

Examining the mediating impact of intellectual capital between credit appraisal measurement and banks' performance

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Abstract. After the global financial crisis, the banking industry concentrated on lowering loan losses by implementing an enhanced credit appraisal measurement program, in addition to optimizing profit. Banks focused more on how to maximize its utilization, lower operating costs and loan losses, and increase profitability. A way of conducting business that lowers costs and increases profits, credit appraisal measurement has frameworks that are appropriately connected to the many customer-oriented services provided. The goal of the current study is to look into how intellectual capital affects the performance of Nepali banks and the way that credit appraisal is measured. Its main focus is on the relationship between intellectual capital and bank performance in Nepal. It also highlights how important credit appraisal measurement can be for enhancing bank financial performances. 175 respondents from commercial banks in Kathmandu, Bhaktapur, and Lalitpur provided the data. A self-administered questionnaire was filled out by participants, which served as the main source of quantitative data for this study. In addition, the data collected via surveys is examined using partial least squares structural equation modeling (PLS-SEM). The results point to a positive correlation between bank performance and credit appraisal measurement. The results show that intellectual capital has an immense impact on bank performance. The results also show that intellectual capital acts as a mediating factor in the relationship between credit appraisal measurement and bank performance. In order to enhance customer satisfaction, fulfill the targeted profitability ratio from credit appraisal measurement, and generate robust financial performance, management should prioritize the appropriate use of intellectual capital.

Keywords: *Credit appraisal measurement, Intellectual capital, Banks, Bank performance, Commercial bank*

1. Introduction

Lenders started using financial ratios to evaluate the creditworthiness of enterprises in the early 20th century. These ratios were computed using data from the borrower's income statement and balance sheet. Lenders' methods for determining creditworthiness have changed significantly as a result of the financial crisis of 2008. The increased emphasis on risk management was one of the most significant shifts. Lenders developed more advanced risk assessment techniques and became more selective about who they are going to lend money (Sabato, 2010). The greater use of alternate data was another modification. Alternative data includes information from sources like social media, mobile devices, and utility bills that aren't normally included in credit scoring algorithms (Abdou & Pointon, 2011). To obtain a more complete picture of a borrower's financial status and creditworthiness, lenders started

using alternative data. Finally, the financial crisis prompted the creation of fresh models for credit evaluation (Chen *et al.*, 2016). Compared to conventional credit scoring models, these models are more advanced and take a larger range of criteria into account. For instance, some modern models consider a borrower's cash flow patterns and employment stability. Assessing a borrower's creditworthiness is done through a technique known as credit appraisal measurement. Lenders use it to calculate the chance of a borrower defaulting on a loan as well as the amount of loss they would suffer if that happened (Chilukuri & Rao, 2014). Lenders take into account several variables when determining a borrower's creditworthiness, including Credit history, Income and employment, Debt-to-Income Ratio, and Credit Score (Galindo & Tamayo, 2000). Galindo & Tamayo (2000) research also ensure the recovery of credit uncertainty in the future, lenders assess creditworthiness using several methods and procedures.

For several reasons, credit appraisal measuring is crucial. First, it enables lenders to choose borrowers with greater knowledge. This minimizes credit losses and safeguards the financial system. In addition, credit evaluation measurement supports the development of ethical lending practices. Lenders can contribute to ensuring that all borrowers have an equal opportunity to access credit by determining a borrower's creditworthiness using objective criteria (Sickler, 2015). Third, measuring credit appraisals contributes to economic growth. Lenders can promote investment and employment growth by facilitating easier access to credit for firms and individuals (Zhang , 2022).

Following a thorough credit assessment measuring method, the company lowers credit losses, encourages fair lending, and boosts economic growth. It also enables borrowers to make wiser financial decisions, such as deciding whether to apply for a loan or credit card, by enabling them to understand their credit score and other credit criteria. A new credit scoring algorithm created by University of California, Berkeley researchers is more accurate for borrowers who belong to underrepresented groups, such as Black and Hispanic borrowers (Muñoz-Cancino , 2023).

Kumar & Bhattacharya (2006) evaluate a borrower's creditworthiness using a range of data sources, including credit history, income, and work history as well as alternative data, such as mobile phone and social media data. The goal of agency theory is to explain how people behave when they are acting on behalf of others. It is a theory used in business and economics. The theory is predicated on the notion that the principal and the agent have competing interests. (Eisenhardt, 1989) finds principle expects the agent to act in their best interests, but because the agent has their interests, they might not always do so. Since agency theory can be used to explain how lenders and borrowers behave, it is crucial to credit appraisal measurement (Kariuki , 2019). In this relationship, borrowers are the agents and lenders are the principals. Although borrowers have their interests and may not always return loans, lenders nonetheless encourage borrowers to do so.

