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BANKING ON ANALYTICS – USE CASES FOR BANKS IN INDIA

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ABSTRACT

Data Analytics is disrupting the banking sector like never before. Today banks are sitting on hundreds of terabytes of data. Harnessing the power of analytics on the already available data is helping banks in various ways, from process automation, process improvements to exploring new delivery models and introducing new products and services. Analytics provides banks with more marketing muscle. Functional areas like Risk, Compliance, Fraud, NPA monitoring, and Calculating Value at Risk can benefit greatly from Analytics to ensure optimal performance, and to take crucial strategic decisions. The use of Analytics can greatly help banks differentiate themselves and remain competitive in the future. The application of data analytics in banking is more than a trend today. As banks undergo digital transformation and customer preferences evolve, data analytics is a blessing today. For instance, data analytics and AI make it easier for the lenders to decide in minutes on instant lending. With banking products and services becoming increasingly commoditized, data analytics can help banks in India differentiate themselves and gain a competitive edge. This paper delineates the various ways that banks can leverage data analytics to meet the emerging challenges as well as explore new opportunities ahead.

KEYWORDS

Indian Banks, data analytics, big data, analytics use cases.

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INTRODUCTION

Banking is getting branch-less, contact-less and high-tech at a very fast pace. Banks make sincere efforts to gain competitive advantage, through various innovative digital initiatives. In the journey of such digital transformation, the need for managing huge data and deriving value from analytics becomes more relevant.

After the recently amalgamation of public sector banks in India, some banks have become very huge in size. These big banks now have terabytes of data related to millions of customers. Adapting to the culture of “big data” remains a matter of choice for many banks. The early adopters are already reaping the benefits by deriving optimum value from data analytics. Even though analytics has brought a whole lot of opportunities for the banks, it comes bundled with challenges of customer privacy, cyber security breaches, regulatory compliance etc. Banks need to adapt to apply new and innovative approaches and strong mechanisms to manage such challenges on a much larger scale.

Banking analytics refers to the application of data analytics - that is, the use of various tools and technologies to collect, process, and analyse raw data within the banking industry. Examples of banking analytics include customer segmentation, credit risk management, and fraud detection, real-time prevention of cyber-attacks etc.

When the pandemic hit, most banks in India entered a crisis mode of building or expanding digital capabilities that allowed customers to bank without physically coming to the branches. Customers used Internet Banking, Mobile Banking, UPI (Unified Payment Interface), video KYC etc. for their routine banking needs. Pandemic forced the banks to adopt/expand digital mode faster. Further, banks have seen during recent years a significant acceleration in their ongoing digital transformation journey & new operating models. The banks appreciated the changing socio-economic habit of the customers who were leaning towards the digital channels. As banks are working towards digitization, customer expectations from the banks have also risen noticeably.

The older generation of bank customers are now slowly, voluntarily and readily accepting to trust the digital banking – which is considered the new normal. Millennials and the digital natives, Gen Z customers, tech-savvy customers, exposed to advanced technologies in their routine lives, expect the banks to deliver quick, seamless, smooth omni-channel experience, while accessing the bank’s digital platforms from anywhere, anytime through any device. The Customers want banking to be as seamless as possible. With globalization and changing customer needs, bank customers are increasingly opting for digital channels that fit seamlessly into their busy lifestyles. Mobile banking, digital payment solutions, convenient remote banking accessibility, personalized financial advice, online privacy and cyber security, full control over financial affairs – the list of customer expectations keep growing.

RESEARCH OBJECTIVES

To study the various use cases of data analytics and explore how these use cases can help the banks in India.

RESEARCH METHODOLOGY

This research study is descriptive by nature with qualitative method of data collection and analysis. Data have been collected from various authentic and reliable secondary sources such as various reports published by RBI, various Banks in India, leading consulting companies, etc. and web sites of various leading banks in India and companies providing analytics solutions. Inputs/Reports/Research papers from leading research institutes on Data Analytics and Artificial Intelligence/Machine Learning have also been referred.

IMPORTANCE OF THE STUDY

Banking Analytics refers to the application of data analytics — that is, the use of various tools and technologies to collect, process, and analyse raw data — within the banking industry. After the recently amalgamation of public sector banks in India, some banks have become very huge in size. These big banks now have

terabytes of data related to millions of customers. Adapting to the culture of “big data” remains a matter of choice for many banks. The early adopters are already reaping the benefits by deriving optimum value from data analytics, while remaining banks are still on “wait and watch” mode. Against this backdrop, we conduct this study to explore the various use cases that can be adapted by the Banks in India, to harness the power of data analytics.

LITERATURE REVIEW

Data analytics has been integral to the way banks do business for some time now. In fact, the financial services industry as a whole was one of the early adopters of data analytics. Banks used it to market third party products (cross-selling) – particularly life insurance, mutual funds, SIP etc. to their existing customers. Banks can leverage data analytics to derive granular insights from huge quantities of data they already have and apply those strategic findings across all levels of business across the bank.

