underlying business value. This concept is essential for analysing the “silos” often found in European investment banking structures.

2.2.4. Synthesis: From Theory to Banking Application

Integrating these models reveals a clear theoretical consensus: digital transformation is a managerial and cultural challenge as much as a technical one.

- Rogers (2016) provides the Strategic Vision.
- Kane et al. (2019) define the required Cultural Mindset
- Westerman et al. (2014) establish the Governance Structure needed to execute.

This theoretical triad provides the necessary academic rigor to balance the practical consulting frameworks (e.g., McKinsey, Accenture) used in the subsequent sector analysis.

As established by Teece (2014), the digital transformation of investment banking is not merely a technological upgrade, but the development of dynamic capabilities required to reconfigure internal assets in response to a volatile environment.

2.3. Banking-Specific Frameworks: Review of BCG, Deloitte, and McKinsey Models.

While academic theories provide the strategic “why” and “how” of transformation, they often lack the granular metrics required to assess specific banking operations. To bridge this gap, this study utilizes practical frameworks developed by leading management consulting firms. These models are selected not merely for their prevalence, but because they effectively set the industry standards against which global investment banks benchmark their own performance.

2.3.1. BCG: The Digital Acceleration Index (DAI)

The Boston Consulting Group (BCG) framework is critical for quantitative assessment. Their Digital Acceleration Index (DAI) acts as a diagnostic tool that estimates a bank’s “digital maturity” by evaluating 36 specific categories across business strategy, process digitization, and technological enablers (BCG, 2021).

Unlike generic models, the DAI is particularly valid for this study because it distinguishes between “bionic” banks, those that blend human and machine capabilities, and traditional players. It emphasizes that the most mature banks (Digital Leaders) utilize Artificial Intelligence not just in isolation, but embedded in core workflows, a metric that will be used in the benchmarking analysis that will be mentioned later.

2.3.2. Deloitte Banking Readiness (DBM)

Where BCG focuses on internal acceleration, Deloitte’s Digital Banking Readiness model provides a comprehensive external benchmark of the customer experience. This framework analyses the digital functionalities available to clients along the entire customer journey, from information gathering to account opening and day-to-day banking (Deloitte, 2022)

This model is essential for testing the “User Experience” dimension of this thesis. It posits that “Digital Champions” are those institutions that have successfully expanded beyond traditional banking products to offer ecosystem services (e.g., non-banking value-added services), a trend directly observed in the rise of Open Banking platforms.

2.3.3. McKinsey: The “Digital Case” for Investment Banking

McKinsey & Company provides the strategic narrative for the sector’s transformation. Their framework, often outlined in their Global Banking Annual Review, focuses on the “Dual Strategy”: optimizing the legacy business (cost reduction via automation) while simultaneously building new digital businesses (revenue growth) (McKinsey & Company, 2023).

McKinsey’s approach is particularly relevant for analysing the European context, as it highlights the specific challenge of “technological debt” in incumbent banks. Their case studies illustrate how investment banks must move from monolithic IT architectures to modular, cloud-native “Digital Cores” to remain competitive against agile FinTech entrants.

2.3.4. Justification for Integration

These three frameworks offer a complementary view that supports the METD-BI model proposed in this dissertation:

- BCG (2021) provides the internal operational metrics (Process).
- Deloitte (2022) measures the external value proposition (Client).
- McKinsey (2023) outlines the overarching strategic imperatives (Strategy)

By synthesizing these practitioner models with the academic governance theories of Kane et al. (2019) and Rogers (2016) discussed in the previous section, this study ensures a holistic analysis that is both theoretically sound and industrially applicable.

2.4. Key Academic Trends: The Convergence of AI, Blockchain, and RegTech

To ground this strategic analysis in empirical evidence, this study adopts the bibliometric findings of Osei et al. (2023), who analysed the intellectual structure of the digital banking research field. Their review confirms that digital transformation is no longer defined by isolated technological experiments, but by the convergence of three dominant “intellectual cluster”: Artificial Intelligence (AI), Blockchain, and Regulatory Technology (RegTech).

2.4.1. Validation of Technological Scope

The selection of technologies for this dissertation is empirically validated by Osei et al.'s keyword analysis, which identifies “FinTech”, “Blockchain”, and “Artificial Intelligence” as the most significant emerging research trends. This confirms that the focus of the key disruptive technologies aligns with the current frontier of academic and industrial research.

2.4.2. The Rise of RegTech as a Strategic Pillar

Crucially for the European context, Osei et al. (2023) identify “FinTech and RegTech in Banking” as a core intellectual cluster. This highlights a shift in academic discourse: compliance is no longer viewed merely as a cost centre but as a driver for technological adoption.

In the investment banking sector, RegTech (Regulatory Technology) leverages automation and big data to manage the increasing complexity of reporting requirements (e.g., MiFID II, PSD2). This supports the hypothesis that in Europe, regulation is a primary catalyst for digital transformation, forcing banks to modernize their data architecture to ensure real-time transparency.

The 'Dual Pressure' environment described in this sector analysis requires what O'Reilly and Tushman (2013) define as organizational ambidexterity: the ability to compete in mature markets through efficiency while exploring new technologies.

2.4.3. The New Digital Business Model

Finally, the literature points to a fundamental change in the business logic of banks. Osei et al. (2023) describe the emergence of “The New Digital Business Model of Banks”, where value is created not through asset ownership but through ecosystem orchestration.

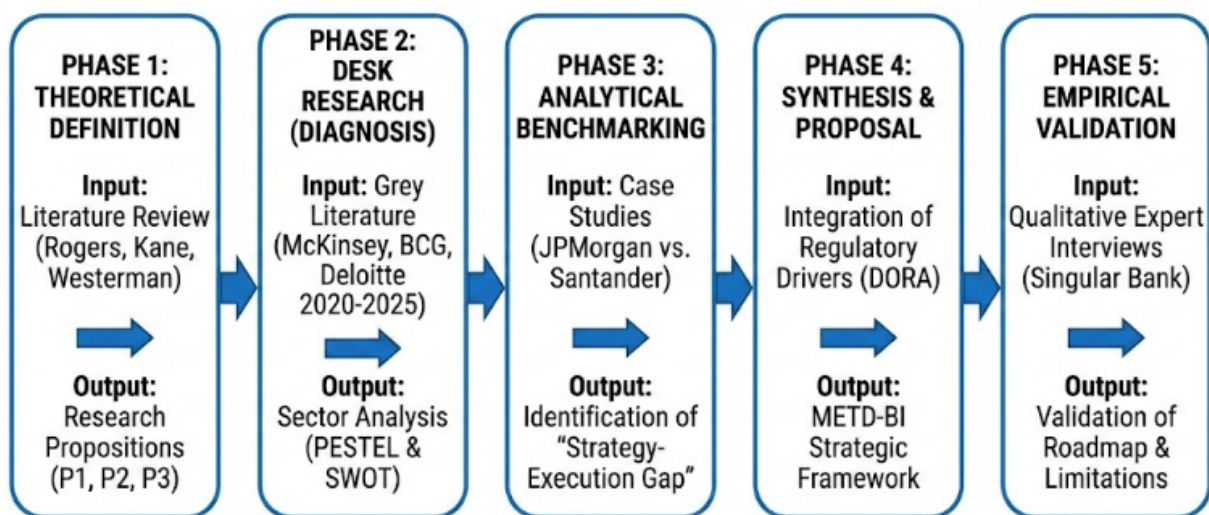
This trend suggests that the convergence of AI (for personalisation) and Blockchain (for secure, decentralised transactions) is enabling investment banks to transition from closed, product-centric institutions to open platforms that integrate third-party FinTech services.

3. Methodology

3.1. Research Design: Qualitative and Descriptive Approach

This research employs a conceptual and qualitative methodology. Moving beyond a purely descriptive approach, the study focuses on the construction of an original strategic framework (METD-BI). The research follows a deductive logic, utilizing a triangulation strategy that maps academic theory (secondary data) against primary expert validation (qualitative interviews) to ensure both rigor and relevance.

Figure 3.1: Methodological Research Design



Source: Author's own elaboration based on the "Research Onion" framework by Saunders et al. (2019)

3.1.1. Methodological Rationale

Following the "Research Onion" framework proposed by Saunders, Lewis, and Thornhill (2019), this study adopts an interpretivist research philosophy. This perspective is essential because digital transformation in investment banking is not merely a technical process, but a social phenomenon shaped by human leadership decisions, organizational resistance, and regulatory interpretation.