By giving lenders knowledge of the borrower's creditworthiness, credit evaluation measurements can help to lessen the conflict of interest between borrowers and lenders. By using this data, lenders can lower their risk of loan defaults and make better-informed lending decisions. Agency theory is useful for Lenders who may request information from borrowers regarding their financial situation and credit history. Lenders can use this information to evaluate the borrower's creditworthiness and decide how likely it is that they will repay the loan.

If the borrower fails to repay the loan, the lender may seize any collateral. In the case of a default, this lowers the lender's risk of financial loss. Lenders can lessen any conflicts of interest with their borrowers by implementing these actions, which will also help them make

wiser loan decisions. Numerous advantages may result from this, including fewer loan losses, more profitability, and better customer satisfaction (Jiang , 2008). Overall, agency theory provides a helpful framework for comprehending the interaction between lenders and borrowers as well as the function that credit assessment measurement plays in this interaction. Lenders can take measures to lessen this conflict and make wiser loan decisions by being aware of the conflict of interest that exists between them and the borrowers. Because it can be used to help explain how corporate managers behave, agency theory is pertinent to corporate structure.

The amount of knowledge about the interaction between corporate framework, operational efficiency of commercial banks, and credit evaluation measurement is expanding. However, there is still a research deficit regarding the intellectual capital mediating influence of corporate structure on the performance and credit evaluation measurement of commercial banks. The whole of a company's intangible assets, such as knowledge, skill, and relationships, is known as intellectual capital (IC) (Inkinen, 2015). Commercial banks should value IC because it can support the creation of new goods and services, increase operational effectiveness, and lower default risk. Commercial banks' performance can be impacted by corporate structure in several ways. For instance, a solid governance framework can aid in lowering the likelihood of agency issues, such as managers acting against the interests of the shareholders while making decisions. Talented managers and directors can be drawn to and kept by a robust corporate system. Assessing a borrower's creditworthiness is done through a technique known as credit appraisal measurement (Catherine, 2019). Commercial banks need accurate and dependable credit assessment measurement because it might lower their risk of loan defaults.

The relationship between commercial bank performance and credit assessment measurement can be tempered by intellectual capital. Commercial banks, for instance, may be better equipped to create a robust good governance framework if their IC is strong (Nawaz, 2019). Furthermore, commercial banks with strong IC might be better equipped to create and use precise and trustworthy credit appraisal models. Therefore, more research is needed to determine how positive impact the performance of commercial banks and how credit appraisals are measured in terms of intellectual capital mediation. (Mollah & Rouf, 2022) may offer important information about how commercial banks might perform better and lower their risk of defaulting on loans. Here are some specific research questions that could be addressed in this area: How does intellectual capital mediate the relationship between credit appraisal measurement and commercial banks' performance? How does intellectual capital affect the credit appraisal measurement? How does credit appraisal measurement impact on bank performance? How does intellectual capital impact on bank performance?

The results of this study could have a variety of effects on investors, regulators, and commercial banks. The results, for instance, could assist commercial banks in determining how to enhance their intellectual capital to increase performance and lower loan default risk. The conclusions might also assist regulators in formulating strategies that support good intellectual capital management in the banking industry. Finally, the research results may aid investors in locating commercial banks with sound credit appraisal measurement frameworks and internal controls.

There are four hypothesis developments in this study. The first one is the direct link between bank performance and credit appraisal measurement. Credit evaluation measurement and bank performance have a close relationship. Generally speaking, banks with better credit evaluation systems have lower loan default rates and higher levels of profitability. This is so that hazardous borrowers can be recognized and avoided by institutions with improved credit

appraisal systems. It is the process of determining a borrower's creditworthiness. Commercial banks need accurate and dependable credit assessment measurement because it might lower their risk of loan defaults (Altman & Saunders, 1997). It improves the performance of banks. The second one is the connection between the form of intellectual capital and the credit assessment measurement. Credit evaluation measurement and intellectual capital have a good relationship. A firm is governed and controlled by a knowledge, skill and qualification known as intellectual capital. It outlines the quality work, customer oriented behavior and rights time on right decision for effective operation using their expertise and quality. Credit assessment measurement and intellectual capital framework are closely related (Ashbaugh-Skaife, 2006). Banks can increase the accuracy of their credit assessment measurement with the use of a solid intellectual capital system. Thirdly, there is a substantial correlation between bank performance and intellectual capital. Strong and well equipped intellectual capital presence on systems are associated with lower loan default rates and higher levels of profitability for banks (Switzer & Wang, 2013). This is because banks with stronger intellectual capital frameworks are more likely to decide to lend money wisely and to efficiently manage their assessment of risks.