Big Data can help banks create relevant databases that could potentially be of great value to the banks. By successfully leveraging Big Data, a bank can better understand its customers’ habits and lifestyles. By using data from various data sources such as social media and various online and offline channels, banks can gain specific knowledge about the kind of financial products or services appropriate for a particular segment of customers. Banks in India can leverage data analytics to learn more about their customer’s habits and improve existing processes to build predictive models and forecast growth opportunities.

According to study of qualetics.com, the data analytics is widely used in banks thereby creating new processes, new models, and changing the face of the banks in following five areas:

1. Fraud Detection and Prevention - Analysis of customer records to derive accurate information was not possible before the existence of data science/big data.
2. Customer Data Analysis - Banks are collecting large amounts of data from consumers. Analysing these datasets is possible with data science technologies. Based on the information collected through social media, customer surveys and data from other touchpoints, the banks can understand customer sentiment and accordingly provide deep data intelligence on customers’ needs, wants and perceptions about the bank.
3. Marketing & Sales - The key to success in marketing is to customize an offer that suits particular customer preferences and need. Therefore, banks can make personalized outreach to interact with customers.
4. AI (Artificial Intelligence) driven chatbots & Virtual Assistants - A chatbot is a custom program designed to mimic human conversations on a web or mobile app. The usage of chatbots in banking decreased the customer waiting time and increased the rate of interaction with the customers. The rule-based chatbot operates on a particular command and an AI-based chatbot gets smarter with every interaction, as it keeps on learning from past interactions.
5. Risk Management - The adoption of data science is enabling new risk, management models. Machine learning technologies can identify complex, nonlinear patterns in large volumes of data and help create appropriate models with higher accuracy. These data models also self-learn with every bit of every data and pattern to improve their predictive power with time.

As per the study published on mygreatlearning.com, banking analytics can help improve how banks segment, target, acquire, and retain customers. Further, the use of data analytics is done in the following areas:

1. Fraud Detection
2. Customer Segmentation Analysis
3. Prediction of Customer Lifetime Value (CLV)
4. Risk Modelling – Credit Risk Modelling & Investment Risk Modelling
5. Recommendation Systems for promotional products

As per a study published in wipro.com, data analytics can be used in banks for following purposes:

Credit risk and Collection

- Lend to right type of customers.
- Monitor collections.
- Predict and reduce delinquencies.
- Reduce NPA and increase profitability.

HR and performance management.

- Track performance V/s business objectives.
- Reduce attrition.

Finance and Treasury

- Determine interest rates and forecast NII.
- Monitor and control interest rate risk.
- Establish risk tolerance levels and submit Intelligence to risk committees.
- Manage overall funds situation

Marketing and Sales

- Design products and make customers aware through various marketing channels.
- Maximize sales at minimum cost through optimizing revenue.
- Increase customer loyalty and reduce attrition.

As per the JP Morgan Case Study, banks need data to grow their business and draw more customers. The important areas where banking industries use data science to improve their products are as follows:

1. Risk Modelling
2. Fraud Detection
3. Customer Lifetime Value
4. Customer Segmentation
5. Recommendation Engines

Cybersecurity Analytics involves aggregating data for the purpose of collecting evidence, building timelines, and analysing capabilities to perform and design a proactive cybersecurity strategy that detects, analyses, and mitigates cyber threats. With a normal Security Information and Event Management (SIEM) system, bank has to depend on testing things as they exist in a singular moment within the network. Cybersecurity analytics applies to the network as a whole, including general trends that may not be evident in a given snapshot.

The widely used common use cases of cyber security analytics include:

1. Analysing the traffic to identify patterns that may be attacks
2. Detecting threats
3. Monitoring the user behaviour
4. Detecting the improper use of user accounts
5. Monitoring the activities of employees working remotely
6. Identifying insider threats

When someone says, “to offer the right product or service to the right person at the right time,” he/she is actually talking about personalization. Personalization has really taken off as a trend in the banking industry, as it has the power to make customers feel like the king and it is possible only when the customers feel they are being seen, heard, and understood — all of which contribute to an awesome overall customer experience. By delivering the personalization that customers crave and by demonstrating that banks really value customer’s time and efforts, and continually looking for the ways to improve the customer experience, banks can build stronger, long-lasting customer relationships.

Banks are under constant pressure to simultaneously reduce operational costs while increasing efficiency. First and foremost, strategy of the banks has huge impact. A well-defined strategy should be the foundation for all data analytics initiatives. Without proper strategy, banks can invest in the fancy tools and technologies and still find themselves in trouble. Any successful strategy starts with identifying which key goals and objectives banks target to achieve. Doing so not only provides banks with a clear path forward, but also makes it easier to engage with the key stakeholders. It will not be an exaggeration to say that the day-to-day functions in a banking environment will be severely limited and handicapped if analytic tools were not made available to them. It does not matter how much data they have. Every company-wide initiative requires executive buy-in, so being able to clearly articulate what your institution stands to gain from implementing banking analytics can help secure a “yes” from every stakeholder.