This study utilises a descriptive-analytical method:

- **Descriptive Phase:** Systematically mapping the current "state of art" of the investment banking sector, identifying key technological trends and regulatory constraints.

- **Analytical Phase:** Diagnosing the root causes of the “digital maturity gap” between traditional banks and FinTechs by applying the theoretical lenses of Rogers (2016) and Kane et al. (2019).

3.1.2. Deductive Logic

The research follows a deductive approach, moving from general theoretical foundations to specific industry applications. As described by Yin (2018), this approach allows for the validation of existing theories in new contents. This logical flow proceeds as follows:

- **General Level:** Analysis of established global digital transformation theories and governance models (e.g., Westerman’s “Digital Masters”).
- **Specific Level:** Application of these frameworks to the European investment banking sector to analyse specific drivers (e.g., DORA regulation) and barriers (e.g., legacy IT).
- **Synthesis Level:** Development of the “Integrated Strategic Model for Digital Transformation (METD-BI)”, offering a prescriptive roadmap for the Spanish and European market.

3.1.3. Reliance on Secondary Data

Given the strict confidentiality policies of investment banks regarding their proprietary algorithms and internal strategic budgets, primary data collection (e.g., internal surveys) is restricted. Therefore, this study implements a Desk Research strategy based on the rigorous curation of secondary data.

As noted by Synder (2019), a systematic review of secondary data is highly valid for analysing broad industry trends where direct access is limited. To ensure robustness, the study employs data triangulation, cross-referencing academic literature with high-level industry reports from Tier-1 Consulting firms (McKinsey, BCG, Deloitte) to validate findings and minimise the bias of any single source.

3.2. Data Collection Strategy: Selection Criteria for Reports (2020-2025)

To ensure validity in a sector characterized by trade secrets and rapid obsolescence, this study employs a rigorous Desk Research strategy.

3.2.1. Justification for the Use of Grey Literature

The specific context of investment banking, characterized by proprietary secrecy and rapid innovation requires the integration of "grey literature" (industry reports, white papers, and regulatory guidelines). This approach is grounded in Bowen's (2009) framework for Document Analysis, which argues that non-academic documents provide essential context and "unobtrusive" data that surveys cannot capture. Furthermore, Adams et al. (2017) emphasize that in fast-moving management fields, high-quality industry reports often precede academic publication, offering more timely insights into operational realities. Therefore, this study triangulates academic theory with empirical data from Tier-1 management consulting firms to ensure both rigor and relevance.

3.2.2. Quality Control: The Scott Criteria

To mitigate the potential bias inherent in commercial reports, each source was evaluated against Scott's (1990) four criteria for documentary quality:

- **Authenticity:** The origin of the document is verified (official release from a Tier-1 firm).
- **Credibility:** The source is an established authority (e.g., McKinsey, ECB) with access to primary banking data.
- **Representativeness:** The document reflects broad industry trends rather than niche anomalies.
- **Meaning:** The evidence is clear and comprehensible within the banking context.

3.2.3. Inclusion and Exclusion Criteria

Following the systematic review guidelines proposed by Tranfield et al. (2003), the following criteria were strictly enforced to select relevant data:

- **Criterion 1: Temporal Relevance (Post-2020 Focus).** Priority was assigned to sources published between 2020 and 2025. This temporal restriction is critical because, as noted by Zhou (2022), the COVID-19 pandemic acted as a structural break in the banking industry, rendering many pre-2020 digital strategies obsolete due to the sudden shift in remote operations.

- **Criterion 2: Source Authority.** Data regarding market trends is sourced exclusively from recognized global authorities. The primary industry sources selected are McKinsey & Company, Boston Consulting Group (BCG), Deloitte, PwC, and Accenture. These firms were selected based on their market dominance and the publication of longitudinal indices (e.g., the Global Banking Annual Review), ensuring longitudinal validity.
- **Criterion 3: Geographic Specificity.** To ensure the applicability of the findings to the European market, sources were categorized by geographic scope. Global reports establish technological benchmarks (e.g., AI adoption rates), while European Union-specific texts (e.g., European Central Bank regulations) are used to analyze the specific impact of MiFID II and DORA.

3.2.4. Primary Data: Qualitative Expert Interviews (Validation Phase)

To triangulate the findings from the secondary literature and mitigate the limitations of desk research, this study incorporates a phase of primary qualitative data collection through semi-structured expert interviews (Saunders et al., 2019).

A. Purposive Sampling Strategy: The “Dual-Lens” Profile

The selection of interviewees follows a purposive sampling strategy, specifically targeting “Elite Informants”, individuals with privileged access to strategic decision-making (Yin, 2018). To ensure high-value insights, the study prioritizes a unique “Dual-Lens” profile: experts who possess both academic rigor and executive operational responsibility.

Specifically, the research targets the profile of a Digital Business Director within the specialized banking sector (Singular Bank), who concurrently holds an academic position as a Professor of Portfolio Management. This specific profile is critical for this study for three reasons:

- **Strategic Validation:** As a Digital Director, the subject directly confronts the “Regulatory Paradox” and the practical implementation of DORA identified in the sector analysis (PwC, 2024).
- **Operational Insight:** As a Portfolio Management expert, the subject can validate Hypothesis 1, specifically how AI is reshaping asset allocation and risk modelling beyond theoretical hype (Boston Consulting Group, 2025; CFA Institute, 2024).

- **Model Applicability:** This profile represents the “Specialized/WealthTech” banking model, offering a vital contrast to the SIFI models analyzed in the benchmarking section (EY, 2024).

B. Interview Protocol

The interview is designed as semi-structured, focusing on validating the proposed Integrated Strategic Model for Digital Transformation (METD-BI). The protocol addresses:

- Real-world friction points in implementing the Digital Operational Resilience Act (DORA) (PwC, 2024).
- The cultural challenge of integrating “Quant” talent with traditional bankers, testing Hypothesis 2 regarding cultural barriers (Kane et al., 2019; Zhou, 2022).
- The future of “Hybrid Advisory” (AI + Human) in the Spanish market (EY, 2024; TechFluence, 2024).

3.3. Analytical Frameworks

To move beyond a purely descriptive narrative and ensure a rigorous strategic evaluation, this study applies three established analytical frameworks. These tools provide the structured lenses necessary to dissect the complex interplay between external market forces and internal organizational capabilities.

3.3.1. Macro-Environmental Analysis (PESTEL)

To evaluate the external pressures driving the digital transformation imperative, the PESTEL Framework is used. As defined by Jhonson, Scholes, and Whittington (2008), this tool is essential for identifying the macro-environmental factors that are beyond the control of the organization but directly impact its strategic options.

In the specific context of this research, the analysis focuses on four high-impact dimensions:

- **Political/Legal:** The impact of European Union directives, specifically the Digital Operational Resilience Act (DORA) and PSD2, which act as compulsory drivers for technological modernization.
- **Economic:** The influence of the post-pandemic interest rate environment on IT investment budgets and capital allocation.
- **Social:** The shift in client demographics and the demand for "always-on" digital services from Generation Z investors and digitally native corporate clients.

- **Technological:** The availability of "Third Wave" technologies (Generative AI, Quantum Computing) that render legacy systems obsolete.

3.3.2. Internal Strategic Analysis (SWOT)

While PESTEL assesses the external environment, the SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats) is employed to diagnose the internal readiness of traditional investment banks. Following the methodological guidelines of Helms and Nixon (2010), this framework facilitates a direct comparison between incumbent institutions and digital entrants (FinTechs).

The application of SWOT in this study moves beyond generalities to focus on digital capabilities:

- **Strengths/Weaknesses (Internal):** Analyzes internal assets such as legacy IT infrastructure, data silos, and organizational culture.
- **Opportunities/Threats (External):** Evaluates the potential for open banking ecosystems versus the threat of disintermediation by BigTech competitors.

3.3.3. Comparative Benchmarking Variables

To ensure the objectivity of the case studies and address the need for quantitative metrics, a structured Comparative Benchmarking approach is adopted. Addressing the specific requirement for "defined benchmarking variables", the comparison of investment banks is standardized across four key performance pillars:

- **Technological Stack Maturity:** Assessed by the degree of Cloud adoption and the integration of AI in core workflows (e.g., algorithmic trading vs. basic chat bots).
- **Customer Experience (UX):** Evaluated through the functionality of digital platforms, mobile app ratings (where applicable), and the availability of personalized, data-driven advisory services.
- **Regulatory Strategy:** Differentiating between banks that view regulation merely as a compliance cost versus those leveraging RegTech for competitive advantage.
- **Organizational Agility:** Measured by the presence of dedicated innovation hubs, digital factories, or agile governance structures.