Regarding the fourth hypothesis, we examine the mediating impact of intellectual capital on credit appraisal measurement and commercial banks' performance. This indicates that the relationship between intellectual capital and commercial banks' performance and credit assessment measurement is positively influenced for better outcome on performance by proper use of intellectual capital. The efficiency of commercial banks and the evaluation of their ability to extend control on credit risk. This implies that the degree of intellectual capital may have an impact on the strength of the relationship between the credit appraisal and the performance of commercial banks and the evaluation of their ability to extend credit (Khan & Ali, 2018). Commercial banks, for instance, may be better equipped to create and use precise and dependable credit appraisal models if their intellectual structure is solid (Switzer & Wang, 2013). The idea of the intellectual capital mediating effect on commercial banks' performance and credit assessment measurement is a complicated one overall (Vo, 2023). It is crucial to investigate this idea, nevertheless, as it may offer critical information about how commercial banks might enhance their operations and lower their risk of failure. Four different assumptions in all were interconnected and positively impacted the result both directly and indirectly.

There are various ways in which intellectual capital might act as a mediator in the interaction between banks' performance and credit evaluation measurement. Firstly, banks may create more complex and precise CAM models with the assistance of IC. These models are more effective in determining which borrowers are most likely to repay their loans and which ones are not. As a result, loan losses may decrease and bank profits may rise. Secondly, banks can enhance their risk management procedures with the aid of IC. Strong internal control (IC) helps banks recognize and reduce new risks. They can safeguard their performance and prevent monetary losses by doing this. Third, IC can support banks in creating fresh, cutting-edge goods and services. They can expand their clientele and draw in new business as a result. Additionally, this may result in better financial outcomes.

All things considered, intellectual capital can be a major mediating factor in the relationship between banks' performance and credit evaluation measurement. Banks can enhance their risk management procedures, CAM skills, and product innovation by investing in IC. This may result in fewer credit losses, better risk handling, and faster company expansion. A bank may invest in creating a new CAM model that is more precise and sophisticated than its prior model, for example, or it may choose to develop intellectual

capital to mediate the relationship between CAM and banks' performance in other ways. The bank uses its IC to develop new and innovative risk management practices that help it avoid financial losses and protect its performance. The bank's financial performance improves as a result of these investments in IC. The new CAM model also helps the bank reduce its credit losses and increase its profitability.

Theoretically, current research can contribute in several ways, initially; it has the potential to enhance our comprehension of the function of intellectual capital in bank operations. Although other studies have demonstrated a positive relationship between intellectual capital and bank performance, the exact mechanisms behind this relationship remain unclear. Clarifying these mechanisms can be achieved by looking at the mediating function of CAM. Secondly, it can aid in the creation of fresh bank risk management theories. Conventional approaches to bank risk management concentrate on monetary hazards including market and credit risk. But there's also a chance that intellectual capital could pose a threat. Through an analysis of CAM's mediating function, we may create new bank risk management models that consider these nonfinancial risks. Thirdly, it can aid in bridging the knowledge gap between studies on bank performance and intellectual capital. For the most part, research in these two fields has been done independently of one another. We may establish a connection between these two fields of study and create a more thorough grasp of the variables affecting bank performance by looking at the mediating function of CAM.

This study can provide several managerial benefits, as initially, banks can use it to pinpoint precise methods for enhancing their CAM skills, risk management procedures, and product innovation. Numerous advantages may result from this, such as fewer credit losses, better risk management, faster company expansion, and enhanced financial performance. Secondly, it can assist banks in creating a more comprehensive risk management strategy. Banks can more effectively detect and manage both financial and non-financial risks by comprehending how intellectual capital mediates the relationship between CAM and banks' performance. Thirdly, it can assist banks in creating a more strategic human capital management plan. Banks are better equipped to create and execute efficient CAM and risk management procedures when they have a large staff of knowledgeable and experienced workers. By analyzing CAM's mediating function, banks can determine which particular knowledge and expertise are most crucial for their risk management and CAM operations. All things considered, analyzing the mediating role of intellectual capital between CAM and banks' performance is a useful tool that banks may use to enhance their financial performance, risk management, and strategic HRM practices.

2. Research hypotheses

a. Credit appraisal measurement and bank performance

The efficiency with which a bank operates and meets its financial and strategic objectives is measured by its performance. Financial indicators such as profitability, effectiveness, asset quality, and risk management are used to evaluate it (Bhatt , 2023). Profitability is a gauge of a bank's earnings. Return on assets (ROA), return on equity (ROE), and net interest margin (NIM) are common profitability indicators. Efficiency is a gauge of how well a bank employs its resources. Cost-income ratio and efficiency ratio are two typical efficiency indicators.