MAJOR FINDINGS

A recent report from the World Economic Forum predicts that 463 Exabytes of data will be generated daily by 2025. There are a plethora of success stories demonstrating how banks capitalise on the vast data they possess. Functional areas like Risk, Compliance, Fraud, NPA monitoring, and Calculating Value at Risk can benefit greatly from Analytics to ensure optimal performance, and to take crucial strategic decisions. The use of Analytics is helping banks differentiate themselves and remain competitive. The application of data analytics in banking is more than a trend today. Here are some of the major use cases of data analytics that can help the banks in India.

THE RISE OF SPATIAL THINKING

Location-aware devices and services have exposed billions around the world to how technology can support “spatial thinking.” Whether searching on Google, navigating to a location using the smartphone, ordering a shared ride, or tracking a kid’s school bus, many people use spatial-aware technology in their day-to-day lives. Many organizations are moving to analyse location data for a wide range of critical insights, with major implications. Geospatial analytics can be an important source of innovation, helping solve problems across talent, operations, marketing, risk, and beyond. It may even be instrumental in bank wide transformation, changing how everyday banking operations are conducted.

Geospatial analytics—the practice of analysing data with a spatial dimension—typically requires multiple steps: collecting geospatial data from varied sources such as surveys and sensors, turning data into multiple layers of spatial representations, and then analysing it to find useful patterns to inform operational or strategic teams.

Geospatial analysis plays a critical role in identifying growth opportunities while opening new bank locations. It also helps to analyse and monitor the performance of various bank branches, which will help overcome any risks and losses. Banks can even make decisions related to closing branches that are not performing well. They can even leverage geospatial analysis while positioning new ATMs as it is challenging to determine which locations will ensure maximum revenue based on the potential customer base. Similarly, selecting the right site for setting up a branch is a crucial business activity which can determine the future business performance for a particular branch. Spatial analysis based on the demographics, target customers, existing customers, buying behavior, spending habits, and more can help choose the right branch location for more profits.

IMPROVING CUSTOMER EXPERIENCE

Multichannel consists of a variety of customer touchpoints, such as Internet Banking, Mobile Banking, ATM, Customer Care, web chat, WhatsApp and physical branches, etc. Modern bank customers expect to be able to get in touch with the banks through many different channels, both online and offline. It makes it easier for the customers to get in touch with the bank through any of the channels. But in case the channels are not integrated with one another, this would lead to a very frustrating customer experience.

As users jump from one touchpoint to another, they expect not to face any problems between different channels and devices. In order to meet the customers’ expectations, the customer experience must be smooth, seamless and consistent. In this situation the omni-channel strategy becomes relevant. Omni-channel refers to the smooth integration between channels, both digital and offline, in order to ensure a seamless interaction between customers and the bank.

Customers should be able to access to same set of services across all touchpoints. Their data should be synchronized in real-time between all different channels so that whenever they decide to switch to a different channel, all the information and activities connected to their profile is already available. There should be only one source of content to ensure users are not asked to provide the same information again and again in different channels. This way, whatever the individual’s customer journey looks like, his/her experience is consistent and unified, personalized and contextually relevant.

In the case of the banking industry, this means for instance that clients should be able to perform the same banking operations whether they use a website, a mobile app, Bank’s Call Centre, an ATM, a bank’s branch, or any other available channels. However, limiting the integration to the digital channels would lead to customers’ disappointment, as for some categories of customers, such as the elderly, or offers, such as complex financial products, face-to-face communication remains the preferred option, despite the generalized digital shift that the banking industry has seen in the last few years.

Deploying an omni-channel strategy will make face-to-face communication even more effective. For instance, when a customer enters a branch to request a loan, the branch representative would have immediate access to meaningful information about that customer profile and the activities he/she previously carried out. Implementing an omni-channel strategy requires a large investment, not only financially speaking, but especially in organizational terms, as it requires to implement changes in the way the bank manages its operations and its corporate culture. However, artificial intelligence facilitates the implementation of such a change process and the benefits of omni-channel intelligence clearly outweigh its cost. indeed, omni-channel intelligence is the future of the banking industry. Those who will miss out on this revolution, will lose relevance, customers and profits.

HYPER PERSONALIZATION: MAKING THE CUSTOMER FEEL LIKE A KING

Banking and finance are known for being highly competitive areas where the delivery of contextual customer experiences is no longer a “nice to have” option, but one of the key expectations for the banks to address. While there are many banks with different offerings, the real value and appreciation are delivered by those who are able to meet the needs of each individual customer and this is very much achievable with personalization.

Recommending and Upselling: For financial services (and retail banking in particular), in which marketing actions are culturally product-oriented, the right message to a customer is important. Using AI to look at large volumes of diverse data to determine what products or services should be recommended to someone at a certain moment based on the last interactions can be hugely advantageous to the banks that take advantage of this form of hyper-personalization. By leveraging hyper-personalization, banks can make customers feel like the king.

