

# BANKING AND FINANCIAL ANALYTICS – AN EMERGING BIG OPPORTUNITY IN DATA ANALYTICS

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#### Abstract:

Big data analytics is a promising new technique. Yet, its implementation and value extraction roadmaps are unknown. This paper explores the interrelations and interdependencies of BDA enablers in the banking and financial services sector.

Design/Methodology/Approach: Delphi review, interpretive structural modelling, and fuzzy MICMAC method are used to identify enabler interactions and BDA implementation success. Our integrated strategy uses experts' domain experience to get a fresh insight into enabling causal linkages, language analysis of varying mutual affects, and two creative methods for displaying outcomes.

Findings: Our findings emphasise the importance of enabling aspects including skilled and technical labour, financial help, infrastructure preparation, and selecting the right major data solutions. These forces drive many hierarchical enablers. The results provide dependable, straightforward, and robust insights into BDA implementation in banking and monetary service as a whole programme, showing possible affects of all interconnected vital parts.

Originality/Value: This paper examines the main BDA enablers in banking and financial services. Operating and dependency degrees indicate element relationships. This study shows managers how to apply BDA well.

**Keywords:** Banking & finance industry, Optimum decision for business promotion, descriptive, predictive, and prescriptive analytics, Business analytics, Competitive advantage for banks.

### **Introductions:**

Investing in big data analytics is a crucial managerial decision for the banking and financial services sector, not only because of its potential to increase corporate value but also because of prospective organisational changes and resource commitments [12]. BDA may be better defined by taking into account essential characteristics of big data, in addition to including equipment, infrastructure, and mental models that invariably result in managerial insights and bring value to the decision-making process [15]. According to a 2019 report from the IDC Institute, BDA investments are valued at roughly \$1.26 trillion in the BFS industries. BFS industries have recently started increasing their BDA teams to suit the rising demands. For instance, HSBC is getting ready to hire 1,000 data scientists to improve risk management and the customer experience using BDA [3]. The investment in BDA has provided BFS firms with numerous benefits. For instance, JP Morgan Bank has identified fraud risk among its consumers by examining their purchasing and spending patterns, while American Express

offers customers data-driven incentives by examining their social networking data [5]. Notwithstanding the great benefits of BDA for performance and commercial value, many BFS organisations are still lagging in the adoption of BDA solutions [15]. One of the more frequent issues is that the BFS companies' information collecting, interpretation, and processing skills are hampered by the continually rising volumes of information from various sources. Undoubtedly, practically all of the useful data relating to banking and finance hasn't been examined for strategic implications to comprehend managerial decisions about service innovation, marketing tactics, value co-creation, and customization [17]. As a result, BFS managers require extensive coaching. discuss how BDA implementation may match their organisation. Research has provided exploratory debates.

on BDA's advantages, problems, and socioeconomic impacts in banking, research, and financial services, which emphasise on fiscal control's technical applications and features.

This research addresses three questions: RQ1: What are the main BFS BDA enablers? RQ2: How do two dependency driving capabilities affect BDA enablers? RQ3: How do BFS firms apply BDA?

This study uses Delphi review, interpretive structural modelling, and fuzzy Matrice d' Impacts Croises Multiplication to cover this critical literature vacuum. Use a classification technique to identify BDA facilitators and their linkages [4]. In this research, BDA enablers are organisational, managerial, technical, or data-related features that help organisations implement BDA projects, from pre-adoption to implementation [17]. Moreover, BDA enablers are linked by two criterion of dependency driving capacities [6].

Identifying and representing the expected influences between critical components gives BFS organisations new insights into BDA. Our work goes beyond establishing and giving a summary of verified aspects from experts' viewpoint to calculate facilitators' driving and dependent powers [20]. RQ1: a Delphi analysis verifies the list of BFS firms' most important big data analytics enablers and highlights relevant context-based enablers based on domain experts' experience. To answer RQ2, we used ISM, a mathematical method. We used fuzzy MICMAC analysis to quantify enabler interdependencies and calculate their travelling and dependent energy. ISM uses interconnected matrices to structure complex events to answer RQ3. Hence, complicated variable relationships are frequently quantified. Academics and providers can better grasp enabling interconnectivity by innovatively portraying it in recommended frameworks [7]. This study contributes greatly. It's among the first to use an integrated and organised empirical strategy to find BDA implementation success [9]. Our findings help BFS firms implement BDA empirically.

