

# Optimizing Analytics Deployment in Banking – Building Strategic Capabilities

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**Abstract:** Data analytics capability is the holistic approach towards capturing, processing and analyzing the various dimensions of data. Being the new frontier of innovation in banking space, analytics aids banks in producing data-driven financial insights. Every time a customer transact, banks can generate insights on each of the transactions. Leveraging data to create value from deploying analytics is the potential challenge for banks and hence building strong analytics capabilities has become imperative for banks. At the global level, leaders and agencies are emphasising on practices that promote sustainable development goals and banks are therefore focusing on sustainable initiatives. The present research aims at investigating analytics capabilities and challenges faced by banks in building these capabilities. Literature on analytics capabilities is drawn by researcher by using keyword strategy. A structured questionnaire was built to collect responses from bank staffs and data was further analysed by using SPSS (Statistical Package for Social Sciences). Researchers have employed TOE model (Technology-Organization-Environment) to gain insights on adoption of analytics and factors influencing for building capabilities in banking. The findings indicated that technical know-how of handling analytics and investments on analytics deployment are foundational requirements to build analytics capability in banks. Data integration and security and compliance are found to be quite challenging for banks while developing analytics capabilities.

The research concludes with suitable measures to be adopted by banks for smooth deployment of analytics initiatives.

**Keywords:** Analytics capabilities, Banking analytics, Data analytics, Data integration, Sustainable banking.

## I. INTRODUCTION

Business decisions are currently driven by data at larger scale and this is leading to increased importance of adopting analytics. Banking industry is at the front-run to adopt analytics much prior to any of the other industries. In the era of data, there has been an exponential growth in the data generation and this has led to an exponential investment into building analytics capabilities to create value from data. With the accelerated deployment of analytics, banks are currently focusing on achieving competitive advantage. Earlier, banks were just involved in recording and storing customer data but currently, capturing and then creating value out of the data is gaining importance. To create value, banks are deploying tools of analytics to generate insights and leverage the data. Large volume of customer data can help the banks to enhance their understanding about customers and accordingly strategize business operations to achieve profitability. The interesting challenge in creating value out of any data is the format of data as it can be either structured or unstructured or semi-structured or both. As per the term, structured data is more organized and

standardised. Unstructured data is unorganized and difficult for banks to connect the dots, whereas semi-structured data will be partially organized and partially un-organized. Analytics helps banks to convert organized, unorganized and semi-organized data into meaningful insights [1]. Technologies such as business analytics are transforming business strategies [2]. For instance, analytics has the ability to influence firms to enter into new markets by leveraging customer data [3].

Banks across the globe are committed to provide long term value creation to all stakeholders. Banks are acting as change agents by responding positively on sustainable actions and demonstrating the commitment towards achieving these goals. Traditional banking system operated tremendously on paper based whereas, modern day banks are driving their business activities by reducing carbon footprints. Focusing on adopting analytics, funding to socially responsive business ideas, reducing paper consumption, customer data privacy and value creation are some of the good sustainable practices being adopted by banks.

Banks used to generate paper printed reports which affect the green initiative of the banks. Analytics can be treated as an alternate way of generating reports by reducing the dependence of paper, waste and leading to prioritizing sustainability. Research suggests that analytics aids banks in achieving financial performance and sustainability [4]. Banks are integrating business strategies with the sustainable strategies as they have understood the importance of incorporating sustainable business practices. These strategies aim at creating an environment that supports the growth of banking business without causing environmental and societal factors.

Innovation is one of the sustainable development goals to transform the globe and analytics can be fostered as innovation in banking space by increasing internal performance and sustainability. It is evident that investing into such sustainable business practices shall mitigate several risks to which banks can be exposed. Hence, banks can assess the initiatives of borrowing company towards environmental and societal consideration and then decide on lending. In this regard, several banks are appointing special

officers to monitor the sustainable practices of the bank and exclusive reports are constituted in the annual reports of the banks.

## II. ANALYTICS AS A NEW FRONTIER OF INNOVATION IN BANKING

In the fast-changing world of modern banking, analytics has emerged as a key driver of innovation and redefining the industry's future trajectory. Banking no longer relies simply on old techniques and intuition; instead, data-driven insights are transforming every element of financial services, from client interaction to risk management and operational efficiency.