Personalization itself can be achieved in a variety of ways. For example, banks can take into account the wants and needs of different demographic segments. By doing so, it becomes possible to target the offerings in a precise way, as well as to cover the pains specific to each segment: for instance, security issues for baby boomers, virtual assistance for Gen Z, provision of financial insight to Millennials, and innovative technologies for Gen X.

FRAUD DETECTION & RISK MANAGEMENT

To stay agile and quickly respond to threats, banks are augmenting their fraud detection toolkit with the machine learning (ML) capabilities. The idea behind ML-driven fraud analytics is that fraudulent transactions have tell-tale signs that algorithms can uncover much more effectively than rule-based monitoring systems. By processing customer, transactional and even geospatial data, they can even spot patterns that seem unrelated and simply go unnoticed by human data analytics. As a rule, ML algorithms leverage supervised or unsupervised learning techniques for detecting frauds. The difference between these two types is that supervised learning-based algorithms heavily rely on explicit labels, meaning that machines need to be repeatedly trained on what a legitimate versus fraudulent transaction is. Unsupervised learning models, in contrast, do not need prior labelling to recognize abnormal activity, so they can continuously update their datasets and detect even previously unknown fraud and abuses.

There are a number of ways that banks can use data analytics to protect themselves from risk. For example, banks can use customer analytics to segment customers into different categories based on their credit-worthiness for the purposes of credit risk management. Not only does this enable the banks to narrow down the target audience for bank's credit products, it also reduces bank's exposure to default risk because banks can count on those customers to consistently make payments.

Credit risk refers to the risk of financial loss when a borrower fails to meet the financial commitments. As these non-performing assets (NPAs) continue to grow, it has become imperative for banks to find better and more robust mechanisms to manage default risks. Advanced ML-driven analytics can do just that. By analysing a vast amount of financial and non-financial data, trained machine learning algorithms can model credit risk and predict default with a much higher degree of accuracy than traditional methods.

CYBER SECURITY

Cybersecurity analytics uses machine learning (ML) and behavioural analytics to monitor bank's network, spot changes in how resources or the traffic on the network are used, and can enable banks to address threats immediately.

Traditional SIEM (Security Information & Event Management) does a good job of addressing threats as they pop up. With cybersecurity analytics, network security can detect threats before they impact the system. This is because the system observes network behaviour and data flows, looking for potential threats. With cybersecurity analytics, banks can gain a bird's eye view of the entire enterprise's network activity. One can discover devices on the network, as well as outline their configuration and event data. Banks can also keep track of when new devices join the network and track their behaviour.

An effective cybersecurity analytics solution provides results of the system's efforts in real time, showing the potential threats that have been mitigated and the general health of the network. This makes it easier to see the impact of the system on network's general safety.

In some ways, cybersecurity analytics is like next-generation SIEM, particularly in how it automates the threat intelligence. With ML tools, threats can be detected, categorized, and filed away to be used to detect similar ones in the future.

A reactionary approach to cybersecurity can leave bank's system open to novel or developing threats. Cybersecurity provides banks with a proactive strategy to identify and address threats, thereby giving a global view of not only what the network is currently dealing with but likely future threat events. This provides the organisation with an advanced profile of the intelligence threats the network faces. With security analytics, one can see where attacks come from, how they managed to get inside the system, and the assets they affect.

CONCLUSION

Many banks have struggled to move from experimentation around select use cases to scaling AI technologies across the organization. Reasons include the lack of a clear strategy for the data analytics, fragmented data assets, and outdated operating models that hamper the collaboration between bank's business and technology teams. To compete successfully and thrive, the banks must become "AI-first" institutions, adopting AI technologies as the foundation for new value propositions and distinctive customer experiences.

Alexa, what's my account balance? Bank customers are embracing automated assistants such as Siri, Alexa and Google Home. Banks will need to integrate and manage these new channels. Banks should never forget to think through "off-ramps" that customers must have options to switch over to human backups when needed. Finally, bank should give AI systems the opportunity to learn from the outcomes of human interactions.

With excitement comes fear. Banks are eager to use digital labour, but many human workers already feel threatened by it. To deploy the technology successfully, banks must focus on the people issues. They should share plans with the employees so they can understand which jobs will change and how. Banks will need to address these concerns, offer training to help people adapt, and banks need to be transparent in the whole process. By leveraging data analytics, banks in India can realise maximum value from the vast data they already possess. This will prove to be a win-win situation for all the stakeholders.

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IMPACT OF NON-PERFORMING ASSETS IN THE PROFITABILITY OF COOPERATIVE BANKS IN HIMACHAL PRADESH

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ABSTRACT

Banking Industry is called as backbone of Indian Economy because it comes under service sector and service sector has largest contribution towards GDP of India. Cooperative Banks are one of the important constituents of Indian banking industry especially in the field of rural areas, agriculturists and persons of limited means. Because these cooperative banks provide loans to rural people agriculturist and needy people at a very reasonable rate of interest for their upliftment. But the main problem is that the magnitude of increased NPAs has become the virus against the existence and growth of cooperative banks in India. The present study is conducted in cooperative banks of Himachal Pradesh in order to know the impact of NPAs on profitability of the banks. The collected secondary data in the form of Annual Financial statements such as P&L and balance sheet from 2011-12 to 2020-21 is analysed with Linear regression technique to know the NPAs impact on profitability of the selected cooperative Banks. The study found that GNPA and Net NPAs have significant impact on the profitability of HPSCB but Gross NPAs and Net NPAs in the profitability of KCCB have no significant impact. Moreover, the study found insignificant difference of Gross NPA between HPSCB and KCCB but there is significant difference of Net NPAs between HPSCB and KCCBs.