Second, our analysis adds value to BDA literature by identifying the major enablers of BDA implementation and examining their links to present an evident pathway for BDA implementation using Delphi research, interpretive structural modelling, and fuzzy MICMAC

methodology. Finally, we present BDA implementation enablers to help BFS providers maximise BDA benefits. The report continues with core facts and anticipated BFS sector consequences. Section three presents the research design. Section four discusses outcomes.

Finally, part five and six examine ramifications, future research, and limitations.

### **Research History:**

Big data analytics was considered a breakthrough technology that might generate strategic and operational company values [12]. BDA helps financial institutions satisfy customer expectations and revitalise their business models. Since 2008's financial crisis, BFS firms have faced intense pressure to act in a fashion conference, stakeholders' expectations, and relevant regulations and laws. Innovative laws like the Payments Service Directive and Basel III require BFS companies to be transparent and provide vast amounts of accurate customer data. BDA, IoT, and Blockchain could change industrial building, though. BDA is needed to gain insights into the organisation and its environment and make better decisions and strategic moves. BDA has had a major impact on companies, especially enterprises that are already well-established in the field of banking and financial services [8]. According to Sazu et al. (2022), big data has the potential to completely benefit chain of information in three different ways: a) about different technologies, processes, and people; b) greater amalgamation of solutions for analytics, as well as understanding extraction; and c) depending much more on information scientists as well as analysts to allow for real-time decision making and self-service making [28]. Big data is believed to result in even more successful and powerful actions, or even as an empowering stimulus or agent, which makes it possible to create new business models [24]. Businesses now have the opportunity to enter new industrial settings thanks to the opportunities made available by the BDA [30]. In addition, the elimination of conventional company boundaries has resulted in the demise of a number of previously existing monopolies. Therefore, large companies such as Alibaba may decide to enter the financial and banking sector, and by making use of the massive amounts of data at their disposal, they may be able to provide their customers with innovative new solutions that eliminate the need for traditional banking institutions [30]. Hence, businesses in the financial services sector should consider the great details they have as a two-edged sword in order to make fundamental adjustments to their company strategy [9].

Although the vast majority of studies have demonstrated the benefits of BDA programmes, the implementation of BDA tasks is both expensive and complicated. A great number of companies have difficulty revealing the commercial value of them. In light of the facts, it is abundantly clear that around sixty percent of BDA programmes are unsuccessful. In particular with regard to the BFS sector, research on the visiting strategic use of BDA is yet in the preliminary stages of its development. There is a general lack of awareness regarding the significance of the enablers of BDA implementation and the connections between them [10]. As a result, Jahan's research is a response to the request for a much greater attention on management issues of BDA, which involves investigating the organisational elements that influence the adoption of BDA [28].

Previous research has explored the enablers of BDA deployment from the organisational, datarelated, and technical points of view [1]. Yet, there is still little progress made in finding enablers for the application of BDA. It is essential to take use of sets of BDA enablers that are holistic, interdependent, and connected, as this can result in a more in-depth comprehension of BDA implementation [11]. To come to this conclusion, successful BDA efforts require an integrated design that reveals the interrelationships between various BDAEs and demonstrates their driving and dependent capacities. We were able to finalise and test the summary of BDAEs in the BFS sector, extract their interdependencies, and visualise the results by a combination of the Delphi technique, the ISM approach, and the fuzzy MICMAC approach [16].

#### The Plan for the Research:

In order to get answers to our research questions, we utilised an integrated multi-method strategy that blends qualitative and quantitative research approaches. This was done so that we could get a more complete and in-depth picture of the topic under investigation.