A bank's loan portfolio's quality is gauged by its asset quality. The non-performing loan (NPL) ratio and the loan loss reserve ratio are common measures of asset quality (Bhatt , 2023). How successfully a bank handles its risks is determined by risk management. Leverage

ratio and capital adequacy ratio are typical risk management metrics. In addition to these financial measurements, non-financial criteria like customer happiness, employee engagement, and innovation can also be used to evaluate a bank's performance. A bank that is operating efficiently, and effectively, has strong asset quality, and manages risk well. Additionally, it will have a sizable client base and a track record of innovation (Siswanto , 2019).

For several reasons, bank performance is crucial. It is a gauge of the bank's stability and financial health, first and foremost. A bank that is doing well will be better able to withstand economic downturns and fulfill its responsibilities to depositors and creditors. Second, a bank's capacity to draw in and keep clients is impacted by its performance. Customers are more inclined to transact business with a bank if they have confidence in its financial stability and reputation. Third, the entire health of the economy depends on bank performance. By making loans to people and businesses, as well as by enabling the movement of money, banks play a crucial part in the financial system. Economic development and prosperity depend on a healthy banking industry (Diamond & Rajan, 2001). Economic conditions, interest rates, competition, bank size, and bank management are some of the important results from earlier studies on bank performance. Other studies have looked at the effect of particular elements, such as corporate governance, risk management, and financial innovation, on bank performance in addition to these broad factors (Shakil , 2019). Banks who are substantially investing in digital transformation beat their competitors on a variety of important indicators, like as profitability and customer happiness (Tsindeliani , 2022). This research formulated banks that are setting the pace for digital transformation are reporting a 20% rise in customer satisfaction and a 40% rise in profitability. The Basel Committee on Banking Supervision discovered in research from 2021 that banks that are managing climate change risks are more likely to be shock-resistant and perform better financially (Supervision, 2020). According to the report, banks that are vulnerable to the effects of climate change are more likely to suffer loan losses and other financial setbacks.

The COVID-19 pandemic had a disproportionately negative effect on banks in developing nations (Brenton , 2022). Research although institutions with good risk management procedures fared better. According to the study, banks in developing nations saw a 20% loss in profitability in 2020; this decline was curbed by banks with effective risk management procedures. Credit evaluation measurement's effect on bank performance (Kosse & Mattei, 2023). The banks tend to perform better in terms of profitability and asset quality when their credit appraisal systems are more accurate. According to (Kosse & Mattei, 2023) institutions with more precise credit rating systems are better equipped to recognize and steer clear of risky loans.

According to Sadok (2022), artificial intelligence (AI) may be used to increase the precision and effectiveness of standard credit appraisal measurement process. The study discovered that credit appraisal systems driven by AI can analyze more data and spot patterns that are challenging for human analysts to find. The effect of credit assessment measurement on developing country banks' performance According to Al-Qudah (2023) developing nations see the greatest influence of credit evaluation measurement on bank performance. Banks in developing nations with more precise credit rating systems are better equipped to lend to SMEs and other underserved borrowers. Credit evaluation measurement's function in sustainable banking Credit assessment evaluation can be used to assist sustainable banking operations. according to Ning (2023) banks can utilize credit appraisal to find companies and people who are working toward sustainable development goals and lend to them. This led to the development of the following hypothesis.

H1: credit appraisal measurement has a positive impact on the performance of banks

b. Credit appraisal measurement and intellectual capital

Beyond physical assets like buildings and machines, a company's ultimate worth lies in the dynamic world of business, where knowledge and creativity are paramount. The area of intellectual capital, which includes the intangible assets that drive a company's success and competitive advantage, is where the buried wealth is found. The combined knowledge, experience, and skill found in an organization's structural capital, relational capital, and human capital are collectively referred to as intellectual capital. It's the recipe that spurs creativity, boosts output, and builds a solid reputation. All the knowledge that each employee in a company possesses that provides it with a competitive advantage is its intellectual capital (Giampaoli, 2021). An organization's worth and competitive edge are derived from its intangible assets. Relational, structural, and human capitals are all components of intellectual capital. Financial capital is quantifiable and concrete; intellectual capital is not. Although it is harder to measure and intangible, its comparable value is high (Cabrita & Bontis, 2008). It is crucial for an organization to uphold and preserve performance standards. It supports their ability to innovate and create new goods and services, increase production and efficiency, draw in and keep top talent, establish a solid reputation and brand, and outperform their competitors (Haris, 2019). After reviewing the literature, this study concludes that dynamic capabilities, which enable firms to adapt to change and gain a competitive edge, can be derived from intellectual capital. Cabrita & Bontis (2008) found that intellectual capital and firm performance have a substantial positive association. Rehman (2022) proposed that importance of companies concentrating on the three components of intellectual capital—human capital, structural capital, and relational capital—Businesses that successfully balance each of the three aspects of intellectual capital are more likely to succeed.