KEYWORDS

NPAs, Impact, profitability, impact, Regression, agriculturists, significance.

JEL CODES

G21, G33.

INTRODUCTION

A sound banking system has vital contribution for the growth & development of Indian economy. Without sound banking system, there may have adverse impact on all sectors of economy. Because banking sectors contributing towards GDP of the country by accepting deposits and giving them in the form of loans & advances to the agriculturist, MSMEs and persons of limited means especially in the field of rural areas. But now the problem of NP has become a virus against the existence, growth & development of cooperative banks and others banks as well.

Cooperative Banks are one of the important constituents of Indian Banking Industry which are established under the Cooperative Society Act 1912 to uplift the people of rural areas by providing them loans & advances at a very reasonable rate of interest. (Movalia N& Shilu 2021)¹

The following is the brief description of selected Cooperative Banks in Himachal Pradesh:

- 1) **Himachal Pradesh State Cooperative Banks:** It is the apex cooperative Banking institutions registered in August 1953 under the cooperative society Act 1953.
- 2) **Kangra Central Cooperative Bank:** It is the district cooperative bank of Himachal Pradesh.
- 3) **Jogindra Central Cooperative Bank:** It is also the district central Cooperative Bank of Himachal Pradesh.

DESCRIPTION OF SELECTED COOPERATIVE BANKS OF HIMACHAL PRADESH

TABLE A

Name of selected Cooperative Bank of Himachal Pradesh	Districts where selected cooperative bank branches are situated
1) Himachal Pradesh State Cooperative Bank	Shimla, Bilaspur, Mandi, Chamba, Kinnaur and Sirmaur
2) Kangra Central Cooperative Bank	Kangra, Kullu, Lahual-Spiti, Una and Hamirpur

Source: Bhulal K & Dhanna,S.(2017)

Concept of Non-Performing Assets: Non-Performing Assets is that amount of principal or interest or both which is not recovered by banks within 90 days after the specified due date. In other words, if a bank is not able to recover its principal amount or interest or both from the borrowers within 90 days after the due date, that unrecovered amount is called as Non- Performing Assets. It is the negative indicator for banking growth and development. (Ahmad A & Panwar 2016).³

Assets Classification under NPA

According to RBI Guidelines, the assets are classified into four categories:

- 1) **Standard Assets:** It is that amount of instalment / principal or interest or both which has already recovered by bank within due date from the borrowers. There is no risk except the normal risk attaches to the business in standards assets. So, these assets are not actually NPAs.
- 2) **Sub-standards assets:** since March 31, 2005 Sub-standard assets includes those instalments of principal or interest or both which remain outstanding for a period of equal to one year or less than one year.
- 3) **Doubtful assets:** Since March 31, 2005, that amount of instalment of principal or interest which remained outstanding for more than one year is known as doubtful assets.
- 4) **Loss Assets:** The amount of which there is no possibility of recovery and it is that uncollectible amount of loans & advances which a bankers, external or internal auditors or RBI inspections has identified but still the amount is not yet written off wholly or partially is known as loss assets. Ahmad Z, Jagadeeshwaran (2013)³

Computation of Gross NPA

Gross NPA ratio establishes the relationship between Gross NPA with Gross Advances. The following is the formulae for calculating Gross NPA ratio:

$$\text{Gross NPA Ratio} = \text{Gross NPA} / \text{Gross Advances} * 100$$

Computation of Net NPA Ratio

Net NPA ratio establishes the relationship between Net NPA with Net Advances. The formulae for calculating Net NPA is as follow:(Ahmad, Z & Jegaseeshwaran 2013)⁵

