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Does Big Data Adoption Enhance Competitive Advantage in Commercial Banking?

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Abstract:

The paper explores whether the use of big data contributes to the competitive edge of commercial banks, analyzing a substantial number of secondary sources, which include scholarly articles, industry reports, and empirical case studies. Literature analysis shows that commercial banks are resorting increasingly to massive data, sophisticated analytics, and automated intelligence to enhance customer interaction, credit-risk, fraud detection, and efficiency in operations. Companies that manage to implement analytics in their fundamental operations have in most cases, recorded notable gains in their profitability, service delivery, accuracy of decisions and risk management. Such improvements in performance help in the creation of long-term competitive advantage, especially in industries that are typified by the existence of digital competition and ever-changing customer demands. The results also indicate that big data does not bring an advantage by default. The measures that are strategic alignment, organizational culture, availability of talents, technological infrastructure/ underlying governance structures play a significant role in determining the effectiveness of analytics initiatives. Without such capabilities, banks may not be able to achieve the full potential of big data and hence imbalances in digital maturity will emerge in the sector. The secondary-data method, whereas giving a general overview of the said dynamics, does not offer the necessary access to proprietary data that can cause the establishment of causal relations unconditionally. In general, the study takes the view that big data is an effective facilitator of competitive advantage provided it is by well-organized organizational preparedness and integrated analysis abilities.

Keywords: Big Data; Competitive Advantage; Commercial Banks; Data Analytics; Digital Transformation.

1. Introduction

With increasing competition, changing consumer behavior, and speedy advancement in technology, commercial banking has gone through a deep transformation over the last ten years as the strategic priorities of financial institutions are reshaped. Digitalization has established a niche in the working of a bank and has affected customer interactions with their banks, the design and delivery of products, and the execution of internal decisions made in a bank (Attah et al., 2024). Customer relationships are increasingly becoming mobile with mobile device interaction, online interfaces, and automated service channels creating large amounts of real-time behavioral and transactional data. The increase in digital footprints offers more opportunities than ever before to banks in gaining insights, but also causes an extra burden to the institutions to deal with the data in an intelligent, responsive way. The contemporary commercial banks are confronted with a situation in which business speed, individualized interaction, and tough risk-mitigation skills determine the duration of performing business. (Paleti, 2025).

Discourse on the topic of the industry constantly supports the notion that data-driven banks perform better in comparison to their less-digitized counterparts in terms of key financial and operational measures. The consulting firms, technology vendors, and sector analysts have often indicated the existence of an increasing performance disparity between analytics-led institutions and those that exist based on traditional processes. The ability to generate revenues, cost efficiency, cross-selling effectiveness, and customer retention seems to become greatly enhanced when banks use information as a strategic resource. In numerous studies of the industry, big data analytics are seen as a driver of innovative business models, business responsiveness, and a better customer experience. These views are part of an overall positive picture of the big data adoption and how it can be used to enhance competitive positioning in commercial banking. A variety of empirical investigations indicate that good analytical skill enhances credit risk evaluation, better recognition of fraud, and efficient customer segmentation. (Tetteh et al., 2025). It is also found that banks with sound analytics structures tend to have a lower cost of operation and more precision in their processes.

However, the advantage of education is often recognized in a dependent manner as a result of academic literature. The cost of big data initiatives is affected by the differences in organizational preparedness, data quality, resource accessibility, and technological foundation. There are other challenges of regulatory limits, especially on the aspects of data privacy and model transparency. Extensive research based on secondary data can thus assist in elucidating the argument whether the practice of big data really improves competitive advantage in commercial banking. Review of the literature available, individual industry reports, and documented case studies can contribute to an idea of the contribution of big data to increased, and where shortcomings prevail. Competitive advantage in the given study can be defined as a performance that is higher than the industry average, which is measured in terms of greater profitability, better market share, better customer loyalty, increased operational effectiveness, and firmer risk management. (Ghaleb et al., 2023).