According to Sazu et al. (2022), one of the advantages of employing a multi method strategy is that it allows one to "compensate for the flaws, and utilise the strengths, of the multiple methodologies" [12]. [Citation needed] Because it enables us to generate a structural model for a complicated issue in a created pattern, we went with an integrated ISM and Delphi fuzzy MICMAC approach. Instead of thinking about each variable on its own, we constructed a hierarchical type of variables so that we could accurately and methodically describe the trend that was underlying the research [13]. The fuzzy MICMAC approach and the fuzzy ism method both recognise the interdependencies between variables and highlight the impacts that the variables may have on each other during the course of the pathways and loops. At the last phase, we constructed fuzzy MICMAC models and ism by making use of the comments of several industry professionals [15]. Our integrated research methodology enables us to generate a clear picture of the complexities involved in the implementation of BDA [27]. In the next subsections, additional elaborations of each study subject are offered for your perusal.

#### FIRMS Study

In this particular piece of writing, we made use of the Delphi method to enjoy a summary of significant enablers associated with BDA implementation and to get to the consensus of panel participants regarding these enablers, in addition to their contextual interrelationships. In doing so, we were able to: [a] enjoy an overview of the main enablers connected to BDA implementation; [b] enjoy an overview of The Delphi technique is a rigorous examination that can be used to gain insights into the aspects of a complex event that are most important. The method is helpful for accumulating collective assessments while avoiding the unfavourable consequences associated with interpersonal biases, defensive attitudes, powerful personalities, as well as ineffectual disagreements. According to the definition provided by Jahan et al. (2022), an authority is "an individual that has earned knowledge in big data progressively from a period of experience" and learning.

#### **Interpretive Structural Modelling**

As was mentioned earlier, ISM is a strategy that is logically and mathematically derived, and it is a part of a complex phenomenon that includes interrelated variables by way of an organised progression that is based on the structural modelling of interconnected matrices [26]. This strategy is known as the interconnected systems model. The ISM technique is an interpretive one since it relies on the judgement of industry professionals to determine the interrelationships between the factors connected to a complex problem [29]. One of the many advantages is One of the advantages of the ISM methodology is that it transforms hazy and insufficiently articulated logical representations of devices into versions that are well-structured and visible.

### **Observations and endpoints**

In the sections that follow, we will discuss the reasons behind the ISM procedure in a great deal more detail. The consequence of each stage is thoroughly discussed and shown by the relevant outputs that belong to their respective categories.

### **Determining Which Factors Are at Play**

The ISM approach begins with the step of compiling a list of the most important aspects of a complicated problem. The literature research and the Delphi technique were utilised in order to compile and choose the essential enablers for the list, as was discussed earlier. Reviewing previous work reveals that there are twenty-three primary enablers. These enablers appear to be a summarised and synthesised type of important factors coming from relevant case studies, taxonomy oriented research, as well as broader analysis on the basic successfully accomplishing BDA tasks [19]. The Delphi assessment allowed for the elimination of several BDAEs that were deemed to have a meaning that was comparable to other BDAEs or to have a lower level of legitimacy in the BFS context. Additionally, in light of the significance of their roles in BFS organisations, expert panels proposed the addition of four brand new elements [31]. In the end, our panellists arrived at the conclusion that there are nineteen major BDAEs that should be considered as criteria that are important for properly applying BDA tasks.

The reasoning behind BDAE's decision is outlined in Table 3, which may be seen here [25].

# The Construction of the ISM Model

The ISM technique will conclude with the last stage consisting of the establishment of the structural model or digraph. Figure three depicts the representation of the BDAEs, along with their interrelationships dependent on the FRM, as well as level partitioning of the reachability matrix. This is the third and final version of the ISM. The ISM model consists of five tiers, the top of which has the following four enablers:

Integrating big data into corporate processes, establishing appropriate organisational structures, developing a business case that is both justifiable and transparent, and strategically positioning big data analytics On this particular level are the enablers that have maybe the highest ranking of dependency power, but lower levels of getting energy than on previous levels. Because of this, they are to a large extent defined by the enablers on the lower levels.