4. Sector Analysis: The Strategic Context of Investment Banking

Having defined the theoretical frameworks and methodological approach in the preceding chapters, this section shifts the focus to the empirical reality of the global Investment Banking sector.

The objective of this chapter is to diagnose the structural and environmental conditions that define the current “digital imperative”.

Unlike retail banking, where digital transformation is primarily driven by consumer convenience, the transformation of Investment Banking is characterized by higher complexity, systemic risk, and institutional inertia. This analysis posits that the sector is currently navigating a unique strategic conjecture defined by a “Dual Pressure” environment:

- **External Pressure:** A “Regulatory Tsunami” (MiFID II, DORA) that mandates technological modernization for compliance.
- **Competitive Pressure:** The erosion of traditional profit pools by agile FinTech entrants and the commoditization of execution services.

By applying the PESTEL (Macro-environment) and SWOT (Internal capabilities) frameworks established in the Methodology, this chapter evaluates how these converging forces are reshaping the competitive landscape. It moves beyond a general discussion of “digitalization” to specifically analyze how regulatory mandates in Europe are creating a distinct transformation trajectory compared to the market-led approach observed in the United States.

4.1. The "Dual Pressure" Environment: PESTEL Analysis

The application of the PESTEL framework reveals that the most immediate threats to the investment banking model stem from the Political/Legal and Competitive dimensions. This creates a “pincer movement” where banks are forced to invest heavily in compliance technology (RegTech) just to retain their license to operate, while simultaneously lowering fees to compete with low-cost digital entrants. The 'Dual Pressure' environment described in this sector analysis requires what O’Reilly and Tushman (2013) define as organizational ambidexterity: the ability to compete in mature markets through efficiency while exploring new technologies

4.1.1. Regulatory Pressure (PSD2, MiFID II, DORA)

In the European investment banking landscape, regulation has evolved from a governance mechanism into the primary driver of technological architecture. Unlike the US market, where digital adoption is largely market-led, European banks are currently navigating a "compliance-driven innovation" cycle defined by three key frameworks.

A. MiFID II: The Catalyst for Data Transparency and Research Unbundling

While initially framed as a transparency directive, MiFID II has fundamentally altered the digital revenue models of investment banks.

- **Research Unbundling:** By mandating the separation of research costs from trade execution fees, MiFID II destroyed the traditional cross-subsidy model. According to Oliver Wyman (2017), this forced banks to digitize their research distribution. Investment banks have had to build "Research Portals" (essentially e-commerce platforms for equity analysis) to track consumption and bill buy-side clients precisely, transforming research from a "soft dollar" perk into a tracked digital product.
- **Algorithmic Accountability:** The directive requires granular timestamping of algorithmic trades. This has needed an upgrade in High-Performance Computing (HPC) infrastructure to capture and store tick-level data, pushing banks away from legacy databases toward cloud-native data lakes capable of handling petabytes of regulatory logs (ESMA, 2021).

B. DORA (Digital Operational Resilience Act): The ICT Risk Mandate

As of January 2025, DORA shifts the focus from "financial resilience" (capital buffers) to "operational resilience" (IT uptime). For investment banks, which rely heavily on outsourced infrastructure, this is a strategic game-changer.

- **Third-Party Risk Management:** Investment banks depend on a concentrated set of providers (e.g., AWS/Azure for cloud, Bloomberg/Refinitiv for data). DORA mandates that banks must not only manage their own IT risks but also accept legal liability for their Critical Third-Party Providers (CTPPs).

- **Strategic Implication:** PwC (2024) notes that this effectively forces banks to map their entire digital supply chain. It creates a "Compliance Moat" where large incumbent banks can afford the complex vendor auditing systems required, while smaller boutique banks may be forced to exit or merge due to the high cost of digital compliance.

C. PSD2 and the Shift to "Open Finance"

While PSD2 is often associated with retail payments, its strategic impact on Investment Banking lies in the normalization of API connectivity for corporate clients.

- **Corporate Treasury APIs:** Corporate treasurers now demand the same real-time visibility into their liquidity that retail consumers have. PSD2 has accelerated the development of "Open Banking for Corporates", where investment banks must expose APIs that allow clients to plug their ERP systems (e.g., SAP, Oracle) directly into the bank's ledger for real-time cash management (Deloitte, 2023).

4.1.2. Competitive Pressure (FinTech and BigTech Entrants)

The second arm of the "Dual Pressure" comes from new market entrants. In investment banking, the threat is not total replacement, but "Vertical Unbundling", where agile competitors strip away the most profitable, low-capital-intensive services, leaving traditional banks with the capital-heavy, regulated risks.

- **The "Unbundling" by FinTechs:** FinTechs are attacking specific verticals of the investment banking value chain where margins are high and friction is common. Historically a cash cow for investment banks, segments like Forex and cross-border payments are being eroded by players like Wise and Revolut Business. By offering mid-market rates and transparent fees via API, they are capturing the SME and mid-cap corporate flow that previously went to Tier-2 banks. McKinsey (2023) estimates that banks could lose up to 15% of their global payments revenue to these digital specialists by 2025.
- **The "Platform Threat" from BigTech:** The entry of BigTech firms (Apple, Google, Amazon) represents a different strategic threat: Disintermediation. The risk for investment banks is becoming invisible "utilities" or "dumb pipes" that provide the regulated balance sheet while the tech firm controls the user experience and the data. Furthermore, as investment banks move to the cloud, they create a "competition" vulnerability, becoming dependent on infrastructure providers (AWS, Google Cloud) that have visibility into their operations.

4.2. Current State of Digital Maturity: The Gap Between Strategy and Execution

While the strategic intent to digitize is universal across the investment banking sector, the execution reveals a fractured landscape. The sector is currently characterized by a “Front-to-Back Asymmetry”: investment banks have successfully digitized the client-facing front office, but their middle and back-office operations remain heavily reliant on manual intervention and legacy infrastructure.

4.2.1. The “Innovation Illusion”: Quantitative Assessment

Contrary to the marketing narratives of “Digital First” banks, the empirical data suggests the sector is still in the early stages of effective scaling. This disconnect creates an “Innovation Illusion”, where the external user experience (UX) masks deep structural inefficiencies.

- **The Pilot Purgatory:** Drawing on the Digital Acceleration Index, Boston Consulting Group (2025) reveals that while a vast majority of financial institutions have launched AI and blockchain initiatives, only 5% are achieving value at scale. The remaining institutions are trapped in “Pilot Purgatory”, where isolated experiments fail to integrate with core banking engines due to technical incompatibility.
- **The Investment Paradox:** Despite rising IT budgets, a significant portion of expenditure is consumed by “Run-the-Bank” (maintenance of legacy systems) rather than “Change-the-Bank” (innovation). KPMG (2024) reports that approximately 70-75% of IT budgets in traditional banks are allocated to maintaining legacy infrastructure. This “Technical Debt” is a primary structural barrier preventing European banks from matching the agility of US peers.

4.2.2. Front-to-Back Asymmetry

The digital maturity of investment banks is not uniform. Applying Deloitte’s (2024), the Digital Banking Maturity model reveals a sharp divergence in readiness across the value chain:

- **Front Office (High Maturity):** Client onboarding and execution platforms are highly digitized. Features such as real-time dashboards and algorithmic trading interfaces are now industry standards.
- **Middle & Back Office (Low Maturity):** Settlement, reconciliation, and compliance workflows often remain fragmented. This “hollow” digitization creates operational risk, as the speed of digital trade execution in the front office clashes with the slower, manual processing speeds of the back office.

4.3. Comparison: Traditional Banks vs. Digitally Native Challengers

To visualize the structural disadvantages identified in the problem statement, the following table contrasts the operating models of traditional investment banks (Incumbents) against digitally native entrants (FinTechs/Challengers).