At its foundation, banking analytics uses data to find important patterns, trends, and correlations, allowing organizations to make more educated decisions. This revolutionary power not only improves the customer experience by providing individualized services, but it also allows banks to optimize internal operations for increased efficiency and profitability. Analytics is driving innovation in product creation and service offerings in the banking sector. Banks can use data analytics insights to predict new market trends, anticipate client demands, and provide innovative solutions like digital wallets, AI-powered chatbots for customer support, and personalized investment advising services. These innovations not only address changing consumer tastes, but also position banks as leaders in a competitive environment driven by technological breakthroughs.

Technology such as analytics can be used to broaden the reach to under-served customers of the banks. Innovative practices help banks to attract new customers and retain existing customers [5]. Banking industry has always been at the front run to experiment any newer technologies to enable customers to experience convenient and secured banking. At the inception stage, banks could just make profits if customers visited the branch and involved in basic transactions. Over the years, banking industry has seen massive transformation due to the velocity of market competition both at the domestic and global level. Banks with more customer base would naturally enhance bank's profitability level

as deposits tend to increase. With an objective to increase the widespread of customer base, banks are focusing on initiating digital convergence strategies. Adopting analytics is one such diverse strategy that provides technical solutions by integrating data and technology at various levels. Digital transformation can streamline the customer journey by leveraging technology to create dynamic consumer engagements and information-based revenue streams [6]. Today, banks are able to use advanced analytics to explore data set of customers such as demographic features and product held details like credit card statements, point of sale data, online fund transfers and credit bureau data [7].

Increased quantity of data and every year and low price of data storage and computing has made adopting analytics as desirable to gain competitive advantage. Banks are in position to generate huge volume of data from both internal and external sources. Through opening of different accounts, credit scoring, withdrawals, deposits and availing various banking services, banks can generate data of any customer. Banks are therefore deploying technologies such as analytics to improve data capturing, data processing, storage and undertaking real-time decisions [8]. Due to exponential growth in data generation, banks find it difficult to generate insights as data is complex and competitive. Many financial services firms such as banks are using the 'customer journey' through websites, ATM stations, physical visit to banks and presence in other social media channels to understand the approach of customers towards the bank, how a particular path may lead to customer attrition and whether a particular product is likely to be bought by customers [9].

### III. ANALYTICS CAPABILITIES AND IMPLEMENTATION CHALLENGES

In order to gain competitive advantage, banks are now investing on staff, process and technologies to enhance deeper understanding of customers and all other stakeholders. Investments alone cannot create competitive advantage; firms need to focus on creating capabilities that distinct the firm from

others in the market [10]. Data analytics capability is the ability of a firm to capture and draw insights from data by deploying necessary resources [11]. Identifying resources needed to build a capability model and configuring these resources with the banking operations is the greatest challenge. Hence, it is significant for banks to design a framework that aids bank to align analytics capabilities to attain the value. Picking the ideal blend of resources is critical as single alone resource is insufficient to develop analytics capability model. Which combination of resource capabilities lead to generate value is to be determined by banks as it is subject to one bank to another bank.

Banks can deploy analytics to translate data into actionable insights and increase bank performance. Though banks are able to realize the potential usage of data, there are challenges while implementing analytics capabilities models in the banks. Therefore, prior implementing analytics, banks should take inputs from all stakeholders [12].

- *Integration Challenge*

The result of implementing analytics in banks relies primarily on the presence of technology. Hence, there is a need to integrate analytical techniques to support the linkages between internal and external aspect of the banks such as market, product, service and technology [13]. The integration challenge is significant as banks should also ensure that regulatory compliance and data privacy is well considered. Banks should create a checklist to ensure its preparedness to implement analytics before actually integrate existing technology with new analytics tools. The preparedness of the bank should reflect in availability of existing technology to integrate with other functional and operational activities of the bank.

- *Training Challenge*

In order to undertake smooth implementation of analytics in bank, it may require data scientists or any professionals with expertise in analytics. Otherwise, analytics initiatives cannot be dealt by regular bank staff. It is important to note that not all data is useful for drawing insights. Banks should provide adequate training to create skills for the staff so that correct

data set is identified and correct insight is drawn [14]. The success of integrating analytics into banking eco-system depends on the overall execution. It is significant that banks should train the employees on analytics tools so that execution is made possible. Due to increased integration of analytics into banking, newer job titles can be expected in banks [15].