#### **Fuzzy MICMAC Analysis**

With the purpose of dissecting the framework of complicated systems, Godet and Duperrin conceived of the MICMAC strategy. The MICMAC analysis provides a visual representation of the variables in a complex system based on the dependence and driving power of those variables. The driving and dependency energies of each process are calculated by the MICMAC examination, with the driving energy being changeable by adding the values along each vertical and horizontal axis. While performing a binary MICMAC analysis, the total number of ones in a row indicates the operational energy of a variable, whereas the total number of ones in a column indicates the dependence power [21]. We used fuzzy MICMAC analysis to consider not only the presence of all variables, but also the robustness of the relationships, in order to increase the sensitivity and precision of the final result. This allowed us to think about not only the presence of all variables, but also the strength of the relationships.

#### Discussion

With the help of a solid design, the author of this particular study hopes to identify the factors that have contributed to the success of big data applications in the BFS industry. The ISM and fuzzy MICMAC analyses were used to specify and quantify the interrelationships among the nineteen BDAEs that we had previously discovered and validated through the use of literature review and the Delphi learning method. The structural component that was produced as a result of ISM provides a visual representation of the potential influences and dependencies of the enablers [23]. The digraph model and the MICMAC analysis both show that selecting the appropriate major data technologies, having a skilled and technical workforce, having infrastructure that is ready, having financial support, and being able to select these things will be the main enablers and have the highest driving power in applying BDA tasks in BFS firms [22]. This particular location indicates that having access to the appropriate energy is vital for doing great data jobs. [Citation needed] Before beginning the BDA assignment, BFS companies should make certain that they have access to the appropriate materials and that they have considered all of their options.

In addition, the research that has been done has highlighted the connections that exist between the presence of these primary enablers and the success of large data projects. The criticality linking of these individual enablers and the joint potential influence that they have within the model is one of the ways in which our research contributes to the expansion of this particular area of inquiry. The BFS companies have a responsibility to acquire the necessary technical, human, and financial resources, and then to effectively utilise these basic enablers in order to achieve productive results.

In the next higher level of the digraph, the other primary enablers include the capacity for huge data customization, dependability, scalability, and data security. The acquisition and unwarranted use of customers' information is viewed as having both ethical and legal repercussions by managers, notably in the financial business, who have excellent concerns over issues of security and are concerned about the implications of such actions. In addition, the non-functional capabilities of big data technologies, in addition to the capability to change the functions and analytical capabilities of its regarding the requirements of end-users, are essential

aspects in the duties associated with big data. The dependence of these BDAEs on the additional enablers in the lower level indicators, which BFS firms have utilised in order to make use of specialist professionals and hold more assets in order to Manage the essential functions, and address any concerns regarding safety.

Big data governance, building a data driven society, managers need to exercise extreme caution when it comes to strong management support and controlling their dependent on legacy equipment because both of these things have high levels of instability. Due to the fact that these enablers are connected to one another in a myriad of different ways, the fact that a large information project is experiencing problems with even just one of them can have a domino effect that affects other aspects of the project as well as the overall outcome of the endeavour. The vast majority of financial service providers have already invested untold millions of dollars in their existing systems and infrastructures, and they are dependent on these investments to carry out their essential and day-to-day activities. So, managers are faced with the challenge of updating and combining these historical approaches with great data solutions while simultaneously taking into consideration the large expenditures that have now been made in their infrastructure. In addition, a healthy data-driven society, effective large data governance, and support for best control all have a favourable impact on other enablers in addition to being good comments on themselves.

Data integrity, empowering end users, embedding big data in business processes, correct organisational structures, justifiable and clear business situations, and BDA strategic positioning are at the top and upper-middle levels of the hierarchy, where they have a larger reliance power. This data lends credence to the hypothesis that components at lower levels can exert an influence on enablers. BSF companies have a responsibility to investigate this outcome in order to ensure that the performance of each component in the top and upper-middle levels is predominantly driven by other variables that are interconnected.