2. Literature Review

2.1 Conceptual Foundations of Big Data in Commercial Banking

Commercial banks are in a data-rich ecosystem that entails the generation of vast volumes of structured and unstructured data with each transaction, customer interaction, and regulatory requirement. A tremendous amount of digital content is payment records, credit histories, mobile-banking logs, customer service transcripts, social-media traces, and compliance reports. The concept of big data covers the data sets the size of which, the rate of creation, and the variety of data are beyond the reach of conventional data-processing technology. (Farinloye et al., 2024). The intricate flow of information should be served with the help of distributed computing systems and sophisticated methods of analysis that are able to recognize hidden patterns and anticipate the development of behaviors. Machine-learning applications, natural-language processing systems, and graph-based network analytics and predictive modelling systems are key elements in finding something valuable in all these large sets of data. (Taha, 2025). Bank analytics enable financial institutions to process behavioral patterns, identify abnormal actions, predict creditworthiness, and make business decisions.

In modern banking studies, the most popular areas of big-data application have always been customer analytics, credit and risk analytics, fraud and anti-money laundering (AML) monitoring, operational optimization, and regulatory reporting. (Ahmad, 2023). Collectively, these areas would represent the scope of analytical integration that contemporary banks are pursuing. An increased data environment improves strategic and operational decision-making as banks are in a better position to respond faster to the requirements of the customer, as well as market fluctuations and regulatory imperatives. Higher analytical power enhances organizational intelligence and facilitates business models that depend on individualized service, active mitigation of risks, and effective operations. (Shafa, 2025). The theoretical basis of big data gives an indication of a more fragmented, predictive, and technologically ad-

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vanced banking industry.

2.2 Big Data and the Strategic Basis of Competitive Advantage

A significant portion of the literature of strategic management scholarship focuses on the attainment and maintenance of competitive advantage by firms, and the Resource-Based View (RBV) is one of the most influential provision methods. RBV focuses on valuable organizational resources that are rare, imitable, and complemented by supporting capabilities. And data alone does not usually satisfy these requirements, primarily because competitors tend to have similar access to large datasets. (Nayak et al., 2023). Competitiveness arises as banks develop special analytics skills on their database. The integrated capabilities that are fashioned through proprietary algorithms, current data architecture, governance models, and deep-specialized analytics skills cannot be readily portrayed by rivals. The analysis of the industry continuously reveals a digital gap in the maturity of banks that inculcate analytics in organizational decisions and those that have adopted traditional decision-making systems (Crescenzi, 2025).

Digitally mature banks can typically grow their revenue at faster rates, gain their customers more easily, have lower cost-to-income ratios, and manage their risks more efficiently. The competitive differentiation is realized in the form of extremely personalized customer experiences, quick credit decisioning, near real-time risk surveillance, and increased fraud protection (Saxena & Muneeb, 2024). A long-term benefit will arise when the data-based capabilities are disseminated throughout the organization, and not confined to particular departments. United analytical cultures promote experimentation, an evidence-based approach, and continuous development. It is through the coordination of people, processes, technology, and governance that a bank will either achieve a real source of strategic advantage or will be left with underutilized big data on its hands.

2.3 Big Data in Customer Analytics and Market Positioning

The retail and commercial banking business environments have changed considerably with regard to convenience, speed, transparency, and personalization in regard to customer expectations. There is intense pressure on banks to develop services that resonate with the personal financial behavior and life cycle needs. Compared to traditional demographic profiling, big data analytics provides support for much more granular segmentation (Aeby et al., 2024). A diverse behavioral study allows distinguishing micro-segments according to the spending behavior, saving behavior, digital activity tendencies, and history of using products (Kannan et al., 2024). Predictive models help banks increase their ability to know what their customers want, even before they become a reality. Churn-forecasting algorithms are used to emphasize the high-risk customers, and the lifetime-value model helps inform the resource distribution to the high-potential segments.

The marketing campaigns get more focused, and the messages of the campaign are directed at individual behavior rather than a wide range of customers. Banks that implement superior customer analytics always record retention levels, better product penetration, and enhanced cross-sell outcomes (Quân, 2024). The digital channels are crucial media used in the provision of customized services. There exist potentials of customized engagement in mobile banking applications, online platforms, and automated advisory systems. The omnichannel integration also amplifies the customer-bank relationship since the constant and context-sensitive interactions build trust and satisfaction levels (Hutabarat et al., 2024).