- *Data Governance and Compliance*

Banks can deploy analytics initiatives if strong data governance practices are put into place. Banks should have proper Standard Operating Procedures [SOP] to define bank data, data ownership, data access, data usage, data control, data management, etc. because traditional data governance models focused primarily on structured data formats. On the similar line, it is another challenge for banks to ensure that data collected is used to run analytics initiatives and it is fair, transparent and not misused by banks. Banks need to commit themselves for data monitoring to achieve operational efficiency and sustainability goals [4].

- *Cultural Resistance*

Another important challenge for banks could understand the adoption rate or response rate of bank staff if analytics initiatives are deployed in the bank. Any technological disruptions may create fear among the staffs and may resist adopting the new change.

- *Investments*

Deploying analytics in banks will definitely costs to banks as it requires investing heavily on building strong data infrastructure, investing on promoting data-driven culture, investing on staff training and investing on integrating the whole eco-system.

#### IV. RESEARCH METHODOLOGY

Researchers have relied on both primary data sources and secondary data sources. A structured questionnaire was built and shared with the respondents. In the current research, respondents included bank officials of selected banks operating in Bangalore region. Five-point Likert scale

was instrumented in the questionnaire to obtain responses. The questionnaire consisted of questions on analytics capabilities and implementation challenges. Literature survey was undertaken to gain more insights on analytics capabilities in banking space. TOE model (Technology-Organization-Environment) was instrumented in the questionnaire and further data was analysed using SPSS.

- *Data Sources*

To identify key trends, challenges and best practices in leveraging analytics for strategic capabilities, a comprehensive review of existing literature on analytics deployment was deployed. To gather data from bank officials, questionnaire using 5-point Likert scale was administered. Along with this, informal conversation with the bank executives also supported the researcher to extract insights. Thus, the study adopted mixed-method approach, combining surveys, informal discussions and secondary data sources.

- *Sample*

The study focused on the 34 banking executives of selected banks operating in Bengaluru region of Karnataka, India.

- *Research Objectives*

- To identify analytics capabilities required to be built in banks.
- To discover the challenges encountered while implementing analytics in banking.
- To propose measures for effective and smooth implementation of analytics in banking.

#### V. DATA ANALYSIS

The researcher adopted descriptive statistics to summarize the data with all items using SPSS. Missing values turned out to be zero with 34 valid items. In order to understand the degree and direction of the skew, test of skewness was performed which turned out to be 1.261, indicating that the distribution is positively skewed for Q1.2, whereas, the result indicated negative skewness for Q1.3. A kurtosis

value of 8.366 suggests that the distribution has fatter tails and a more peaked central peak compared to a normal distribution, indicating a leptokurtic distribution with a potential presence of outliers or extreme values. The mean of the dataset of technology context 1.9118 indicate that the average values in the dataset clusters around 1.998. A standard deviation of 0.51450 is a relatively moderate value. It indicates that, on average, the data points deviate from the mean by approximately 0.51450 units.

● *Test of Reliability*

The internal consistency was checked using Cronbach alpha measure which indicated that all items are acceptable with reliability of 0.728.

TABLE I: RELIABILITY STATISTICS

Cronbach’s Alpha	N of Items
.728	25

TABLE II: DESCRIPTIVE STATISTICS – TECHNOLOGY CONTEXT

		Basic Resources are Must for Implementing Analytics in Banking	Data Security is Critical While Implementing Analytics in Banking	Banks Should Ensure Existing Technology is Compatible with New Tools of Analytics
N	Valid	34	34	34
	Missing	0	0	0
Mean		1.0000	1.9118	1.9118
Std. Error of Mean		.00000	.08824	.08824
Median		1.0000	2.0000	2.0000
Mode		1.00	2.00	2.00
Std. Deviation		.00000	.51450	.51450
Variance		.000	.265	.265
Std. Error of Skewness		.403	.403	.403
Std. Error of Kurtosis		.788	.788	.788
Range		.00	3.00	2.00
Minimum		1.00	1.00	1.00
Maximum		1.00	4.00	3.00
Sum		34.00	65.00	65.00
Skewness			1.261	-.157
Kurtosis			8.366	1.041

Source: Author Calculation.