Table 2. Comparative Analysis: Traditional Investment Banks (Incumbents) vs. Digitally Native Challengers (FinTechs)

| Dimension | Traditional Investment Banks (Incumbents) | Digitally Native Challengers (FinTechs) |
|----------------------------|---|--|
| Core Architecture | Monolithic Legacy Systems (30+ years old) with high technical debt ² . | Cloud-Native, API-First Microservices architecture allowing rapid scalability. |
| Data Structure | Siloed by department (e.g., Risk vs. Trading operate on different databases). | Unified "Data Lakes" allowing real-time access and cross-functional analytics. |
| Innovation Cycle | 12–18 months (Waterfall methodology, rigid approval chains). | 2–4 weeks (Agile/DevOps sprints, rapid prototyping). |
| Cost Structure | High fixed costs (physical branches, mainframe maintenance) ³ . | Low variable costs (SaaS/Cloud infrastructure), scalable on demand. |
| Regulatory Approach | Reactive: Compliance is viewed as a cost center and a constraint. | Proactive: "RegTech" is embedded as a core feature of the product value proposition. |

Source: Author's own elaboration based on McKinsey (2023) and Capgemini (2024).

This comparison highlights that FinTechs possess a structural agility advantage. Their lack of legacy infrastructure allows them to pivot strategies rapidly in response to market changes, whereas traditional banks must navigate complex internal approvals and system integrations before launching new digital products (McKinsey & Company, 2023).

4.3.1. Synthesis: From Theory to Banking Application

“The integration of academic maturity models with empirical reality is demonstrated by the operational shift observed in digital leaders within the Spanish market. While the theoretical frameworks provided by the BCG Digital Acceleration Index (DAI) and Deloitte’s Digital Banking Maturity (DBM) focus on high-level governance and ecosystem integration, the expert insights provided by Ignacio Prieto (Director of Digital Business at Singular Bank) reveal how these models are operationalized in a high-net-worth environment.

Prieto confirms that true digital maturity, as suggested by McKinsey’s “Digital Case”, is achieved by prioritising the “banker’s journey” over the “client’s interface”. According to the expert, a major differentiator in achieving maturity is the unification of fragmented legacy systems into a single, AI-driven cockpit for the banker. This reflects the transition from a “digitized” bank to a “digital-first” institution.

A critical piece of evidence for this synthesis is the capacity multiplier effect: by applying the pillars of digital reporting and automated document management, a banker can scale their portfolio from the industry standard of 40-50 families observed in traditional firms like UBS to managing over 100 families without diminishing service quality. This practical outcome validates that the “Digital Imperative” is not merely an aesthetic choice but a fundamental requirement for operational leverage and competitive survival in the current European landscape”.

4.4. Barriers to Change: Organizational Culture and Legacy Infrastructure

Addressing Hypothesis 2, the analysis confirms that internal barriers are the primary impediment to transformation.

4.4.1. The Burden of Legacy Systems (Technical Debt)

The single biggest technical barrier is “Technical Debt”. As noted in the PESTEL analysis, global financial institutions spend most of their IT budgets merely maintaining legacy systems. Older mainframes cannot easily communicate with modern APIs, forcing banks to build expensive “middleware” layers that increase complexity and risk (Gartner, 2023)

4.4.2. Cultural Resistance and Silos

Technology is not the problem; culture is:

- **Siloed Operations:** In many investment banks, the IT department functions as a separate “utility” rather than a strategic partner. McKinsey & Company (2025) notes that transformation fails when business units (e.g., trading, M&A) operate in isolation, adopting disparate tools that do not integrate.
- **Talent Gap:** There is a critical shortage of “hybrid” talent, professionals who understand both complex derivatives and Python coding. European banks struggle to compete with Big Tech firms for this specialized labour pool, creating knowledge gap that slows down digital adoption (Capgemini, 2024).

4.4.3. Empirical Validation: Expert Insights on Structural Barriers

“The theoretical barriers to digital transformation identified in previous sections, namely technical debt and cultural inertia, are explicitly confirmed by current practitioners in the Spanish investment banking sector. Ignacio Prieto, Director of Digital Business at Singular Bank, notes that while the industry often focuses on client-facing technology, the most significant structural barrier remains the digitalization of the banker’s internal workflow.

Prieto identifies two primary dimensions of these barriers:

- **Technological Fragmentation:** Traditional legacy structures often force bankers to manage client portfolios using two or three disparate applications (e.g., separate tools for CRM, fund analysis, and historical data). This fragmentation validates the “Front-to-Back-Asymmetry” theory, where external digital appearance masks internal manual inefficiencies.
- **The Psychological Barrier (Change Management):** Addressing the 'Cultural Bottleneck' identified in Section 4.4.2, Prieto emphasizes that the primary difficulty is not the tool itself, but the fear among bankers of becoming irrelevant through automation. To overcome this, successful transformation requires framing AI as a 'spectacular intern'-a non-threatening, highly efficient assistant available 24/7 to handle reporting and data processing-rather than a direct replacement for the human advisor.

Furthermore, the expert highlights a critical disconnect in software development speed: while legacy institutions may require an entire year and fifty developers to deliver a new project, AI-assisted coding in a digitally native environment allows for the same delivery in a single week. This empirical gap reinforces the argument that legacy infrastructure (Technical Debt) acts as a physical drag on the 'Time-to-Market' for European incumbents."

5. Key Disruptive Technologies (Refined to focus on the "Big 3" + Enablers)

This chapter analyses the specific technological levers that drive the digital transformation in investment banking. Following the "Third Wave" framework (Osei et al., 2023), the focus shifts from mere digitization to algorithmic cognition and decentralized infrastructure.

5.1. Artificial Intelligence (AI) and Machine Learning: From Trading to Risk Management

Artificial Intelligence (AI) represents the cornerstone of the current transformation. As identified by Osei et al. (2023), the sector has moved beyond simple automation to an era of algorithmic cognition, where systems not only process data but generate actionable insights and autonomous decisions.

To understand its strategic impact, this analysis distinguishes between Analytical AI (Machine Learning/Predictive) and the emerging Generative AI (GenAI).

5.1.1. The Evolution: From Stochastic Models to Generative AI

Historically, investment banks relied on static stochastic models for pricing and risk. Today, the paradigm has shifted toward dynamic Machine Learning (ML) models capable of learning from unstructured data.

- **Analytical AI (The Engine of Efficiency):** This remains the primary driver of value in "run-the-bank" operations. According to BCG (2025), ML algorithms now automate reconciliation and fraud detection with accuracy rates surpassing 99.9%, significantly reducing operational risk.
- **Generative AI (The Creativity Augmenter):** This represents the most significant disruption in the 2023-2025 period. Unlike analytical models, GenAI can synthesize information to draft equity research reports or generate code for trading algorithms. McKinsey (2025) estimates that GenAI could unlock between \$200 billion and \$340 billion in annual value for the banking sector, primarily through productivity gains in coding and content generation.

5.1.2. Application in Front Office: The Search for “Alpha”

In the Front Office, AI is no longer a competitive advantage but a baseline requirement for "Alpha" generation.

- **Algorithmic Trading:** Algorithms now execute trades in microseconds. The differentiation lies in Natural Language Processing (NLP), which allows banks to analyse "market sentiment" by scanning thousands of news articles in real-time to predict asset price movements before traditional indicators react (Feyen et al., 2021).
- **Hyper-Personalization:** For Wealth Management, AI engines analyse client behavioural data to propose "Next Best Actions," shifting the advisory model from a quarterly review to continuous engagement (Capgemini, 2024).

5.1.3. Application in Risk & Compliance: The “Regulatory Shield”

Validating Proposition 3, AI is arguably most critical in the Middle and Back Office, where the "Regulatory Paradox" is most acute.

- **Stress Testing:** Under DORA regulations, banks must predict liquidity crises under extreme scenarios. ML models allow for non-linear stress testing, simulating thousands of correlated market shocks (e.g., a simultaneous crash in bond markets and a cyberattack) to verify operational resilience (PwC, 2024).

5.2. Cloud Computing: The Foundation of Scalability

If AI is the "brain," Cloud Computing and APIs (Application Programming Interfaces) constitute the central nervous system. Accenture (2021) argues that cloud migration is no longer a cost decision (OpEx vs. CapEx) but a survival necessity to overcome the rigidity of legacy monolithic systems.

5.2.1. From “Fortress” to “Ecosystem”: The API Economy

Traditionally, investment banks operated as closed fortresses. The transition toward an API-first microservices architecture allows banks to integrate directly into their corporate clients' ERP systems. Deloitte (2023) notes that this enables "embedded finance," offering treasury financing or FX hedging in real-time without human intervention.

- **Strategic Impact:** This architecture breaks down data silos, addressing one of the structural barriers identified by Kane et al. (2019).