Enhanced customer loyalty directly leads to a competitive advantage as the loyal customers of a company tend to demonstrate greater lifetime value and less sensitivity to the service of competitors. When banks manage to turn raw customer data into an actionable insight, market positioning is enhanced (Deshmukh & Boyd, 2024). With a low capability of customer-analytics, institutions find it difficult to remain relevant, especially in competitive markets where fintech companies and digitally mature banks are offering customers seamless and personalized financial experiences. The capability of using customer data effectively, consequently, turns out to be a decisive element in market competition.

2.4 Big Data in Credit, Risk, and Fraud Management

Risk management and credit underwriting constitute fundamental banking services that make major impacts on financial security, profitability, and positioning. The conventional credit rating methods are based on past income history, collateral reports, and credit bureaus. These approaches do not tend to record momentary behavioral signals, particularly in small businesses and individuals who have a meager credit history (Singireddy et al., 2024). The vigilant risk-assessment framework presented by big data analytics is far more extensive and vigorous through its arguably diverse sources of mobile-money transactions, utility-payment habits, e-commerce operations, and social-network behavior. Machine-learning credit models are superior to classical statistical models since they find non-linear relationships and interactions between risk variables (Sweet et al., 2024).

The improvement of the predictive accuracy will result in reduced non-performing loans, impaired provisions

and improved utilization of credit. Still, banks that adopt innovative risk-analytics solutions also offer loans faster, which is an additional advantage that appeals to the customers (Famoti et al., 2023). Greater accuracy reinforces the results of financial performance and positioning. Banking crime advances very quickly, and this has posed a constant challenge to banks to protect the funds that customers have deposited and to ensure that they stay within secure regulations (Jameaba & Ssenyonga Jameaba, 2022). Transactional feeds that have high volumes allow unusual patterns to be identified in real time.

Graph-based analytics identify relationships that are obscure amid systems of transactions on a large scale and indicate suspicious behavior that would otherwise not have been unearthed in a manual review. Enhanced fraud detection helps to safeguard financial resources, bolster the strength of operations, and encourage customer trust (Paul et al., 2023). The image of a sound fraud prevention practice reinforces the competitive positioning since consumers will tend to deal with the financial institutions that they regard as safe and trustworthy. Analytical tools that minimize false positives also enhance efficiency in compliance, on the one hand and enhance the ease of case investigation, on the other hand, align with regulated expectations.

2.5 Organisational Capabilities, Operational Efficiency and Structural Constraints

Commercial banking is a large-scale affair encompassing the services to customers, middle-office activities, and back-office tasks (Biru, 2025). The optimisation of these processes by analytics transforms them with automated processes, predictive maintenance, performance monitoring, and routing. Better efficiency in the processes can facilitate lower prices of operations and enhance profitability that secures further reinvestments in innovations and customer service. Operational agility also improves competitiveness in the markets where speed and responsiveness are the strategic priorities (Isibor et al., 2025). The effective adoption of big data in the operational processes is supported by strong organizational capabilities. The current IT architecture of the Cloud-computing environment and API-based integration integrates with smooth data flows and analytical applications (Bhat & Jayaram, 2025). Correct data governance frameworks provide accuracy, consistency, and privacy regulations. Analytics teams operating across different functional areas help to fill the divide between technical and business entities, allowing the insights to be converted into actionable and value-generating activities.

The issue of structural restraints still holds in most banking institutions. On the one hand, legacy systems can restrict data integration and make it scalable. Cultural resistance occurs in cases where employees do not believe in the use of analytical tools or are fearful that it would interfere with their traditional roles (Almatrodi et al., 2023). Regulations are very strict in terms of the usage of data, consent, fairness, and the explainability of models, which pose an operational challenge to banks that would like to experiment with complex algorithm models. Logistical problems of analytics talent also limit the rate of innovation. The rate at which the banks can surpass these structural impediments is what determines their competitiveness. Those institutions that invest in digital capabilities, current data designs, and favor organizational cultures advance more quickly to become analytically mature.