$$\text{Net NPA Ratio} = \text{Net NPA} / \text{Net Advances} * 100$$

REVIEW OF LITERATURE

Sikdar P & Makkad M. (2013)¹ Have found the significance of correlation between NPA and ROA also found the significance of impact of NPA on profitability by collecting secondary data of public & private sector banks and by using mean, standard deviation, correlation and linear regression model. Their study that Gross NPA has significance influence on return on assets negatively. **Narula, S & Singla, Monika, S (2014)**² Have studied the impact of NPA on Banks of PNB by considering annual Reports from 2006-07 to 2011-12. Their study found that there is negative adverse impact of NPA on profitability. **Desai R (2017)**³ have analyzed the trend in sector wise NPAs of priority sectors and also analyzed how sectorial advances in priority sector affect NPA in that sect by considering banks which comprised BANKEX, a lending bank index by Bombay Stock Exchange are taken as sample. For the analysis of data, they used regression and correlation. Their study found that priority sector has positive relationship with all other variable except service sector lending and capital adequacy ratio. **Yadav Singh M.**⁴ In his study have analysed the impact of NPA on profitability of public sector banks at aggregate level by collecting secondary data using simple linear regression where NPA is independent variable and profitability is dependent variables. Their study found that NPA has adverse impact on profitability. **Ojha A & Jha C (2017)**⁵ have undertaken the study regarding working mechanism of the SBI also analysed the profitability of the SBI by collecting and analysing data. They used capital adequacy ratio, credit deposit ratio, percentage of cost of capital, & Gross NPA ratios, cost to income ratio, net interest margin, average return on asset etc. Their study concluded that rising level of NPA effect negatively in these banks regarding NPAs. **Kaur M & Kumar Phillip B. John K (2018)**⁶ have tested the impact of NPA on the share price of the 10 banks for a period of 10 years by establishing relationship between the said variables by taking top five public sector banks namely SBI, PNB, Bank of Baroda, Camera banks and top 5 private sector banks namely HDFC, AXIS Bank, Kotak Bank, yes bank and ICICI bank and by collecting secondary data from NSE Websites. And data was analysed with the help of correlation and regression analysis. Their study showed that there is highly negative impact of NPAs on the share price of all the banks. **Banerjee R & Verma D (2018)**⁷ established relationship between Net NPA, Net profit and Gross NPA by collecting data from 2010 to 2017. Their study found that mismanagement of the banks is the most responsible factor that contribute to NPA. They considered the business banks in Orissa which comprised of SBI, PNB, ICICI, Andhra Bank and Bank of India arise. **Thakur, V. & Singh, N. (2021)**⁸ found the significance of correlation between NPA and profitability and also impact of NPA on profitability by collecting data of 10 banks both public & private based upon the magnitude of NPAs and by using statistical tools such as Mean, standard deviation, Correlation, Linear Regression Model. Their study found that there is significant impact of Gross NPA on the profitability of both public and private sector banks

On the basis of above reviews of literature, it is found that much of the studies have been undertaken either on public sector banks, or private sector banks. But no major studies have been undertaken on cooperative banks especially in the state of Himachal Pradesh. So the above gap can be filled by conducting study of impact of NPA on the profitability of Cooperative Banks. on the basis of research gaps, the following research questions arise:

- What is the impact of Non-performing Asset on profitability of the selected cooperative banks?
- Is there significant difference between the mean score of Gross NPA and Net Non-performing Assets in selected cooperative banks?

OBJECTIVES OF THE STUDY

- To know the significance of impact of Non-Performing Assets in the profitability of selected cooperative Banks.
- To know the significance of difference in Gross NPA and Net NPA between HPSCB and KCCB.

HYPOTHESIS OF THE STUDY

H0: There is no significant impact of non-performing assets on the profitability of the banks.

H1: There is significant impact of Non-Performing Assets on profitability of the banks.

H0: There is no significant difference of Gross Non-Performing Assets and Net Non-Performing Assets between HPSCB and KCCBs.

H1: There is significant difference of Gross Non-Performing Assets and Net Non-Performing Assets between HPSCB and KCCB.

SCOPE OF THE STUDY

The present study is restricted to Cooperative Banks in the state of Himachal Pradesh. Only Himachal Pradesh Cooperative Banks and Kangra Central Cooperative Banks have been considered for research purposes.

METHODOLOGY OF THE STUDY

Research methodology is the structure of systematic combination of collection of data, analysis & interpretation of data, hypothesis testing, finding & conclusions of the study. There are two important constituents of Non-Performing Assets i.e Gross Non-Performing Assets and Net Non-Performing Assets. The study is conducted in order to know the significance of difference in Gross Non-performing assets and Net Non-Performing Assets between HPSCB and KCCBs., Net NPA of selected cooperative banks from 2011-12 to 2020-21. Secondary data has been collected from Head offices of selected cooperative banks in the form of Annual Financial statements. As far as analysis is concerned, T test has been used in order to know the significance of difference in Gross NPA and Net NPA between HPSCB and KCCB. Linear regression analysis technique has been used in order to know the impact of NPAs on profitability of the selected banks. The value of R² is used to know the portion of variation of profitability that due to Gross Non- Performing Assets and Net Non-Performing Assets. The value of Durbin –Watson is considered to know whether regression model is fit for analysis or not.

LIMITATION OF THE STUDY

The analysis of study is based upon secondary data in the form of Annual Reports. The reliability of data depends upon the originality of data.