A recent study has also shown that intellectual capital is a dynamic asset. To maintain a competitive advantage, it must be consistently developed and invested in. Companies must foster a culture of creativity and learning and assist in the skill and knowledge development of their workforce. The practice of evaluating a borrower's creditworthiness to ascertain the possibility of repayment is known as credit appraisal (Boahene, 2012). When determining whether to grant credit, creditors often take into account a number of variables, such as the borrower's financial documents, credit history, and business plan. An increasing amount of research indicates that when evaluating credit, intellectual capital may be an important consideration (Haris, 2019). This implies that a company's intellectual capital may be a major source of wealth.

Islam (2021) discovered in study that intellectual capital can be a source of dynamic capabilities that can aid firms in gaining a competitive edge and adapting to change. This shows that intellectual capital can contribute to long-term corporate success. It's probable that creditors will take intellectual capital into account more frequently when making credit appraisal choices, given the expanding corpus of studies on the subject. This is due to the possibility that creditors view intellectual capital as a means of lowering risk and raising the likelihood of payback.

All things considered, there is a complicated relationship between intellectual capital and credit assessment measurement. On the other hand, an increasing amount of research indicates that credit evaluation choices may find intellectual capital to be a useful consideration (Switzer & Wang, 2013). By taking intellectual capital into account when evaluating loans, creditors may be able to lower risk and increase the likelihood of repayment.

H2: Intellectual capital positively correlated to the credit appraisal measurement.

c. Intellectual capital and bank performance

The performance of banks and intellectual capital is highly positively correlated. High levels of intellectual capital are associated with higher earnings, a larger market share, and more customer satisfaction, according to studies. For banks, intellectual capital is crucial because it may help them innovate and develop new goods and services, increase productivity and efficiency, draw in and keep top personnel, establish a strong brand and reputation, and gain a competitive edge over their rivals (Malhotra & Singh, 2009). A bank that has a solid staff of educated and experienced workers is more likely to be able to provide cutting-edge new services and products that cater to the needs of its clientele. A bank may run more profitably and more cost-effectively when its processes are productive and efficient. More customers can be drawn in and kept by a bank with a strong reputation and brand, increasing its market share. In the long run, a bank that has an advantage over its competitors is more likely to succeed.

Intellectual capital can be a source of dynamic capabilities that can help firms adapt to change and gain a competitive edge. According to Azmi & Kurniawan (2021), banks may benefit from having more intellectual capital in the long run. This implies that there is a good chance that the correlation between intellectual capital and bank performance can be used in a variety of settings. According to Cabrita & Bontis (2008), intellectual capital significantly improved the profitability and operational effectiveness of Portuguese banks. The contemporary economic landscape marked by swift alterations and heightened rivalry, underscores the significance of banks allocating resources towards their intellectual capital. Banks can set themselves up for long-term prosperity by doing this.

Banks have a variety of options for investing in their intellectual capital, including hiring and developing skilled staff, spending on education and training, fostering an innovative and learning culture, making research and development investments, and cultivating enduring connections with suppliers and customers (Rehman, 2022). Banks can enhance their performance and obtain a long-term competitive edge by investing in their intellectual capital. It is crucial to remember that there are many variables that might affect the intricate relationship between intellectual capital and bank performance, including the competitive landscape and the economic environment. But according to the research, banks may benefit greatly from their intellectual capital, and maintaining and investing in it can boost productivity.

The majority of the study indicates a high and favorable correlation between intellectual capital and bank performance. Long-term success is more likely for banks that properly invest in and manage their intellectual capital.

H3: Intellectual capital and bank performance has a positive relationship

d. Mediating effect of intellectual capital

Banks have a variety of options for investing in their intellectual capital, including hiring and developing skilled staff, spending on education and training, fostering an innovative and learning culture, making research and development investments, and cultivating enduring connections with suppliers and customers. Banks can enhance their performance and obtain a long-term competitive edge by investing in their intellectual capital (Aljuboori, 2021). It is crucial to remember that there are many variables that might affect the intricate relationship between intellectual capital and bank performance, including the competitive landscape and the economic environment. But according to the research, banks may benefit greatly from their intellectual capital, and maintaining and investing in it can

boost productivity. The majority of the study indicates a high and favorable correlation between intellectual capital and bank performance. Long-term success is more likely for banks that properly invest in and manage their intellectual capital (Rehman , 2022).