3. Methodology

The research will follow a secondary-data research design that will synthesise evidence based on writing of academics, industry reports, regulatory reports and case studies on commercial banks. A secondary-data design allows the extensive analysis of the current body of knowledge because it prevents the limitations of primary data collection, including restrictions to proprietary bank data and ignorance of internal performance measurements. The research methodology facilitates the investigation of trends, theoretical stands, and empirical evidence already identified in the literature, and it is an effective way of evaluating the interconnection between the use of big data and competitive advantage in the context of commercial banking. The evidence base of the study was made up of a plethora of peer-reviewed journal articles, institutional policy documents, and practice-oriented reports. The academic sources served as a source of conceptual and theoretical information on the subject of analytics capability, technology adoption and competitive advantage.

The consulting firm industry materials, the professional associations and international financial bodies provided supplementary insights into the indication of new trends, use-case experiences and technological trends that determine the banking operations. The case studies especially were useful in the realization of the practical challenges that are encountered when implementing analytics as also what results are achieved by those institutions that have already adapted big data as part of their operating model. Relevance, quality of publications and credibility were the inclusion criteria. Sources were chosen with the criteria that they dealt with big data implementation in commercial banking or directly similar fields, e.g., credit modelling, fraud detection, operational digitisation or strategic value creation. Sources published as of 2018 were paid favoritism because this would capture insights in line with the latest technological development in the field of analytics, artificial intelligence and cloud-based financial infrastructure. The literature on healthcare, research on retail

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or manufacturing were excluded unless it had transferable information on the use of analytics or organisational preparedness.

The themes of the analysis comprised customer analytics, credit and risk modelling, fraud management, operational efficiency, organisational capability and structural barriers. The literature review based on those categories allowed recognizing convergent outcomes, discrepancies in the results of the studies, and gaps that need more academic consideration. There was no quantitative modelling or statistical test to be performed as the research purpose was rather focused on synthesis and not a causal estimate. Nevertheless, quantitative results found in literature e.g. a better risk-prediction accuracy or a lower cost of operation were included in the narrative where applicable. It realized limitations that were inherent to secondary-data methodologies in the process of analysis. Numerous reports in the industry highlight success stories and they can under-report the unsuccessful analytics projects or failed business cases. Academic research usually has limited access to proprietary bank data which constrains the extent to which empirical validation in large sample size can be done. The limitations were also affecting the level of insight that could be achieved; however, the broad scope of the secondary resources offered a holistic and sound foundation to the analysis of the big data adoption and its contribution to the competitive advantage.

4. Findings and Analysis

A profound analysis of the secondary data collected in the literature demonstrates a fairly definite, albeit inconsistent, list of relations between big data implementation and competitive advantage in commercial banking. The insights based on the research focused on customer analytics, credit scores, fraud detection, operational efficiency, and readiness of the organisation confirm that there were measurable improvements in the performance. A difference in digital maturity, technological infrastructure, and strategic alignment has a strong impact on the level of their benefit gained through the implementation of analytics. The results presented below summarise the main findings of the academic and industry sources used in the Literature Review and are accompanied by tables that summarize the results of the empirical findings where feasible.

4.1 Customer Analytics and Competitive Outcomes

An interesting trend arises in various studies, with notable improvement in competitive positioning with higher levels of customer-analytics capability. The authors of the study by Aeby et al. (2024) illustrate that the use of predictive customer-segmentation models led to an increase in the accuracy of campaign targeting by 31% in financial-services companies present in their sample. The effect of these advances was greater cross-selling efficiency and a decrease in churning of digitally active customers. Behavioural data enabled granular segmentation which enabled banks to create micro-segments who had different financial habits, resulting in the greater accuracy of personalised offerings.

The use of complementary evidence by Quân (2024) involves the implementation of financial institutions using AI-enhanced CRM systems. According to the study, there was an increase of 28 to 37% in the retention rates of customers after the implementation of real-time personalised advisory tools. Customer experience was increased, leading to loyal buyers and customer lifetime value, which both are closely linked to long-term competitive advantage. The result shows that banks that could read the behavioural signals in order to predict the financial requirements are in a better position to preempt the anticipated requirement and act in response to it with customized products.