5.2.2. The Resilience Challenge: DORA and Cloud Concentration

However, reliance on external hyperscale's (AWS, Azure, Google) introduces Concentration Risk. Here, technology clashes with regulation (Proposition 3). As PwC (2024) highlights in their analysis of the Digital Operational Resilience Act (DORA), banks are now forced to demonstrate they can recover from a cloud provider outage in near real-time. This mandate forces entities to invest heavily in complex "multi-cloud" strategies, diverting budget from innovation to operational resilience.

5.3. Blockchain and DLT: Transforming Transaction Transparency

While AI and Cloud optimize the current model, Distributed Ledger Technology (DLT) threatens to rewrite market infrastructure entirely.

5.3.1. Tokenization of Real-World Assets (RWA)

The strategic value for investment banking lies in the tokenization of illiquid assets (private debt, real estate). McKinsey (2023) estimates tokenization could reach transaction volumes of \$5 trillion by 2030. This allows banks to shift from intermediaries to platform providers, fractionalizing assets for a broader investor base.

5.3.2. Efficiency in post-trading

The immediate impact is in the Back Office. Implementing Smart Contracts enables atomic settlement (T+0), eliminating the traditional two-day lag (T+2). According to Oliver Wyman (2017) and Capgemini (2024), this could reduce post-trading operational costs by 30-50%, freeing up regulatory capital.

5.4. Enabling Technologies: Big Data Analytics, RPA, and Cybersecurity

While AI and Blockchain represent the frontier of disruption, their deployment depends entirely on a robust foundational layer.

This section analyses the three critical "enablers" that stabilize the digital ecosystem in investment banking: Data Analytics, Robotic Process Automation (RPA), and Cybersecurity

5.4.1. Big Data Analytics: The Fuel of Transformation

Data is the primary asset of the digital economy, yet traditional banks have historically struggled to leverage it due to fragmented "siloes" architectures. Applying the Resource-Based View (Barney, 1991), a bank's data architecture only becomes a strategic asset when it is organized into unified 'Data Lakes' that allow for real-time, inimitable insights.

- **From Structured to Unstructured:** The shift involves moving beyond structured transaction data (SQL databases) to analysing unstructured data (emails, voice logs, social media sentiment) within unified Data Lakes.
- **Strategic Application:** According to Deloitte (2022), advanced analytics enables "Client 360" views, allowing bankers to predict client needs rather than reacting to them. For example, analysing a corporate client's cash flow patterns to proactively offer liquidity solutions before a shortfall occurs. This transition from descriptive to predictive analytics is what separates digital leaders from laggards (Westerman et al., 2014).

5.4.2. Robotic Process Automation (RPA): The "Digital Workforce"

RPA should not be confused with AI. While AI involves cognitive decision-making, RPA focuses on automating repetitive, rules-based tasks. It serves as a tactical bridge between legacy systems and modern interfaces.

- **Operational Efficiency:** In the Middle and Back Office, RPA "bots" handle high-volume processes such as trade reconciliation, client onboarding, and Know Your Customer (KYC) checks. Gartner (2023) notes that RPA can reduce processing costs by up to 60% while eliminating human error.
- **The "Legacy" Fix:** Crucially, RPA allows banks to modernize operations without ripping out their core mainframe systems (a high-risk endeavour), acting as a non-invasive layer of efficiency that supports Proposition 1 (Efficiency Driver).

5.4.3. Cybersecurity: The Prerequisite for Trust

As banks migrate to the Cloud and open their APIs (Section 5.2), the traditional security perimeter disappears. Cybersecurity transforms from an IT function to a core strategic imperative.

- **Zero Trust Architecture:** Banks are moving to a "Zero Trust" model, where no user or device is trusted by default, even inside the network.

- **The Regulatory Imperative (DORA):** Connecting back to Proposition 3, cybersecurity is now strictly regulated. The Digital Operational Resilience Act (DORA), fully enforceable from January 2025, mandates that financial entities must withstand, respond to, and recover from ICT-related disruptions. As PwC (2024) highlights, this shifts the focus from "preventing attacks" to "ensuring continuity," forcing banks to allocate significant resources to cyber-resilience rather than purely commercial innovation.

6. Benchmarking and Case Studies

To contextualize the theoretical gaps identified in previous chapters, this section conducts a comparative analysis of industry leaders. The objective is not merely to list technological achievements, but to contrast the execution strategies of US incumbents (who benefit from a unified market and lower regulatory friction) against European banks (operating under the constraints of DORA and fragmented markets).

6.1. Methodology for Comparison: The Digital Maturity Matrix

To ensure a rigorous comparison, this thesis adopts a modified version of the Digital Acceleration Index (DAI) proposed by BCG (2021) and updated in their 2025 report. The analysis evaluates entities across three critical dimensions:

- **Technological Core:** The degree of migration from legacy mainframes to Cloud-native architectures (The "Gravity" of the bank).
- **Cultural Agility:** The transition from "Waterfall" project management to Agile/DevOps squads (The "Speed" of the bank).
- **Ecosystem Openness:** The effective use of APIs to integrate with third parties versus maintaining a closed "walled garden" (The "Connectivity" of the bank).

6.2. Global Leaders: Analysis of JPMorgan Chase and Goldman Sachs

US investment banks serve as the global benchmark for "Digital First" strategies, primarily due to their unparalleled scale and investment capacity.

6.2.1. JPMorgan Chase: The "Tech Company with a Banking License"

JPMorgan Chase (JPM) exemplifies the strategy of massive internal investment. In 2024, the bank reported a technology budget exceeding \$17 billion, a figure larger than the total revenue of many European competitors (Zhou, 2022).

- **AI Execution:** JPM has moved aggressively into Generative AI with the development of "IndexGPT," a proprietary tool designed to select securities for clients, directly validating Proposition 1 (AI for Alpha).
- **Blockchain:** Their Onyx division is the world's first bank-led blockchain platform for wholesale payments, processing billions in daily volume, effectively solving the settlement inefficiencies described in Section 5.3.

6.2.2. Goldman Sachs: The Platform Strategy

Goldman Sachs has pivoted from a pure advisory model to a "Platform-as-a-Service" model through its Marquee platform.

- **Open Access:** Instead of hoarding proprietary data, Marquee allows clients to access Goldman's risk analytics engines via API. This validates the "Open Banking" trend (Deloitte, 2023), transforming the bank from a black box into a software provider.
- **Cultural Insight:** Goldman recruits directly from Silicon Valley, paying tech talent on par with investment bankers, a cultural shift that European banks struggle to replicate due to rigid wage structures.

6.3. European Application: Analysis of Santander CIB and BBVA

European banks, while technologically advanced, operate under a "Constraint-Optimization" strategy rather than a "Growth-at-all-Costs" strategy, largely due to the regulatory pressure validated in Proposition 3.

6.3.1. Santander CIB: The Cloud Migration ("Gravity")

Santander is currently executing one of the most ambitious technological overhauls in Europe: project Gravity.

- **Core Transformation:** Unlike US peers who often build layers on top of legacy systems, Santander is migrating its entire core banking ledger to the Cloud. According to Accenture (2024), this reduces energy consumption by 70% and operational costs by 40%.
- **Strategic Focus:** Santander's strategy is heavily focused on efficiency and cost-reduction (Back Office) rather than the "Alpha generation" seen in JPM, reflecting the tighter margin pressure in Europe.

6.3.2. BBVA: The Pioneer of Open Banking

BBVA is widely cited in academia as the European leader in digital transformation (Osei et al., 2023).

- **Partnership Model:** Lacking the \$17B budget of JPM, BBVA relies on a partnership ecosystem. They were among the first to open APIs to FinTechs under PSD2 regulation.

- **Cultural Challenge:** Despite their technical leadership, BBVA faces the fragmentation of the European market. A digital product launched in Spain cannot be instantly rolled out to Italy or Germany without significant compliance customization, slowing down their "Time-to-Market."

6.4. Comparative Findings: Global Best Practices vs. European Constraints

The benchmarking reveals a clear structural divergence. While US banks use technology to expand revenue, European banks primarily use technology to defend margins and ensure compliance.

Table 3: Transatlantic Strategic Divergence

| Dimension | US Leaders (JPM, Goldman) | European Leaders (Santander, BBVA) |
|------------------------|--|---|
| Primary Driver | Alpha Generation (Revenue Growth) | Operational Efficiency (Cost Reduction) |
| Investment Strategy | "Build" (Internal Proprietary Tech) | "Buy/Partner" (FinTech Collaboration) |
| Regulatory Environment | Enabling (Focus on Innovation) | Restrictive (Focus on DORA/GDPR/Resilience) |
| Data Advantage | Unified Market (330M people, 1 language) | Fragmented Market (Multiple languages/laws) |
| AI Adoption | Advanced (Customer-facing GenAI) | Cautious (Internal/Back-office focus) |

Source: Author's elaboration based on McKinsey (2025) and BCG (2025).