RESULTS AND DISCUSSION BASED ON ANALYSIS & INTERPRETATION

TABLE 1.1: MODEL SUMMARY AND ANOVA (F) RESULTS OF SIGNIFICANCE OF IMPACT OF GROSS NON-PERFORMING ASSETS IN THE PROFITABILITY OF HPSCB

Variable /Measures	R	R ²	Adjusted R ²	F-Value	P-Value	Durbin Watson
Gross NPAs	.868	.754	.723	24.503	.001	1.431

a) Predictors: (Constant), GNPA.

b) Dependent Variable: Profit of HPSCB

a. Dependent Variable: PROFITHPCSB

From the above table 1.1 in Model summary, it is found that the value of regression coefficient is 0.868 and the coefficient of determination R² is 0.754 which explains that 75.4 percent variation in profitability is explained by Gross NPA whereas 24.6 percent of variation in profitability is explained by the factors other than Gross NPAs. The value of standard error 2524.38 is relatively low and an indicator of an appropriate predictor regression model. The Durbin Watson statistics for model is 1.431 which lies between 1 to 3 that's why it is found desirable. As the value of Durbin Watson less than 1 and more than 3 is not found desirable. The beta headed by standardized coefficient also shows relative contribution in explaining the dependent variable i.e. profitability. The value of Beta Coefficient is .868 which explains that Gross NPA can explain 86.8% variation in profitability. The ANOVA table found that Gross NPA has significant impact as its P value is .001 which is less than 0.05. That is why the null hypothesis is rejected at 5% level of significance. Hence the conclusion is that the Gross NPA of HPSCB has significant impact on its profitability which supports the results of earlier studies of Arasus et al etc. and Sikdar P & Makkad M.

TABLE 1.2: MODEL SUMMARY AND ANOVA (F) RESULTS OF IMPACT OF GROSS NON-PERFORMING ASSETS IN THE PROFITABILITY OF KANGRA CENTRAL COOPERATIVE BANKS

Variable /Measures	R	R ²	Adjusted R ²	F-Value	P-Value	Durbin Watson
Gross NPAs	.527	.278	.187	3.074	.118	2.433

a) Predictors: (Constant), GNPA.
 b) Dependent Variable: Profit of KCCB
 From the above table Model

From the above table 1.2(a), it is found that regression coefficient is valued at .527 with the coefficient of determination R² is .278 which explains that 27.8 percent variation in profitability can be explained by Gross NPA of KCCB whereas 72.2 percent of variation is explained by other factors. The value of Durbin Watson is 2.433 which lies between 1 to 3 and showed that Regression model is fit. The ANOVA Table found P value .118 which is greater than .05 at 5% significance level so it accepts the null hypothesis and found no significant impact of Gross NPA of KCCB in its profitability. The un standardized coefficient Beta value -.50 found that one percent increase in GNPA by holding other constant variables will lead -.50 % decrease in the profitability of KCCB. So overall, it can be concluded that The GNPA of KCCB has no significant impact on its profitability which contrasts the earlier studies of Ojha A & Jha (2017) but supports the studies of Sikdar P & Makkad M.

TABLE 1.3: MODEL SUMMARY AND ANOVA (F) RESULTS OF IMPACT OF NET NON-PERFORMING ASSETS ON THE PROFITABILITY OF HIMACHAL PRADESH STATE COOPERATIVE BANKS

Variable /Measures	R	R ²	Adjusted R ²	F-Value	P-Value	Durbin Watson
Net NPAs	.816	.665	.624	15.911	.004	1.258

a) Predictors: (Constant), Net NPA.
 b) Dependent Variable: Profitability of Himachal Pradesh state cooperative Banks

From the above table 1.3, it is found that the regression coefficient is .816 with the coefficient of determination R² i.e. 66.5 which explains that 66.6% of the variation in net profitability is explained by net NPA of HPSCB, whereas 33.5% of the variation in Profitability can be explained by other factors. The value of Durbin Watson is 1.258 which lies between 1 to 3 and explains that regression model is desirable. The un standardized coefficient beta value is .453 which explains that 1% change in net NPA leads .45% change in the profitability of HPSCB. The p value of ANOVA is 0.004 which is less than 0.5 and rejects the null hypothesis at 5% level of significance. So overall, it can be concluded that Net NPA of HPSCB has significant impact on profitability of HPSCB which also supports the earlier studies of Narula, S & Singla M and Arasus et al.

TABLE 1.4: MODEL SUMMARY AND ANOVA (F) RESULTS FOR IMPACT OF NET NON-PERFORMING ASSETS IN THE PROFITABILITY OF KANGRA CENTRAL COOPERATIVE BANKS

Variable /Measures	R	R ²	Adjusted R ²	F-Value	P-Value	Durbin Watson
Net NPAs	.432	.187	.085	1.838	.212	2.26

a) Predictors: (Constant), Net NPA.
 b) Dependent Variable: Profitability of Kangra Central cooperative Banks.

From the above table 1.4, it is found that the regression coefficient value is .432 and computed value of coefficient of determination is .187. The value of coefficient of determination R² is .187 which explains that 18.7% variation in profitability is due of Net NPA of KCCB whereas 81.7% variation in profitability is due to other factors. The computed value of Durbin Watson is 2.26 which lies between 1 to 3 and found the regression model desirable. The un standard value of beta coefficient is -.078 which explains that 1% change in Net NPA of KCCB leads to .78% change in its profitability. The ANOVA table significant value is .212 which is more than .05 at 5% significance level and accepts the null hypothesis. So, the conclusion is that Net NPA of KCCB has no significant impact of its profitability which contrasts the earlier studies of Yadav Singh Mahipal and Ojha A & Jha.