Table 1: Evidence from Customer-Analytics Studies

Study	Key Analytics Capability	Reported Secondary Data Results	Competitive Advantage Implication
Aeby et al. (2024)	Predictive segmentation & generative AI	31% improvement in targeting accuracy	Increased product uptake; reduced churn
Quân (2024)	AI-driven CRM personalisation	28–37% increase in customer retention	Stronger lifetime value; stable revenue streams
Hutabarat et al. (2024)	Omnichannel data integration	22% improvement in service-quality indices	Enhanced customer trust and multi-channel engagement

The concept of omnichannel analytics has strategic validity, which is supported even further by Hutabarat et al. (2024). Credit institutions with integrated customer journeys had up to 22% of service-quality and mobile and digital usage improvements. Increased customer interaction has reinforced the positioning of the market by enhancing trusts, visibility, and perceived advantages to the customers. The overall results indicate that banks using big data

instruments in their customer analytics get a competitive edge due to better client retention, enhanced product penetration, and healthier customer relations.

4.2 Credit Analytics, Risk Precision and Market Expansion

One of the significant spheres in which big data can produce quantifiable strategic value is credit-risk assessment. Sweet et al. (2024) analyze machine-learning credit models between insurance and lending conditions and find an accuracy increase of between 18% and 26%, depending on the traditional statistical methods. The improved predictive performance will lower the risk of defaulting and also increase the asset quality. Machine-learning models would measure real dynamic behavioural cues that allow assessment of risky borrowers. Singireddy et al. (2024) provide an additional piece of evidence in the form of financial-risk approaches that make use of predictive intelligence. Their paper describes more rapid credit-review operations and uses huge behavioural datasets, thus reducing decision-processing time by 40%. Quicker response time (especially for small business customers) makes it competitive as it boosts customer satisfaction and expands market coverage.

Table 2: Secondary Data on Credit and Risk Analytics Outcomes

Study	Analytics Application	Secondary Data Result	Competitive Outcome
Sweet et al. (2024)	ML-based credit scoring	18–26% predictive-accuracy increase	Lower default rates; improved portfolio quality
Singireddy et al. (2024)	Predictive intelligence for lending	40% reduction in processing time	Faster approvals; customer acquisition advantage
Famoti et al. (2023)	Data-driven risk systems	12–18% decline in NPL ratios	Higher profitability; better capital utilisation

Impressive results are provided by Famoti et al. (2023) on the basis of the U.S. financial institutions' experience, where data-driven risk system adoption was associated with a reduction in non-performing loan (NPL) ratios ranging between 12 and 18% in three years. Increased quality of assets not only boosted profitability by reducing the need to provisionally cover insurance but also increased the capital adequacy standings. The results of these studies support the fact that quantifiable performance increases are realized with the deployment of big data in credit assessment by banks, which directly translate into competitive advantage. Increased risk accuracy allows increasing the depth of penetration of underserved markets without disrupting the operations.

4.3 Fraud Detection, AML Compliance and Trust-Based Competitiveness

Anti-money laundering (AML) and detection of fraud are very important spheres in which analytics plays a key role in minimizing operational risk. Ahmad (2023) captures the effect brought about by big data and AI to the analytics of fraud with a reported reduction of 35% in false positives and as much as 27% in known indicators of early detection among the global financial institutions. Improved detection will minimise the financial loss and regulatory risk. Paul et al. (2023) review financial institutions of the U.S. security against cybercrimes and reveal that built-in analytics lowered financial losses due to fraud cases by around 25% each year. Most improvements were attributed to real-time anomaly detection, graph-network analysis and behavioural modelling.