6.4.1. The "Scale Gap" and Regulatory Friction

The analysis confirms Proposition 3. European banks are not suffering from a lack of vision, but a lack of scale compounded by regulatory friction. As PwC (2024) notes in their DORA analysis, for every \$1 a European bank spends on innovation, approximately \$0.40 is diverted to regulatory compliance and reporting, whereas US banks benefit from a lower regulatory tax on innovation.

7. Proposed Strategic Framework and Roadmap

Based on the diagnosis of technological enablers (Chapter 5) and the comparative analysis of organizational barriers (Chapter 6), this chapter synthesizes the findings into a proprietary framework: the Integrated Strategic Model for Digital Transformation in Investment Banking (METD-BI).

This model moves beyond the "one-size-fits-all" approach, offering a tailored roadmap for European incumbents operating under strict regulatory constraints (DORA/MiFID II).

7.1. The "Integrated Strategic Model for Digital Transformation (METD-BI)

The METD-BI model postulates that successful transformation in banking is not a linear technological upgrade, but a triangular equilibrium between three forces.

- **The Technological Vertex (The Engine):** Composed of the "Big 3" (AI, Cloud, Blockchain). Its function is to provide capability.
- **The Cultural Vertex (The Driver):** Composed of talent and organizational agility. Its function is to provide adoption.
- **The Regulatory Vertex (The Brakes/Guardrails):** Composed of compliance frameworks (DORA). Its function is to provide resilience.

Most transformation failures occur because banks maximize the Technological Vertex without widening the Cultural Vertex (resulting in "unused tech") or without reinforcing the Regulatory Vertex (resulting in compliance fines). The METD-BI proposes that innovation must be paced by the slowest variable, which in Europe is currently Regulation.

7.2. Phased Implementation Roadmap

The implementation of the METD-BI model is not a linear technological upgrade, but a structured evolution divided into three distinct horizons. This phasing ensures that the bank addresses the "Strategy-Execution Gap" by aligning technological capacity with cultural adoption and regulatory resilience.

7.2.1. Horizon 1: Foundation and Regulatory Compliance (0–12 Months)

- **Strategic Objective:** "Clean the Core" and ensure survival by establishing a single source of truth for data.
- **Key Actions:** Breaking down data silos is a prerequisite, as AI cannot function effectively on fragmented legacy information.
- **Cultural Management:** To address the cultural barrier identified in Proposition 2, AI is framed internally as a “spectacular intern” (I. Prieto, personal communication, February 3, 2026). This positioning presents the technology as a tireless, efficient assistant that serves the banker rather than a competitor for their role.
- **Compliance:** Prioritizing DORA compliance ensures that all third-party ICT providers meet EU operational resilience standards before further innovation (PwC, 2024).

7.2.2. Horizon 2: Integration and Process Automation (1–3 Years)

- **Strategic Objective:** Improving efficiency and protecting margins in a low-interest environment.
- **Key Actions:** Deployment of RPA to automate high-volume Middle Office tasks such as KYC and trade reconciliation (Gartner, 2023).
- **Unification:** Moving from fragmented legacy applications to a unified cockpit where the AI integrates CRM, fund analysis, and historical data into a single interface (I. Prieto, personal communication, February 3, 2026).
- **Operational Impact:** This integration allows the bank to scale its capacity from the industry average of 40–50 families managed per banker to 100 families (I. Prieto, personal communication, February 3, 2026). This effectively doubles the Front Office capacity while maintaining or improving service quality.

7.2.3. Horizon 3: Innovation and Ecosystem Expansion (3–5 Years)

- **Strategic Objective:** Alpha generation and the development of new revenue streams.
- **Key Actions:** Implementation of Generative AI in the Front Office to create hyper-personalized investment reports and autonomous investment selection (McKinsey & Company, 2023).

- **Hyper-personalization:** The system adapts technical language to the client's specific level of financial literacy, ensuring a bespoke advisory experience (I. Prieto, personal communication, February 3, 2026).
- **The Trust-Anchor Consolidation:** Applying the 'Autopilot Metaphor': just as passengers demand a pilot in the cockpit despite an autopilot's technical superiority, the banker remains the irreplaceable 'trust anchor' for the client (I. Prieto, personal communication, February 3, 2026). The human professional focuses on the relationship and security while the machine handles technical execution.

7.3. Key Performance Indicators (KPIs) and Success Metrics

To measure the effectiveness of the METD-BI implementation, metrics must go beyond simple ROI.

Table 4: The METD-BI Balanced Scorecard

| Category | KPI (Key Performance Indicator) | Description & Source |
|-------------|-----------------------------------|--|
| Financial | Digital ROI | Net profit from digital channels / IT Investment (CapEx). |
| | Cost-to-Income Ratio | Measures the efficiency gains from RPA/Automation (Accenture, 2024). |
| Operational | Straight-Through Processing (STP) | % of transactions processed with zero human intervention. |
| | Cloud Adoption Rate | % of apps migrated to the Cloud vs. Legacy on-premise. |
| Cultural | Digital Adoption Rate | % of bankers actively using the new CRM/AI tools weekly. |
| | Time-to-Market | Time elapsed from idea conception to product launch (Agile metric). |
| Resilience | DORA Compliance Score | Internal audit score on ICT risk management and recovery time. |

7.4. Limitations and Scope of Validity of the Framework

Academic rigor requires acknowledging the boundaries of this proposal.

- **Geographic Bias:** The METD-BI is heavily influenced by the European regulatory landscape (DORA/GDPR). Its application to US or Asian banks would require recalibration, as their regulatory friction is lower (as analyzed in Chapter 6).
- **Technological Volatility:** The roadmap assumes a linear evolution of Generative AI. A disruptive "Black Swan" event in technology could render the Horizon 3 predictions obsolete faster than anticipated.
- **Qualitative Validation:** While supported by expert interviews (Ignacio Prieto, Singular Bank), the model lacks longitudinal quantitative testing, as the digital transformation of this sector is currently in progress.

8. Impact Analysis

Following the implementation roadmap proposed in the METD-BI framework, this chapter quantifies the projected impact of digital transformation on the three critical pillars of investment banking: the bottom line (efficiency), the top line (clients), and the license to operate (risk).

8.1. Operational Efficiency and Cost-Benefit Analysis

The most immediate measurable impact of digital transformation is visible in the Cost-to-Income Ratio (CIR). For European banks, which historically operate with higher CIRs (60-65%) compared to their US peers (<55%), digitalization provides the only viable lever to restore profitability in a low-margin environment.

8.1.1. The “Zero-Ops” Ambition

The integration of RPA and Smart Contracts allows banks to move toward a "Zero-Back-Office" model.

- **Reduction in Manual Touchpoints:** By implementing Straight-Through Processing (STP), trade settlements can bypass manual reconciliation entirely. Accenture (2024) estimates that automating these post-trade processes can reduce operational costs by 20-30% within three years.
- **Scalability without Headcount:** Traditionally, growing the business meant hiring more operations staff. With a cloud-native architecture, banks can scale transaction volumes exponentially while keeping fixed costs flat (operating leverage).

8.1.2. Cost of Implementation vs. Long-term Savings

While the initial Capex (Capital Expenditure) for migrating to the Cloud is high (Horizon 1), the OpEx (Operating Expenditure) savings are structural.

- **Legacy retirement:** Decommissioning physical data centres reduces energy and real estate costs.
- **Error remediation:** Automated systems eliminate human "fat-finger" errors, which often result in costly trade breaks and reputational damage.

8.2. Impact on Client Experience and Engagement

In the Front Office, the impact shifts from "Efficiency" to "Effectiveness." The goal is not just to service the client faster, but to increase the Share of Wallet (the percentage of the client's business captured by the bank).

8.2.1. From Reactive to Predictive Advisory

Traditional relationship banking was reactive: the banker called the client after a market event.

- **The Augmented Banker:** Using the "Client 360" analytics described in Section 5.4, bankers receive proactive alerts. For instance, if an algorithm detects a currency volatility spike, it prompts the banker to offer an FX hedging product to a corporate client before they even ask.
- **Impact Metric:** McKinsey (2023) reports that banks utilizing predictive analytics in relationship management see a 10-15% increase in revenue from cross-selling ancillary products.

