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# TRANSFORMING FINANCIAL INSTITUTIONS THROUGH DATA-DRIVEN DECISION-MAKING: A CASE OF VIDARBHA REGION

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## ABSTRACT

Given the constant change in the financial industry environment, the use of DDDM as a key way of increasing productivity, managing risks, and improving customers' satisfaction has been adopted. This paper focuses on how DDDM is influencing financial institutions for the Vidarbha region of Maharashtra to adopt the analytical tools like data analytics, artificial intelligence and machine learning for improving the financial decision making. The study therefore develops a blend of quantitative and qualitative data in ascertaining the level of DDDM implementation and outcomes on financial performance. The important areas of the submission of big data are risk management, lending, credit risk, fraudulent behavior detection, and customer relationship management. The research also discusses antioxidants like data security, constraint infrastructures, and scope confinements on financial organizations that may slow the adoption of data analytics. This paper presents how DDDM supports innovation, maps a better understanding of financial decisions, and increases customer-centric services. Various suggestion and recommendation has been made at the end of study for how the financial institutions can effectively adopting data driven technologies for the sustainable growth and competitive advantage in the Vidarbha region.

**Keywords:** Data-Driven Decision-Making, Financial Institutions, Vidarbha Region, Predictive Analytics, Risk Management, Financial Performance, Artificial Intelligence, Data Analytics

## 1. INTRODUCTION

The financial industry has evolved over the recent years due to the developments in the area of technology and more specifically data. Industry leaders know and understand how DDDM helps to improve operations, manage risks and develop better relationships with customers. DDDM is a process by which data is gathered, analyzed, and applied in business processes in a strategic manner. Thanks to big data analytics AI and ML, other financial institutions can now forecast tendencies in the market, evaluate risks within credit, control fraud and even provide differentiated services.

In the context of the Vidarbha region of Maharashtra, there had been a gradual increase in the level of data management by the segments of financial institutions that include banks, NBFCs, and cooperative credit societies for competitive advantage. These institutions have been able to improve on their decision making especially in their operations and portfolio such as credit, asset and management and regulation. Nevertheless, there are some challenges associated with the implementation of the decisions made in the framework of the transition to DDDM. Challenges like

information security threat, limited digital environment, rules and regulations and the resistance of change remain paramount hindrances to the smooth execution of data solutions.

This research therefore seeks to assess the current applicability of DDDM in the financial institutions within Vidarbha region, viability, prospects and exploits on usage of data analytics for betterment and efficiency for the organizations. This study aims at evaluating the practical submission and the influence of the data oriented approaches in the hope that it will help in aiding the various financial institutions to enhance the usage of data analytics as a tool in their growth and as a way of getting competitive advantage in the market.

## 2. LITERATURE REVIEW

Consumer satisfaction has not been left out when it comes to the impact of data analytics. It has been realized that through the implementation of predictive analytics, financial institutions have been able to automate more services, enhance the quality of services, let alone customizing services as well as customers' relations and products and services offering (Chen et al., 2012). This way, financial institutions may need to make several attempts such as analysing the buying behavior and information about other transactions made by a customer in order to know what he or she requires. As in the case of this article, customers get to keep coming around and also remain satisfied due to such a strategy (Gomber et al., 2018).

One more success story that is worth mentioning about the contribution of data analytics is the efforts to enhance revenue growth. As rightly said by Davenport (2013), through the adoption of some of the analytic tools for client segmentation and marketing, financial institutions have noted a shift in their improvement across the cross-sell and up-sell effectiveness. Banks and other similar institutions may identify their high net worth customers and provide them with customized services based on analysis of the relevant data. In addition, information technology systems in the financial sector may now customise loan products and interest rates based on specific credit risk ratings given by analytical business pricing and credit scoring technique. The McKinsey & Company (2017) revealed that it is important also noted that there was a shift of 10-15% increase on the conversion rate for sales every time financial organisations incorporated data analytics in the marketing of their products.

Thus, data analytics has also implemented significant advances in risk management. So fraud, credit risk, and the regulatory compliance may be better and efficiently identified through the help of predictive modelling and of machine learning algorithms (Fischer et al., 2020). However, to prevent the act of fraud from escalating, financial institutions employ real time analysis to detect the suspicious activities. It has enhanced the ability of the bank to conform to the set regulations and significantly reduce incidents of fraud based financial losses. It is according to Ernst & Young (2016) that using advanced analytics to manage risk has led to a decrease in operational risk by a quarter in five years.

The growing internal and external demands for faster and more accurate analysis due to the phenomenon of big data led financial organisations to adopt more and more extensive analytical tools in the course of the 2000s as a result of technological advancements. At this period new approaches of predictive modelling and other analytical tools were developed in the financial institutions and it provided capability to detect frauds, credit risks, and even predict future movements of the market (McAfee & Brynjolfsson, 2012). Chukwunweike JN et al. (2024) opine that through use of predictive analytics, possibly in the current world, financial institutions are able to produce tailored products with respect to the users.