The paper underlines the strategic value of customer trust, stating that customer acquisition and churn are higher in institutions with the capability of high-level protection against fraud. Jameaba and Ssenyonga (2022) give macro-level insights, whereby institutions that have contemporary AML analytics have shown better regulatory compliance scores and reduced supervisory intervention. Good compliance performance will insulate institutional reputation and lower the cost of regulatory audits. Results made throughout these sources show that analytics-informed fraud management goes a long way in reinforcing its competitive edge by safeguarding financial resources, evoking customer confidence and bettering its regulatory reputation.

4.4 Operational Efficiency, Productivity Gains, and Cost Leadership

The topic of operational transformation emerges as a common theme throughout the secondary literature. A study by Biru (2025) reveals that in the case of investment banking, optimization in middle-office operations that are powered by analytics increased the effectiveness of processing tasks by up to 33%. These advancements came out in the form of automated reconciliation, workflow routing, and predictive maintenance. The same effect is observed by Bhat and Jayaram (2025) in multi-cloud banking environments that are powered by API. Operational stability

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in the form of secure analytics-based integrations shrunk IT-related downtime by 18% and cut the system response time by 29%. The enhanced system performance translates to rapid service delivery, which helps to enhance customer experience.

The careful approach to strategic agility and market intelligence is significant (Isibor et al., 2025). They analyze and find that operational optimization through the use of analytics in the firms results in a higher accuracy of the forecasts, which enables the firms to allocate resources more strategically and have a stronger congruence between the capacity and demand. The fact that these studies provide evidence shows that there is an important portion of competitive advantage, in the case of data-driven banks, via the operational efficiency gains. Lower cost, increased speed of service provision, and overall organizational agility are factors that reinforce greater financial performance.

4.5 Organisational Readiness, Constraints and Varied Competitive Outcomes

The outcomes also have significant differences according to organizational capability and readiness, which is also indicated in the literature. Resistance to automation is cited by Almatrodi et al. (2023) as one of the key obstacles, which showed that status-quo bias among employees lowered the rate of adoption failure by almost 40% margin in organizations of the public sector that participated in their study. The barriers to the use of big data are cultural resistance and fear of technological displacement. Scalability is mentioned by Crescenzi (2025) as a challenge; governance attracts gaps in complex data processes. The time-to-data source errors in institutions using legacy systems were also greater, and their analytics-deployment cycle was slower, which reduced the possible data quality performance advantages.

Nayak et al. (2023) point out that the only difference between big data and strategic value is when it is combined with organizational processes, leader commitment, and resource access. In the absence of this alignment, investments made in analytics will not result in quantifiable competitive returns. The pooled results reveal that competitive advantage develops in the case of strong governance that enriches the adoption of analytics, the existence of a modern infrastructure, and an appropriate organizational culture. Organizations that do not get such underpinnings get partial or incomplete bakeries, and this serves to reiterate the centrality of capability maturity.

5. Conclusion

The evaluation of the secondary evidence gives a robust ground to determine the effect of the acceptance of big data on competitive advantage among commercial banks. The analysis of academic literature, the industry reports and recorded bank experiences show that the institutions managed with the application of analytics are better than the traditionally managed ones in many performance dimensions. Banks integrating big data in customer management and credit assessment, as well as fraud monitoring and operational optimisation, can be met with an increase in profitability, quality of services and strategic nimbleness. The better customer understanding is beneficial to personalised interaction and customer loyalty boosts, whereas improved credit analytics lowers default rates and makes it possible to better price risks by how much they are personalised. The fraud-detection models enhance financial system resilience by detecting the suspicious behaviour at an earlier stage and minimizing the operational losses. Operational analytics achieve internal effectiveness and reduce cost-to-income ratios, which eventually contributes to financial performance.

The totality of evidence shown so far demonstrates that competitive advantage does not come in the way of large datasets, but comes in the way of being able to convert the large datasets into usable intelligence. The strategically important value of big data hinges on financial institutions having elaborate analytics, modernising their technology infrastructure and implementing governance systems that provide quality, compliance, and ethical use and utilisation of their data. Banks with good analytical maturity tend to entrench analytics in their basic levels of decision-making and puts emphasis on cross-functional analytics groups and invest in data-engineering capabilities regularly. In the event of such organisational attributes, big data serves to compound the performance of the institutions, as it allows them to make strategic responses to the market changes quicker and produce experiences that speak to customers in the modern day.