8.2.2. Hyper-Personalization at Scale

For Wealth Management clients, digitalization enables the "democratization" of sophisticated strategies.

- **Mass Customization:** Generative AI allows banks to produce personalized investment reports for thousands of clients instantly, a service previously reserved for Ultra-High-Net-Worth Individuals (UHNWI).
- **Retention:** According to the Capgemini World Wealth Report (2024), 46% of high-net-worth clients claim they would switch banks if their digital experience does not match big-tech standards. Therefore, digital transformation is a defensive need for client retention.

8.3. Risk Reduction and Regulatory Compliance Improvement

Often viewed as a burden, Compliance is the area where technology delivers the highest strategic return on investment by mitigating existential risks.

8.3.1. Automated Compliance (RegTech)

The sheer volume of regulatory reporting (MiFID II, EMIR, SFTR) makes manual compliance impossible.

- **Real-Time Monitoring:** AI algorithms can monitor 100% of trader communications (voice and chat) to detect market manipulation or insider trading in real-time, drastically reducing the risk of massive regulatory fines.
- **DORA Resilience:** By automating stress testing and recovery protocols, banks ensure they remain compliant with the Digital Operational Resilience Act, avoiding penalties that can reach up to 1% of total daily turnover.

8.3.2. Reduction of Model Risk

Moving from Excel-based spreadsheets to Python/Cloud-based industrial models reduces End-User Computing (EUC) risk.

- **Version Control:** In a digital ecosystem, there is only one "Golden Source" of data. This eliminates the common error where different departments (Risk vs. Trading) use different figures to calculate capital requirements, ensuring alignment with the European Central Bank's expectations.

9. Conclusions and Recommendations

9.1. Synthesis of Findings and Objective Achievement

The primary objective of this dissertation was to conceptually propose a strategic framework (METD-BI) to guide European investment banks through their digital transformation journey. This research concludes that the “Strategy-Execution Gap” is not merely a technical failure but a structural challenge requiring a balance between innovation and resilience.

9.1.1. Impact of “Third Wave” Technologies on Efficiency (Secondary Objective 1)

This research validates Proposition 1, confirming that the integration of AI and Machine Learning into core workflows is the primary determinant of operational efficiency.

- **Capacity Multiplier:** Digitalization acts as a 2x capacity multiplier; in the Spanish private banking sector, automated reporting and AI-driven document management allowed bankers to scale from managing 40-50 families to over 100 families without diminishing service quality.
- **Operational Optimization:** The move toward “Zero-Back-Office” models through RPA and Straight-Through Processing (STP) can reduce post-trade operational costs by 20-30%.
- **Alpha Generation:** In the Front Office, AI has shifted from a competitive advantage to a baseline requirement for “Alpha” generation through Natural Language Processing (NLP) and sentiment analysis.

9.1.2. Diagnosis of Structural and Cultural Barriers (Secondary Objective 2)

This study confirms Proposition 2, identifying that legacy organizational culture is a more significant barrier than technological infrastructure.

- **The Psychological Barrier:** Cultural resistance stems from a fear of professional irrelevance among staff. This is successfully mitigated by framing AI as a “spectacular intern”, a supportive assistant that augments the banker’s capabilities rather than replacing them.
- **Technical Debt:** Approximately 70-75% of IT budgets in traditional banks are consumed by maintaining legacy systems (“Run the Bank”) rather than innovation (“Change the Bank”). Applying Teece’s (2014) Dynamic Capabilities theory, this indicates a need for banks to “transform” their internal assets to close the execution gap.

9.1.3. The Regulatory Paradox and the METD-BI Model (Secondary Objective 3)

The research validates Proposition 3, establishing that the European regulatory framework (DORA, MIFID II) acts as a unique catalyst for modernization.

- **Compliance-Driven Innovation:** Unlike the market-led US model, European banks navigate a “compliance-driven” cycle where regulation forces the modernization of data architecture.
- **The Resilience Moat:** While DORA imposes a “compliance tax” on innovation budgets, it also creates a “Compliance Moat”, where large incumbents leverage their capacity for complex vendor auditing as a competitive advantage.
- **METD-BI Proposal:** The proposed framework establishes that innovation must be paced by the slowest variable, regulation, ensuring that technological gains are always supported by cultural adoption and regulatory resilience

9.2. Final Reflections: The “Autopilot Metaphor”

The conclusion of this work is that in high-value investment banking, the human professional is irreplaceable as the “trust anchor”.

- Drawing on the “Autopilot Metaphor”, while AI (the autopilot) can technically execute trades and reports with superior precision, the client (the passenger) requires a human banker in the cockpit to provide the security and empathy necessary for complex financial decisions.
- Banks that successfully achieve Organizational Ambidexterity (O’Reilly & Tushman, 2013) balancing the exploitation of legacy stability with the exploration of AI, will emerge as the “Digital Masters” of the new financial era.

Declaration of Use of Generative Artificial Intelligence Tools in bachelor's Thesis

WARNING: The University considers ChatGPT and similar tools to be very useful in academic life; however, their use remains the sole responsibility of the student, as the responses provided may not be accurate. In this regard, their use is **NOT** permitted in the preparation of the Bachelor's Thesis for generating code, as these tools are not reliable for that task. Even if the code works, there are no guarantees that it is methodologically correct, and it is highly likely that it is not.

I, **Claudia Sáiz Vara**, a student of **E-2 english** at Comillas Pontifical University, upon submitting my Bachelor's Thesis titled "**Digital Transformation in Investment Banking**" hereby declare that I have used the Generative Artificial Intelligence tool ChatGPT or similar GenAI coding tools only within the context of the activities described below:

1. **Research Brainstorming:** Used to ideate and outline potential research areas.
2. **References:** To identify preliminary references that I subsequently verified and validated.
3. **Literary Style and Language Corrector:** To improve the linguistic and stylistic quality of the text.
4. **Synthesizer and Communicator of Complex Books:** To summarize and understand complex literature.
5. **Reviewer:** To receive suggestions on how to improve and refine the work across different levels of rigor.

I affirm that all information and content presented in this work are the product of my individual research and effort, except where otherwise indicated and where corresponding credit has been given (I have included the appropriate references in the Thesis and explicitly stated what ChatGPT or similar tools were used for). I am aware of the academic and ethical implications of submitting non-original work and accept the consequences of any violation of this declaration.

Date: 23rd March 2026

Signature: Claudia Sáiz Vara

10. Bibliography

- Accenture. (2021). *Reinventing with the digital core in banking*. <https://www.accenture.com/us-en/insights/banking/reinventing-digital-core-banking>
- Accenture. (2024). *Top 10 trends in the banking industry for 2024*. Accenture Insights. <https://www.accenture.com/us-en/insights/banking/top-10-trends-banking-2024>
- Adams, R. J., Smart, P., & Huff, A. S. (2017). Shades of Grey: Guidelines for working with the grey literature in systematic reviews for management and organizational studies. *International Journal of Management Reviews*, 19(4), 432-454. <https://doi.org/10.1111/ijmr.12102>
- Banco Santander. (2024). *Project Gravity: The cloud transformation of the core banking system*. Santander Corporate Reports. <https://www.santander.com/en/stories/gravity-cloud-platform>
- Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>
- Boston Consulting Group (BCG). (2021). *The Digital Acceleration Index: A maturity model for the future of banking*. <https://www.bcg.com/capabilities/digital-technology-data/digital-acceleration-index>
- Boston Consulting Group. (2025). *The widening AI value gap: 2025 Digital Acceleration study*. <https://www.bcg.com/capabilities/digital-technology-data/digital-maturity>
- Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, 9(2), 27-40. <https://doi.org/10.3316/QRJ0902027>
- Capgemini. (2024). *World wealth report 2024: The new era of client engagement*. Capgemini Research Institute. <https://www.capgemini.com/insights/research-library/world-wealth-report-2024/>
- CFA Institute. (2024). *GenAI and the future of asset management: Impact on portfolio construction and risk*. <https://www.cfainstitute.org/research/reports>
- Deloitte. (2022). *Digital banking maturity 2022: Global benchmarking of digital retail banking channels*.
- Deloitte. (2023). *Open banking for corporates: The next wave of disruption*. Deloitte Center for Financial Services. <https://www2.deloitte.com/us/en/pages/financial-services/articles/open-banking-for-corporates.html>
- Deloitte. (2024). *2024 banking and capital markets outlook*. Deloitte Center for Financial Services. <https://www2.deloitte.com/us/en/insights/industry/financial-services/financial-services-industry-outlooks/banking-industry-outlook.html>