# Conclusion and discussion:

### **Contributions:**

This particular study makes use of an exploratory integrated solution in order to increase the knowledge of BDA enablers by evaluating the interrelationships and influences that they have on one another. With this knowledge, the study aims to improve the effectiveness of BDA. Our work defines BDAEs and their contextualised interrelationships, which are vital in real-world significant details approaches, particularly in BFS context, in order to provide a genuine and consistent theoretical foundation. This was accomplished by determining the BDAEs themselves. Our ability to gain a better understanding of the contextual interdependencies that exist between BDAEs, as well as the impacts that these interdependencies have on the productive critical elements of project implementation, was facilitated by the multi-method strategy.

### **Implications:**

According to the results of the current research, carrying out and maintaining a project with a massive amount of data is a complex issue. Specifically, it is dependent on the firms' potential to simultaneously harness crucial resources and capabilities within a business context, which

includes the information characteristics, and deploy these synergistically to clean the important information implementation process [20]. This ability is essential.

In addition, our findings suggest that even though a variety of enablers discussed in this particular study are essential to the successful implementation of BDA found BFS, the factors with increased driving powers provided at lower levels of Figure three as well as the impartial enablers in cluster IV of Figure four require even more strategic focus. This is the case despite the fact that these enablers are important in the successful implementation of BDA found BFS. These factors with greater impact power or possibly as independent enablers would gain a variety of other associated factors that holistically predict the success of BDA in a banking or even financial service industry. As a result, managers have the responsibility of ensuring that their organisation is both technically and financially ready to take the next step [28]. Our findings not only give BFS management with obvious strategic help, but also the pathway to successfully deploy BDA. This is far more specific than the previous statement. A significantly more accurate depiction of the primary factors that make big data projects possible may be seen in the structural model that was developed for this particular research project. The prioritised contributory BDAEs offer helpful empirical insights for practitioners and managers to notice the whole relevance and structure of elements driving large data initiatives. These BDAEs have been ranked in descending order of importance. The identified interdependencies and hierarchy of the BDAEs enable supervisors to learn a) key variables that have a good impact on some other components, and b) very vulnerable aspects with higher dependence and operating power, and that both groups require continued interest in the effective implementation of BDA tasks [18].

In addition to this, the findings highlight critical facets that have strong driving power for big data activities. As a result, managers and practitioners have a responsibility to pay at least some attention to these essential facilitators [30]. In addition, the excessive dependence and driving energy of some BDAEs, such as good management assistance and controlling dependency on legacy methods, are indicators of the unsteady nature of these BDAEs and provide useful instruction to managers as they embark on their BDA transformational journey. In addition, the prioritised contributory BDA enablers offer significant evidence for practitioners and managers to recognise the comprehensive importance and structure of factors driving BDA tasks. The identified hierarchy, in addition to the mutual associations of the BDAEs, can assist managers in learning a) key variables that have a good impact on some other components and b) very vulnerable aspects that have a higher dependence and operating power, and that both groups require continued interest in the efficient implementation of BDA tasks.

#### **Constraints Perspectives for the Conduct of Future Research**

Despite the fact that this study helps improve our comprehension of the most important BDAEs and the relative value of theirs, the findings of this particular study need to be understood bearing in mind the constraints placed on it. To begin, the conclusions of the present study are based on the participation of twenty experts. As a result, the findings are subject to the subjective nature of the opinion of the experts, and they may not be generalizable to a variety of other circumstances. In spite of this, the substantial data that came about as a consequence of the Delphi study in conjunction with the Delphi study provide an excellent foundation upon which to build further investigation. Next, this particular study was developed and carried out based on the judgement of academics and Gurus who have expertise in the BFS field; however, future studies may analyse the perspectives of ultimate users, outside stakeholders, particularly clients, as well as regulation bodies' concerns and encounters. Finally, the resulting design has not been subjected to statistical validation, and in the forthcoming investigation, structural equation modelling may be utilised for the goal of validating designs in this manner.

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