These industries as we know are among some of the key sectors that have been significantly impacted on by AI and ML taking shape in the last couple of years. Machine learning, credit scoring, trading, and fraud identification are only but the few tasks that have been automated in the recent past. Machine learning models are therefore capable of providing data-based decisions on the fly and enhance the probability of arriving at better estimations of risk because they learn from the data that is fed into them. Such technologies implemented helped in-risk management and in a way enable operational excellence by automating back-office functions and enhance operating efficiency and product quality (Deloitte, 2019).

## 3. OBJECTIVES OF THE STUDY

- To analyze the adoption of data-driven decision-making practices in financial institutions within the Vidarbha region.

- To evaluate the impact of data analytics on financial performance and risk management.
- To examine the role of artificial intelligence and machine learning in financial decision-making.

## 4. HYPOTHESIS

Null Hypothesis ($H_0$): Artificial intelligence and machine learning do not have a significant impact on financial decision-making in financial institutions within the Vidarbha region.

Alternative Hypothesis ($H_1$): Artificial intelligence and machine learning have a significant impact on financial decision-making in financial institutions within the Vidarbha region.

## 5. RESEARCH METHODOLOGY

This work uses descriptive research paradigms in order to solve the research issues that relates to the usage of data-driven decision-making in the financial institutions within the Vidarbha region. Data collection will involve structured questionnaires and interviews from questions administered to methodical official of the selected sample of the financial firms, which incidence in the study include; banks, Non-Banking Financial Companies (NBFCs), and cooperative societies. Therefore, there will be the utilization of the Likert scale based questionnaires designed to cover the level of acceptance of data-driven decision making, influence of AI and ML, and perceived challenges in the economic institutions. Secondary data, which are financial statements from organization's financial reports, Journals, Magazines, and regulatory agencies' documents will be used to make the analysis. The research will use arithmetic techniques to establish the effectiveness of data analytics in the decision-making process in the financial environment. The interviews will be analyzed by means of thematic analysis techniques in order to gain further insights as to trends in the industry as well as the practical application of the recommended strategy. Consequences of the research will be informative for assessing the outcomes of the approach and for providing suggestions on how to improve the process of data-oriented decision-making in financial organizations.

## 6. DATA ANALYSIS AND DISCUSSION

**Table 1: Descriptive Statistics of Key Variables**

| Variable | N | Mean | Standard Deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| AI & ML Adoption Score (1-5) | 150 | 3.85 | 0.76 | 2.0 | 5.0 |
| Decision-Making Efficiency (1-5) | 150 | 4.12 | 0.68 | 2.5 | 5.0 |
| Risk Reduction Percentage (%) | 150 | 18.7 | 4.35 | 10.2 | 25.4 |
| Fraud Detection Improvement (%) | 150 | 22.4 | 5.12 | 12.5 | 30.8 |
| Customer Satisfaction (1-5) | 150 | 4.05 | 0.81 | 2.8 | 5.0 |

The details of the descriptive data collected for the study and the effect of AI and ML on the overall financial management of the institutions in Vidarbha region are given in table 1.

The AI & ML Adoption Score is 3.85 with standard deviation of 0.76, which means the mainstream of the financial institutions are of moderate to high AI & ML adoption level that ranges from 2 to 5. This therefore implies that while there are firms that are deeply ingrained in using AI to make company decisions, there are companies that are only slightly involved in the usage of AI.

So in the term of Decision-Making Efficiency, the mean score is 4.12 and standard deviation is 0.68, which indicates that overall financial institutions think that AI & ML enhance the accuracy and speed of their decision-making process. The minimum and maximum values (2.5 to 5.0) entail some level of fluctuation of efficiency displaying what may probably be driven by the level of AI & ML implementation in an institution and the preparedness of the set institution.

The mean of the Risk Reduction Percentage is 18.7 % the minimum value being 10.2%, and the maximum value is 25.4% indicating that the use of AI in analytics is effective in risk management. The mean value of the Fraud Detection

Improvement Percentage is even higher 22.4 %, SD = 5. 12, which proves the importance of AI &ML to detect frauds on financial security.

Last of all, the mean of Customer Satisfaction is 4.05 with standard deviation of 0.81 and its values varying between 2.8 and 5.0. This implies that AI & ML solutions such as effective financial solutions, exceptional and efficient fraud service delivery increase consumer trust and hence satisfaction.

In general, the obtained measure for descriptive investigation displays a positive correlation amongst AI & ML and the effectiveness of financial decisions, risk management, fraud detection experiences, and general customer satisfaction. From the analysis of the results, the means of all the variables are quite high and it may be concluded that AI & ML are seen as having a significant worth in the improvement of financial activities in the Vidarbha region. Additional findings using further inferential analysis like regression testing will aid in the understanding of these tested results as to the degree of significance.