There are several methods by which creditors can weigh intellectual capital when making credit appraisal decisions. These include the caliber and experience of the borrower's management team, the borrower's R&D expenditures, the borrower's portfolio of intellectual property, the borrower's connections with customers, and the borrower's reputation as a brand. In order to determine the value of the borrower's intellectual capital and how it affects their creditworthiness, creditors might also employ specialized techniques for intellectual capital assessments (Albertini & Berger-Remy, 2019). Lending to borrowers with high levels of intellectual capital is more likely for a bank that takes such capital into account when evaluating credit.

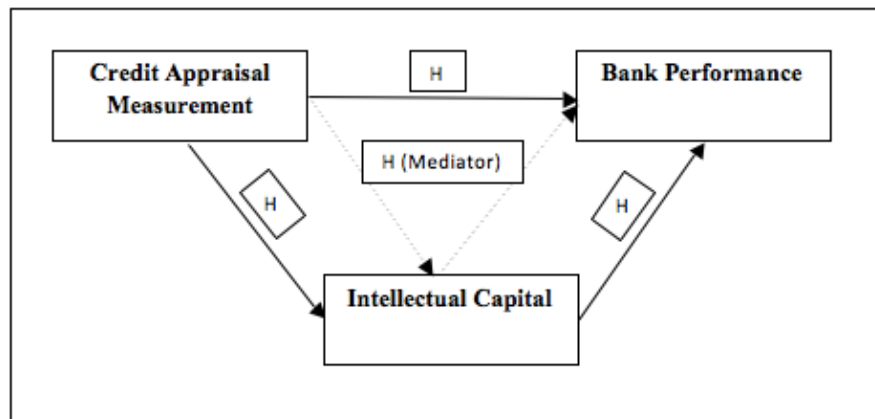
The bank is less likely to risk losses on these loans because these borrowers have a higher chance of long-term success. Intellectual capital acted as a mediator in the association between credit assessment measurement and bank performance (Azmi & Kurniawan, 2021). These findings imply that banks are more likely to lend money to borrowers who have a higher chance of long-term success when they take intellectual capital into account when evaluating credit.

Bank performance may increase as a result, since these loans are less likely to result in losses for banks. Though research on the mediating role of intellectual capital on credit assessment measurement and bank performance is still in its infancy, what is known indicates that there is a significant relationship between the two. When evaluating credit, banks should take intellectual capital into account if they wish to perform better. Incorporating intellectual capital into credit evaluation judgments can help banks operate more efficiently and lower risk. This is particularly crucial given the fast-changing and fiercely competitive nature of the modern economy.

H4: Intellectual capital mediates the relationship between credit appraisal measurement and bank performance

Research on intellectual capital and bank performance already conducted can be utilized to support the current conceptual model for investigating the mediating role of intellectual capital between credit appraisal measurement and banks' performance. Numerous ways that intellectual capital might influence bank performance have been found in this research, including enhanced CAM skills, risk management strategies, and product innovation. Another research on bank risk management theories, these ideas can shed light on how banks might detect and manage risks, both financial and non-financial, with the aid of intellectual capital.

Figure 1. Conceptual model



Source: The authors

3. Research Methodology

a. Research Methodology and Data Collection Tools

Research methods, according to Kothari (2004), are specialized procedures or tactics used to find, select, process, and analyze data on a particular subject. We used quantitative approaches to address the goal, research questions, objectives, and hypotheses of the dissertation (Nenty, 2009). The main focus was on aspects of credit appraisal measurement, particularly how intellectual capital mediating impacts the performance of Nepal's commercial banks. We began with a well-considered study design, demographic, and sample. Then, we focused on the instruments used, the methods of validation, the experiments, and the collection and analysis of data. As a result, simple random sampling procedures were used to determine overall population objectives, and every member of the population had an equal chance of being selected for the sample. According to (Olken & Rotem, 1995) the justification for simple random sampling is that it removes bias from the selection process and should produce a representative sample. Selection criteria for the sample population will depend upon certain characteristics that must be present within it to address research questions effectively. The sample will include banks representing large, medium, and small banks to represent Nepal's banking industry. This will capture its diversity. To represent Kathmandu, Lalitpur and Bhaktapur regional commercial bank which facilitate differences loan and credit facility to their key customers. Selected Banks must be willing to participate by providing data for analysis; prioritizing banks that are transparent and open to collaborations for research will be prioritized.

The information was gathered via a closed-ended questionnaire, with each question provided in a logical order and written in a clear, clean, and plain way. This strategy allowed us to express the purpose of the study in a way that would motivate participants and result in a high rate of questionnaire return by giving participants the ability to address any uncertainties of any kind (White & Frederiksen, 2005). We chose 175 commercial bank employees as our sample for this study, however, a closed-ended questionnaire was employed, and the studies concentrated on registered commercial bank employees from Kathmandu, Bhaktapur, and Lalitpur, district of Nepal. The target sample included all registered commercial banks in these cities that offer credit facilities to borrowers in different ways of lending process.