TABLE III: DESCRIPTIVE STATISTICS – ORGANIZATION CONTEXT

		Stakeholder Support is Crucial in Implementation of Analytics in Banking	Bank Staff Should Have Sound and Sufficient Knowledge About Usage of Analytics in Banking	Banks Should Invest Considerably in Building Analytics Capabilities
N	Valid	34	34	34
	Missing	0	0	0
Mean		1.8529	1.6471	1.6471
Median		2.0000	2.0000	2.0000
Mode		2.00	2.00	2.00
Std. Deviation		.55772	.48507	.48507
Variance		.311	.235	.235
Skewness		-.067	-.644	-.644
Std. Error of Skewness		.403	.403	.403
Kurtosis		.253	-1.688	-1.688
Std. Error of Kurtosis		.788	.788	.788
Range		2.00	1.00	1.00
Sum		63.00	56.00	56.00

Source: Author Calculation.

In this case, the values in dataset, on average, deviate from the mean by approximately 0.55772 units. The mode with the value 2 represents the frequency in the dataset with more occurring. A variance of 0.311

implies that, on average, the squared differences between individual data points and the mean is 0.311, which is relatively closer to the mean or less variability in the dataset.

TABLE IV: DESCRIPTIVE STATISTICS – ENVIRONMENT CONTEXT

		Government Regulations Do Impact the Operation of Analytics in Banks	External Data Sources Such as Economic Data or Market Trends Affect Your Bank’s Analytics Initiatives	Environment Sustainability Factors (ESG) Should Be Considered While Deploying Analytics Capabilities
N	Valid	34	34	34
	Missing	0	0	0
Mean		2.2353	1.7353	1.8824
Median		2.0000	1.5000	2.0000
Mode		2.00	1.00	1.00
Std. Deviation		.74096	.96323	1.03762
Variance		.549	.928	1.077
Skewness		1.485	1.439	1.112
Std. Error of Skewness		.403	.403	.403
Kurtosis		2.039	1.363	.194
Std. Error of Kurtosis		.788	.788	.788
Range		3.00	3.00	3.00
Minimum		1.00	1.00	1.00
Maximum		4.00	4.00	4.00
Sum		76.00	59.00	64.00

Source: Author Calculation.

From the table given below, it is evident that banks are considering environment sustainability factors while deploying analytics capabilities in banking.

44% of bank officials have strongly agreed that ESG should be considering while deploying analytics.

TABLE V: ESG SHOULD BE CONSIDERED WHILE DEPLOYING ANALYTICS CAPABILITIES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	15	44.1	44.1	44.1
	Agree	13	38.2	38.2	82.4
	Neutral	1	2.9	2.9	85.3
	Disagree	5	14.7	14.7	100
	Total	34	100.0	100.0	

Source: Author Calculation.

● *Correlation*

To measure the relationship between bank size and having an exclusive analytics department, Pearson

correlation was checked, which resulted to 0.328, indicating a moderate positive relationship between bank size and exclusive analytics department.

TABLE VI: CORRELATIONS

		Bank Size	Exclusive Analytics Department
Bank size	Pearson Correlation	1	.328*
	Sig. (1-tailed)		.029
	N	34	34
Exclusive Analytics Department	Pearson Correlation	.328*	1
	Sig. (1-tailed)	.029	
	N	34	34

\*. Correlation is significant at the 0.05 level (1-tailed).

The absolute value of the correlation coefficient (0.500) is less than 1, suggesting a moderate negative linear relationship between bank size and reporting and communication.

TABLE VII: CORRELATIONS

		Bank Size	Reporting & Communication
Bank size	Pearson Correlation	1	-.500**
	Sig. (1-tailed)		.001
	N	34	34
Reporting & Communication	Pearson Correlation	-.500**	1
	Sig. (1-tailed)	.001	
	N	34	34

\*\* . Correlation is significant at the 0.01 level (1-tailed).

● *Regression*

R value of 0.274 suggests a moderate positive correlation between the dependent and independent variables. A positive “r” value indicates a positive linear relationship, meaning that as one variable increases, the other tends to increase as well.

R-squared value of 0.75 suggests that your model explains the best proportion of the variability in the

dependent variable. R<sup>2</sup> value depicts the best fit of the model and accuracy in predictions.

A higher adjusted R<sup>2</sup> indicate better fit of the model. In the present case, it is 0.46 which is balanced and lower than the R<sup>2</sup>. A standard error of the estimate of 0.81471 suggests that, on average, the observed values deviate from the regression line by approximately 0.81471 units.

TABLE VIII: MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.274 <sup>a</sup>	.075	.046	.81471

a. Predictors: (Constant), Bank size.