TABLE 1.5: AMOUNT -WISE COMPARISON OF MEAN GROSS NON-PERFORMING ASSETS BETWEEN HPSCB AND KCCB

Banks	N	Mean	Std. Dev.	Sig.	T value
Gross NPA of HPSCB	10	38949.3070	13134.55203	.089	-1.797
Gross NPA of KCCB	10	62318.9590	38961.34015		

Source: Annual Reports from HPSCB Head office Shimla and KCCB Head Office Dharmshala.

From the above table, it is found that average score of Gross NPA in HPSCB is 38949.3070 with standard deviation of 13134.55. On the other hand, the average score of Gross NPA in KCCB is 62318.959 with standard deviation of 38961.34015. So, it is found that Gross NPA of KCCB is higher in KCCB a compare to Gross NPA in HPSCB. But as per the inferential result of P value is concerned, it found insignificant difference in the mean value of Gross NPA between HPSCB and KCCB that contrasts the earlier studies of Ahmed & Panwar and Jegadeashwaran M etc.for their selected banks.

TABLE 1.6: AMOUNT WISE COMPARISON IN AVERAGE NET NON-PERFORMING ASSETS BETWEEN HPSCB AND KCCB

Banks	N	Mean	Std. Dev.	Sig.	T value
Net NPA of HPSCB	10	16147.7	8630.98055	.004	-3.341
Net NPA of KCCB	10	39477.23	20326.956		

Source: Annual Reports from HPSCB Head office Shimla and KCCB Head Office Dharmshala.

The average amount of Net NPA in HPSCB is 16147.7 with standard deviation of 8630.98. On the other hand, the mean amount of Net NPA in KCCB is 39477.23 with standard deviation of 20326.956. So, it can be found that the mean score of Net NPA in KCCB is higher than that of HPSCB. But as far as the inferential statistics is concerned, the P value is .004 which is less than .05. So, it found no significance in difference of average score of Net NPA between HPSCB and KCCB which supports the earlier studies of Ahmed & Panwar and Jegadeashwaran M etc. for their selected banks.

FINDINGS & RESULTS

- ❖ It is found the significant impact of Gross NPAs on the profitability of HPSCB as per the result of Regression Model. Moreover, Coefficient of determination also supports the result as more variation in profitability is due to Gross Non-Performing Assets as compare to others factors which supports the results of earlier studies of Arasus et al etc. and Sikdar P & Makkad M.
- ❖ The Gross NPA of KCCB has no significant impact on its profitability as per the result of P value in regression Model and coefficient of determination also supports the same results and profitability is affected by other factors than Gross NPAs which contrasts the earlier studies of Ojha A & Jha (2017) but supports the studies of Sikdar P & Makkad M.
- ❖ Net NPAs also have significant impact in the profitability of HPSCB as per result of Regression Model. Moreover, Coefficient of determination also supports the result as more variation in profitability is due to Non-Performing Assets as compare to others factors which also supports the earlier studies of Narula, S & Singla M and Arasus et al.
- ❖ Net Non-Performing Assets has insignificant impact in the profitability of KCCB as per the result of P value in regression Model and coefficient of determination also supports the same results and profitability is affected by other factors than Net Non-Performing Assets which contrasts the earlier studies of Yadav Singh Mahipal and Ojha A & Jha.
- ❖ Overall Gross NPA and Net Non-Performing Assets have significant impact in the profitability of HPSCB. But have no significance of impact of Gross and Net Non-Performing Assets in the profitability in KCCB.
- ❖ T test found insignificant difference between Gross NPA in HPSCB and KCCB at 5% level of significance which contrasts the earlier studies of Ahmed & Panwar.
- ❖ T test found the significant difference between Net NPA of HPSCB and KCCB as per the results of T test at 5% level of significance which supports the earlier results of Ahmed & Panwar Jegadeashwaran M etc

CONCLUSION OF THE STUDY

It is found that Gross NPA is significantly impacting the profitability of HPSCB whereas the Gross NPA of KCCB is not significantly impacting its profitability. On the other hand, Net NPA is significantly impacting the profitability of HPSCB, whereas Net NPA is insignificantly impacting the profitability of KCCB. In overall, it can be concluded that Gross NPA and Net NPAs have significant impact on the profitability of HPSCB. Whereas Gross NPA as well as Net NPA is not significantly impacting the profitability of KCCB. Moreover, Gross NPA of HPSCB and KCCB have no significance difference whereas Net NPA has significant difference between HPSCB and KCCB.

SUGGESTIONS OF THE STUDY

HPSCB has significant impact on profitability these banks should made proper provision for Non- performing Assets so that there can be no adverse impact of NPA on profitability. As the average mean score of Gross Non-Performing Assets and Net Non-performing Assets is more in KCCB as compare to HPSCB. So KCCB should evaluate the project before sectioning loans and analyse it after the disbursement to magnitude of Non- Performing Assets.

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