There we were chosen using basic random sample methods because the population was small and targeted to multiple demographics. On the other hand, the owner/ CEO, managers, officers from the loan and credit section, customer service desk officers, and supervisors from the loan and collateral department of chosen banks were the respondents chosen using a purposive sample strategy. The selection criteria were based on their management and operational responsibilities for the credit appraisal measurement system in banking, which were crucial for affecting the commercial bank's financial performance. Because the population was small and more representative, we were picked using conventional random sampling techniques. On the other hand, a purposive sample technique was used to select the respondents, where we targeted the owner/ CEO, managers, credit officers from the credit and loan division, customer care desk officers, supervisors from the loan sanction department, and loan officers of the chosen banks. Their credit department head, loan manager, valuation officer, credit manager, and operational head of concerned branches were essential for influencing the commercial bank's financial performance in a contest of intellectual capital as mediators of this research as the basis for the selection criterion.

Table 1. Variables and definitions

Variables	Definitions
Credit Appraisal Measurement	A commercial bank's evaluation and assessment process to determine the creditworthiness of borrowers or potential borrowers includes analyzing financial statements, collateral, repayment capacity, and risk assessment.
Intellectual capital	Intellectual capital is the intangible assets of a company, such as its knowledge, skills, and expertise. It is a key driver of innovation, competitiveness, and performance. It helps to measure the firm's human capital, structural capital, and relational capital.
Performance	It is the effectiveness, profitability, and achievement of objectives by a commercial bank, which can be measured through various financial and non-financial indicators, such as return on assets (ROA), return on equity (ROE), market share, customer satisfaction, and operational efficiency.

Source: The authors

b. Methodology

Depending on the nature of the study, quantitative data collection procedures are employed because quantitative data are necessary for the research. Usually, the research survey is associated with deductive methods (Rahi, 2017). We had complete control over the research process with a survey approach, which also made it possible to produce survey results that were more fairly priced and accurate representations of the financial institutions located in Kathmandu, Bhaktapur, and Lalitpur districts of Nepal. Structured interviews and questionnaires are the two main data-gathering techniques that are widely employed in survey strategies (Bryman, 2006).

Consequently, a self-administered questionnaire served as the main source of quantitative data for the current experiment. Each questionnaire had the same questions for each variable that was used in this study. Furthermore, the information acquired through questionnaires was examined using partial least squares structural equation modeling (PLS-SEM). The 5-point Likert scale can be used by survey boards of directors, owners, managers, and participants alike with ease. Scales with higher points demand more ease of work and

time to accomplish. More pointy scales fit on mobile device screens are better. Respondents don't feel overloaded with options. As a result, the current study used a 5-point Likert scale with the options strongly agree to strongly disagree (Finstad, 2010).

The study included 200 participants in all, and 175 valid responses were collected. 55 female individuals made up 31% of the overall number of participants in the study, which included 120 male participants, or 69% of the overall age groups for the study. In particular, 20 people (11%) were under the age of 25, 75 people (43%) were between the ages of 26 and 35, 45 people (26%) were between the ages of 36 and 45, and 35 people (20%) were beyond the age of 45.

This study looked at the distribution of career levels among four different positions and employment roles like Supervisor/worker, middle manager, manager, and owner/CEO. The supervisor/worker, 26 people (15%) are in the sample. 98 people (56%) in middle management, 46 people (26%) in the manager position, and 5 people (3%) in the owner/CEO position made up the sample. The participant's educational backgrounds ranged from basic/secondary (10), undergraduate (63), master's (88), and PhD (14) degrees. These percentages were 6%, 36%, 50%, and 8%, respectively. Table 2 exposed the Demographic variations and a variety of characteristics of the population.

Table 2. Demographic variables

Respondents	Frequency	Percent
Gender		
Men	120	69%
Women	55	31%
Total	175	100%
Age group		
Under 25	20	11%
26-35	75	43%
36-45	45	26%
Over 45	35	20%
Total	175	100%
Education		
Secondary or Basic	10	6%
Undergraduate	63	36%
Masters	88	50%
PhD	14	8%
Total	175	100%
Position		
Supervisor/ Worker	26	15%
Middle Manager	98	56%
Manager	46	26%
Owner/ CEO	5	3%
Total	175	100%

Source: The authors

c. Measurement Scale

For the measurement of credit appraisal, 4- items were employed (C. George, 2015). To measure the performance of commercial banks, 4- items were adopted (Abu Hussain & Al-Ajmi, 2012; Ishtiaq, 2015). To measure the intellectual capital, 4-items were adopted from (George, 1992; Kidwell & Robie, 2003; Zeitz , 1997).