Weaknesses in competitive advantage are still observed in organizations that do not have the institutional capacity to handle big data effectively. The efficiency of analytics initiatives is often impaired by legacy systems and disjointed data architecture, a lack of analytics talent and organisational change resistance. Regulatory requirements related to information privacy, model transparency and consumer fairness add further complexity and limit the availability of the use of advanced algorithms by banks. Those institutions that fail to surmount these factors tend to record a slower or irregular improvement, which helps to increase the gaps in digital maturity throughout the banking industry. As a consequence, the evidence shows that big data is a strong facilitator of competitive advantage, but its effects, in turn, is largely dependent on the organisational readiness, strategic intent and capability integration. The financial institutions that perceive analytics as a long-term

strategic investment and develop the nature of culture and technology underpinnings are in a better position to achieve long-term benefits in a more digital commercial-banking landscape.

6. Evaluation

The implementation of the research in terms of the secondary-data method allowed having a good exposure to the broad spectrum of views on big data application to commercial banking, which allowed a broad and theoretically diverse picture of the subject matter. The analysis of academic literature, industry surveys, customer-seek advice, and evidence based on a case study provided a multidimensional perspective of the impact of analytics on the competitive advantage in various banking settings. Working with these various sources served to put things into patterns, contradictions and uncertainties into the current body of knowledge. At the individual level, the exercise reflected the speed at which the technology capabilities are changing and the differences in the capability of financial institutions to exploit them. The use of only secondary source also made evident the limitations more inherent that influenced the depth and scope of the analysis. Reports that were used by industries would usually tell very positive stories, the focus was on successful implementations, and they would hardly be transparent on how something could go wrong or can be used inflict limitations on its operations.

As I continued to read the research, I came to realize that in many cases such documents were concerned with a commercial end; either to market some technology source or to elevate the consulting firm as a specialist; hence a critical reading was required. What enabled me to identify the possible bias as a key aspect of the evaluation was closely connected to the knowledge of the need to triangulate the claims in different sources. Academic literature were much more rigorous but also had issues with access to data. Numerous empirical investigations used small samples, simulations, or biased datasets as they seldom provide researchers with internal analytics information that used by banks. Reading these papers, I understood how hard it is to perform data-driven banking on a large scale and fully empirically, as customer data is a sensitive issue, risk models and security measures are a secret. Due to this, there was a majority of evidence involving description of relationships between adoption of analytics and performance improvements, but there is no clear causality.

A substantial part of the literature looked at the institutions of North America, Europe, or Asia-Pacific regions. Although these contexts are admittedly very powerful, the regulatory conditions, cultural norms and competitive dynamics differ between markets. It is risky to apply the lessons learned in one context to another. The realisation made me get more sufficiently involved in comparative studies and global industry surveys so as to attain a wider generalisability but absolute comparability was not possible. Notwithstanding these shortcomings, the method of conducting a research supported the importance of integrating the various evidence sources to formulate a coherent view on big data and competitive advantage. One of the positive aspects of the findings was the fact that the conceptual frameworks, including the Resource-Based View, were studied and supported by the evidence provided in the financial sector with examples. It was also an eye-opener into the ways in which organisational culture, leadership commitment and governance practices impact on technological success in banks, the theme that would not have been so obvious had it not been introduced to such a mass of literature.

In the future, it is possible to obtain significant value by conducting research with the inclusion of primary data collection. The executives of the banking sector, data scientists and regulatory authorities, would be more insightful to interview and understand the practical limitations and possibilities guiding the analytics adoption. It would also be especially helpful to use longitudinal studies that would trace the banks throughout their history as a tool that would provide more solid evidence on whether competitive advantage based on the usage of big data is sustainable. Considering the general process, the secondary-data approach allowed to develop a very deep insight into the topic but it demanded the method of continual critical evaluation, perceptive interpretation and acknowledgement of the restrictions inherent in current studies. The experience enhanced my analytical capabilities and broadened my understanding of the issues of turning data into a strategic value in the sphere of commercial banking.

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