**Table 2: Regression Analysis Results**

| Variable | Coefficient (β) | Standard Error | t-Statistic | p-Value | Significance |
|---|---|---|---|---|---|
| **Constant ($\beta_0$)** | 1.245 | 0.312 | 3.99 | 0.0001 | Significant |
| **AI & ML Adoption ($X_1$)** | 0.687 | 0.105 | 6.54 | 0.0000 | Significant |
| **Risk Management ($X_2$)** | 0.452 | 0.089 | 5.08 | 0.0002 | Significant |
| **Fraud Detection ($X_3$)** | 0.371 | 0.072 | 5.15 | 0.0001 | Significant |
| **Customer Satisfaction ($X_4$)** | 0.289 | 0.065 | 4.45 | 0.0003 | Significant |

Table 2 shows the coefficients of each independent variable where the model regression is used to regulate the degree or strength of correlation between the selected independent variables in AI/ML adopted institutions and overall efficiency in financial decision-making in the Vidarbha region.

The Constant ($\beta_0$) recorded has a coefficient of 1.245, and, p-value equals to 0.0001 which is significant at 5 % level, so the model intercept is statistically significant as the efficiency measurement model to baseline the financial decisions when other variables are absent.

The coefficient of the variable AI & ML Adoption ($X_1$) is 0.687 and the t-statistic is 6.54 with p-value of 0.0000. This has a very high probability and suggests that the adoption of AI & ML has a positive considerable effect on the effectiveness of the financial decision. This implies that various uses of AI & ML in the financial institutions enhance their efficiency in some aspects, such as risk evaluation, processing time, and accurate estimates of the outcome.

Only the Risk Management ($X_2$) has significant coefficient equal to 0.452, t-statistic of 5.08 and p-value of 0.0002, which confirms that risk management practices have a positive impact on financial decision making efficiency. The positive coefficient indicates that with higher effectiveness of the risk management supported by AI the better is the overall performance of the decision making.

The same also applies to Fraud Detection ($X_3$) that has positive influence it has the coefficient of 0.371, t-statistic of 5.15 and p=0.0001. This means that AI & ML technologies have an important value to provide in the field of fraud detection and, consequently, the reinforcement of financial decisions' security.

At last, Customer Satisfaction ($X_4$) has coefficient of 0.289, t-statistic of 4.45, and p-value of 0.0003; thus it may be inferred that increased customer satisfaction results from the better decision making, personalization, and reduced incidence of fraud so far enhance customer confidence level.

The outcomes of this investigation suggest that all IVs namely AI as well as ML adoption, risk management, fraud detection, and customer satisfaction are statistically significant and exert positive influence on the dependent variable namely, the efficiency of financial decision-making amongst the bank's clients. In proving the hypothesis, it has been found that the submission of both AI and ML has a positive result on the decision making process of the financial institutions in Vidarbha region. These observations can be used to emphasized the relevance of integrating AI & ML in the company to enhance its functionality, mitigate risks or fraudulent activities and satisfy customers.

## 7. CONCLUSION OF THE STUDY

This paper looks at the effects of AI & ML on the financial decisions in the financial institutions of Vidarbha region, Maharashtra. It is evident from the consequence of the investigation that increases effectiveness in achieving better decisions, risk management, reducing fraud detection and increasing the level of customer satisfaction when AI & ML is implemented in the financial practices.

Grounded on the descriptive analysis, it can be noted that there is a reasonable to high level of implementation of AI & ML technologies in the financial institutions located in Vidarbha region of India. In this regard, the above institutions reveal the following benefits; the improvement of the decision-making process, reduction in the risks associated with financial transactions, and increase in the capability to detect fraud cases among customers, and increased customer satisfaction.

Regression analysis further complements these facts, where the function of the adoption of AI & ML is statistically positive and expressively correlated with financial decision-making. In specific, implementation of AI within the fields of risk management, fraud detection and customer relations seems to enhance the current performance of financial institutions. The outcomes also show that the autonomous decisions, based on the AI & ML have extended security, accuracy and efficiency of the financial operations that eventually enables greater sustainability and increased competitiveness in these institutions.

Some potential barriers that the work mentions include the lack of proper digital infrastructure, existing rules and policies concerning AI & ML and the requirement of constant training of its employees. That is why, overall it can be concluded, that the role of AI & ML and applying it to financial decision making in Vidarbha has significant benefits.

Therefore, it could be concluded that the financial institutions of Vidarbha are on the right track in adopting newly emerging technologies of AI & ML to optimize their organizational decision-making. Hence, there is a need for institutions to expend more resources in the usage of AI technologies and innovation, besides offering right training to the staff. This research work has brought out relevant information that could be useful in understanding the expansion of the central role of AI & ML in advancement of the financial services segment not only in Vidarbha but also in the entire India economy.

## CONFLICT OF INTERESTS

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