- Diener, F., & Pacek, M. (2021). Digital transformation in banking: A managerial perspective on barriers to change. *Sustainability*, 13(4), 2032. <https://doi.org/10.3390/su13042032>
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160. <https://doi.org/10.2307/2095101>
- European Central Bank. (2023). *The state of digital transformation in the European banking sector*. ECB Supervision Newsletter. <https://www.bankingsupervision.europa.eu/press/publications/newsletter/2023/html/ssm.nl230215.en.html>
- European Securities and Markets Authority. (2021). *MiFID II research unbundling: Assessing the impact on EU equity markets*. ESMA Reports.
- EY. (2024). *Wealth and asset management outlook 2024: Navigating the hybrid advisory landscape*. https://www.ey.com/en_gl/wealth-asset-management-outlook
- Feyen, E., Frost, J., Gambacorta, L., Natarajan, H., & Saal, M. (2021). *Fintech and the digital transformation of financial services: Implications for market structure and public policy*. (BIS Papers No 117). Bank for International Settlements. <https://www.bis.org/publ/bppdf/bispap117.htm>
- Gartner. (2023). *Top strategic technology trends for banking and investment services*. Gartner Research. <https://www.gartner.com/en/industries/banking-investment/trends>
- Goldman Sachs. (2023). *Marquee platform: Democratizing access to institutional analytics*. Goldman Sachs Engineering. <https://www.goldmansachs.com/what-we-do/products-and-services/marquee/>
- Helms, M. M., & Nixon, J. (2010). Exploring SWOT analysis – where are we now? A review of academic research from the last decade. *Journal of Strategy and Management*, 3(3), 215-251. <https://doi.org/10.1108/17554251011064837>
- Johnson, G., Scholes, K., & Whittington, R. (2008). *Exploring Corporate Strategy: Text and Cases* (8th ed.). Pearson Education.
- JPMorgan Chase & Co. (2024). *Annual report 2023: Principles of the artificial intelligence transformation*. JPM Investor Relations. <https://www.jpmorganchase.com/ir/annual-report>

- Kane, G. C., Palmer, D., Phillips, A. N., Kiron, D., & Buckley, N. (2019). *Accelerating digital innovation: How digital maturity drives organizational change*. MIT Sloan Management Review. <https://sloanreview.mit.edu/projects/accelerating-digital-innovation/>
- KPMG. (2024). *Pulse of Fintech H2 2024: Global trends in financial services*. KPMG International. <https://kpmg.com/xx/en/home/insights/2024/01/pulse-of-fintech-h2-23.html>
- Matt, C., Hess, T., & Benlian, A. (2015). Digital transformation strategies. *Business & Information Systems Engineering*, 57(5), 339–343. <https://doi.org/10.1007/s12599-015-0401-5>
- McKinsey & Company. (2023). *Global banking annual review 2023: The great banking transition*. <https://www.mckinsey.com/industries/financial-services/our-insights/global-banking-annual-review-2023>
- McKinsey & Company. (2025). *Case studies in digital and AI transformation*. McKinsey Digital. <https://www.mckinsey.com/capabilities/mckinsey-digital/case-studies>
- Oliver Wyman. (2017). *MiFID II: The unintended consequences for investment banking*. Oliver Wyman Insights.
- O'Reilly, C. A., & Tushman, M. L. (2013). Organizational ambidexterity: Past, present, and future. *Academy of Management Perspectives*, 27(4), 324–338. <https://doi.org/10.5465/amp.2013.0025>
- Osei, L. K., Cherkasova, Y., & Oware, K. M. (2023). Unlocking the full potential of digital transformation in banking: A bibliometric review and emerging trends. *Future Business Journal*, 9(1), Article 30. <https://doi.org/10.1186/s43093-023-00207-2>
- Prieto Funes, I. (2026, February 3). Digital Transformation and AI Integration in Private Banking [Personal Interview]. Director of Digital Business at Singular Bank.
- PwC. (2024). *Navigating DORA: A strategic guide for financial entities and ICT providers*. PwC Financial Services Risk & Regulation. <https://www.pwc.be/en/industry-sector/financial-services/digital-operational-resilience-act.html>
- Rogers, D. L. (2016). *The digital transformation playbook: Rethink your business for the digital age*. Columbia University Press.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th ed.). Pearson.
- Scott, J. (1990). *A matter of record: Documentary sources in social research*. Polity Press.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333-339.

<https://doi.org/10.1016/j.jbusres.2019.07.039>

- Stefanelli, V., Manta, F., & Toma, P. (2022). *Digital financial services and open banking innovation: Are banks becoming invisible?* University of Salento
- TechFluence. (2024). *The future of hybrid advisory: Integrating AI into the European investment banking model*. <https://www.techfluence.eu/reports/hybrid-advisory-2024>
- Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (augmented) strategic management framework. *Academy of Management Perspectives*, 28(4), 328–352. <https://doi.org/10.5465/amp.2013.0116>
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British Journal of Management*, 14(3), 207–222.
- Westerman, G., Bonnet, D., & McAfee, A. (2014). *Leading digital: Turning technology into business transformation*. Harvard Business Review Press.
- Yin, R. K. (2018). *Case study research and applications: Design and Methods* (6th ed.). Sage Publications.
- Zhou, M. (2022). Research on the investment banking transformation in the post-epidemic era: Case study of JPMorgan Chase. *Proceedings of the 2022 International Conference on Economics, Smart Finance and Contemporary Trade*. <https://doi.org/10.2991/978-94-6463-052-7>

11. Appendixes

Appendix A: Expert Interview Transcript

Interviewee: Ignacio Prieto Funes (Head of Digital Business, Singular Bank)

Date: February 3, 2026

Medium: Video Conference

Duration: 16 minutes

Section 1: Digital Scalability and Efficiency

Interviewer: Singular Bank has grown significantly, partly through the acquisition of the UBS business in Spain. How do you scale a digital bank to that level compared to traditional structures?

Ignacio Prieto: Based on my experience managing legacy structures like UBS versus Singular Bank, the key lies in shifting the focus. Digitalization must reach the client, but more importantly, it must reach the banker. All the AI and digital infrastructure we have built is designed to augment the banker's capabilities, not just the client's app.

Interviewer: Do you have concrete metrics on this efficiency impact?

Ignacio Prieto: Yes. At UBS, the average ratio was roughly 40-50 families per private banker. This allowed for highly personalized service. Today, by applying AI to eliminate paperwork and automate reporting, our bankers can manage up to 100 families while maintaining or improving the quality of service. We have effectively doubled the capacity of our Front Office through technology.

Section 2: Technology and AI Adoption

Interviewer: Regarding Generative AI, are you using standard market tools or proprietary models?

Ignacio Prieto: We have a strategic advantage. While ChatGPT is ubiquitous, currently only three entities in Spain have a bilateral Enterprise agreement with OpenAI integrated into their core systems: Santander, BBVA, and Singular Bank. However, the differentiator is integration. We use AI to unify the banker's fragmented view (CRM, positions, history) into a single interface. The AI adapts the language of the output: if the client is technical, it generates a technical argument; if the client lacks financial literacy, it simplifies the explanation.

Interviewer: How has this impacted the speed of software development internally?

Ignacio Prieto: The impact is drastic. In investment banking, typically 70% of staff is Front Office. Our technology teams, now assisting their coding with AI, are working at unprecedented speeds. My Head of IT recently told me: "What we just delivered in one week would have previously required a year and 50 additional developers."

Section 3: Cultural Barriers and the "Human-in-the-Loop"

Interviewer: With this level of automation, do bankers fear becoming irrelevant?

Ignacio Prieto: That is the critical question. The answer is no, but it requires careful change management. I position the AI not as a replacement, but as a "spectacular intern": it is available 24/7, highly efficient, and never complains, but it is there to serve the banker.

Interviewer: Do you believe the AI performs better than the human banker?

Ignacio Prieto: Technically, yes. It is like an airplane's autopilot: it takes off, flies, and lands better than a human pilot. However, would you board a plane with no pilot in the cockpit? probably not. In Private Banking, trust is the product. Clients need to see the human being behind the decision, even if the machine processed the data. Therefore, the banker is irreplaceable as the "trust anchor," while the AI handles the execution.