VI. RESULTS AND DISCUSSION

The study on optimizing analytics deployment in banking focused on analytics initiatives at selected commercial banks. The research employed a mixed-methods approach, combining surveys, informal

discussions and secondary data analysis to gather insights into strategies, challenges, and outcomes related to analytics deployment.

- The study demonstrated that basic resources are critical for the successful application of analytics in banks. These resources include a

strong IT infrastructure, significant data storage capacity, and skilled individuals who understand data analytics methodologies.

- The study emphasized the vital necessity of data security issues in the deployment of analytics in banks. To protect sensitive client information, critical considerations were ensuring effective data encryption, access restrictions, and regulatory framework compliance.
- Banks should ensure that new technology such as analytics tools should be able to compatible with existing technology.
- The findings emphasized the need of bank employees having strong knowledge and expertise in analytics utilization. Investing in ongoing training programs and upskilling activities was highlighted as critical to maximising the efficacy of analytics tools and driving organisational success.
- Significant investments in analytics skills were discovered to be critical, particularly when aligned with Environmental, Social, and Governance (ESG) criteria. This strategic alignment improves operational efficiency while also reinforcing banks' commitment to sustainability and responsible banking practices.
- Banks should also consider changing government regulations while adopting analytics.
- A large number of respondents strongly agreed that external data sources, such as economic indicators and market movements, have a significant impact on banks' analytics operations. Incorporating external insights improves the accuracy and relevance of analytics-driven decision-making processes.
- The study discovered that the establishment of dedicated analytics departments varies greatly depending on the size and operational scale of banks. Larger organizations often invest in specialist analytics teams to focus on specialized data analytics duties and strategy development.
- The degree of reporting and communication processes differed significantly between banks of various sizes. Larger banks often use more extensive and organized reporting methods than

smaller institutions, reflecting differences in organizational capacity and resources.

- Data integration, security, and regulatory compliance issues were highlighted as significant barriers to the implementation of analytics in banks. Overcoming these difficulties necessitates strong governance structures, innovative data management tactics, and strict compliance requirements.

The findings underscore the critical importance of strategic planning and organizational readiness in optimizing analytics deployment within the banking sector. Effective deployment hinges on aligning analytics initiatives with overarching business objectives and ensuring robust technological foundations.

## VII. CONCLUSION

The research on optimizing analytics deployment in banking has provided valuable insights into the multifaceted challenges and strategic considerations essential for successful implementation. Key findings underscore the critical role of basic resources, data security, compatibility with existing technology, staff expertise, and substantial investments in building analytics capabilities aligned with ESG factors.

Analytics is the new frontier of innovation in banking space. The significance of adopting analytics in banking activities is explored through present research. The results of TOE model depicted that the banks should invest tremendously on implementing analytics in banking. Having an exclusive analytics department is always recommended as execution, monitoring and assessing of analytics initiatives becomes easier. Analytics can promote sustainable practices in bigger way and can be leveraged to greater extent. Analytics can help improve risk management, fraud detection, operational efficiency, consumer insights, compliance, supply chain management, and community impact in banking. Banks may contribute to both environmental and social sustainability while retaining financial viability by appropriately exploiting data and analytics. The findings underscore the multifaceted considerations

and challenges associated with optimizing analytics deployment in banking. By addressing these key areas, banks can enhance their analytical capabilities, strengthen operational resilience, and foster sustainable growth in a competitive financial landscape. In conclusion, optimizing analytics deployment in banking requires a comprehensive approach that integrates technological readiness, robust data governance, strategic investments, and continuous organizational adaptation to regulatory changes. By addressing these key considerations, banks can position themselves competitively, enhance customer experiences, and drive sustainable growth in an increasingly digital and data-driven financial landscape.

### VIII. LIMITATIONS AND FUTURE RESEARCH

The current research focuses primarily on identifying capabilities required to implement analytics in banks. Future research can be extended on identifying those capabilities which affect the performance of bank. Addressing issues such as data silos and personnel shortages is critical for banks looking to maximise the benefits of analytics adoption. Future research could look into how emerging technologies such as AI and machine learning can be used to improve analytics skills while also managing changing regulatory environments.

To summarize, improving analytics adoption in banking necessitates a comprehensive approach that combines strategic planning, strong technological infrastructure, and good data governance. Banks can use the findings of this study to strengthen their deployment plans, improve operational agility, and achieve long-term growth in an increasingly competitive market.

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