4. Results and discussion

The researchers' method preferred for data analysis was partial least squares structural equation modeling (PLS-SEM). According to (Haenlein & Kaplan, 2004) suggest that PLS-SEM is a more advantageous strategy than other traditional multivariate approaches. PLS-SEM is a statistical method that provides a reliable analysis through the use of the bootstrapping method (Iqbal , 2022). In order to evaluate the significance of their findings, researchers can use this method to create standard errors for route coefficients (Nitzl , 2016). Multicollinearity, normality, and common method variance were among the initial assumptions that were evaluated (Hair Jr , 2010; Tabachnick , 2007) examined and interpreted the gathered data using a two-step process incorporating measurement and structural models.

a. Measurement model assessment

It is essential to assess each concept's reliability, internal consistency, convergent validity, and discriminant validity in order to study the measurement model (Hair Jr , 2010). PLS-SEM was used in this work since it has received widespread acceptance and adoption from academics in a variety of academic domains. The new method this study used to set standards for thorough data analysis is what makes it appropriate (Hair , 2019). To assess the dependability of each individual item, the researchers used factor loading (Hair , 2012). According to (Hair , 2019) a minimum threshold of 0.700 or above is required. Table 3 shows that every outside loading in our investigation corresponds with the standards.

Table 3. Mean, SD, CA, CR, and AVE. Source: own Research

Constructs	Mean	SD	CA	CR	AVE
Bank Performance	3.20	0.95	0.817	0.879	0.646
Credit Appraisal Measurement	3.38	0.78	0.784	0.861	0.608
Intellectual Capital	3.23	0.80	0.791	0.865	0.616

SD : Standard deviation; CA : Cronbach alpha; CR : composite reliability; AVE : Average Variance Extracted.

b. Internal consistency

Cronbach's alpha and composite reliability are commonly used by researchers to assess an instrument's internal consistency. According to various research (Bagozzi , 1991; Hair , 2011; Hair , 2019; Hair Jr , 2021), the measurements frequently use a minimum threshold of 0.700. According to Bagozzi (1991), the internal consistency and reliability of the structures are shown in Table 3. A statistical tool for assessing the presence of technique bias and collinearity effects is the variance inflated factor (VIF) proposed (Ringle , 2015). As shown in Table 4, it is often advisable to take into account a threshold of 5 or below for the VIF.

Table 4. Factor loadings and variance inflated factor

Construct	Item	Loading	Variance Inflated Factor
Bank Performance	PCB1	0.838	1.932
	PCB2	0.769	1.579
	PCB3	0.834	1.968
	PCB4	0.771	1.674
Credit Appraisal Measurement	CAM1	0.712	1.373
	CAM2	0.799	1.691
	CAM3	0.829	1.870
	CAM4	0.776	1.505
Intellectual Capital	IC1	0.853	2.978
	IC2	0.787	1.592
	IC3	0.731	3.424
	IC4	0.764	2.530

Source: The authors

The average variance extracted (AVE), as suggested by (Fornell & Larcker, 1981) is used to measure the convergent and discriminant validity. A minimum criterion of 0.500 or above is frequently used to establish convergent validity (Chin, 1998). Table 4 presents the convergent validity research outcomes. Table 4 shows that every latent variable had average variance extracted (AVE) values greater than the set cutoff. Table 5 shows that the average extracted variance (AVE) square root was found to be bigger than the correlations among the latent components. Acceptable discriminant validity is shown in the present investigation across all dimensions.

Table 5. Discriminant validity

Constructs	PCB	CAM	IC
Bank Performance	0.804		
Credit appraisal Measurement	0.714	0.780	
Intellectual Capital	0.801	0.692	0.785

Source: The authors

c. Structural model assessment

The model's ability to predict outcomes is gauged by the R² coefficient (Sarstedt , 2014). An R² value of 0.60 is classified as vital, 0.33 as moderate, and 0.19 as weak by (Chin, 1998) who also recommended particular parameters for evaluating the R² number. The R² and Q² values for the PCB and IC variables are shown in Table 6. For the PCB variable, the coefficient of determination (R²) is 0.691, while for the IC variable, it is 0.478. PCB's Q² value was determined to be 0.439, while IC's Q² value was determined to be 0.291. The result of the F² tests for the CAM constructs (0.158) and IC (0.588) shows that our study model is legitimate.

Table 6. Predictive Relevance and Model Fit

Constructs	Q ²	R ²	F ²
PCB	0.439	0.691	
CAM			0.158
IC	0.291	0.478	0.588

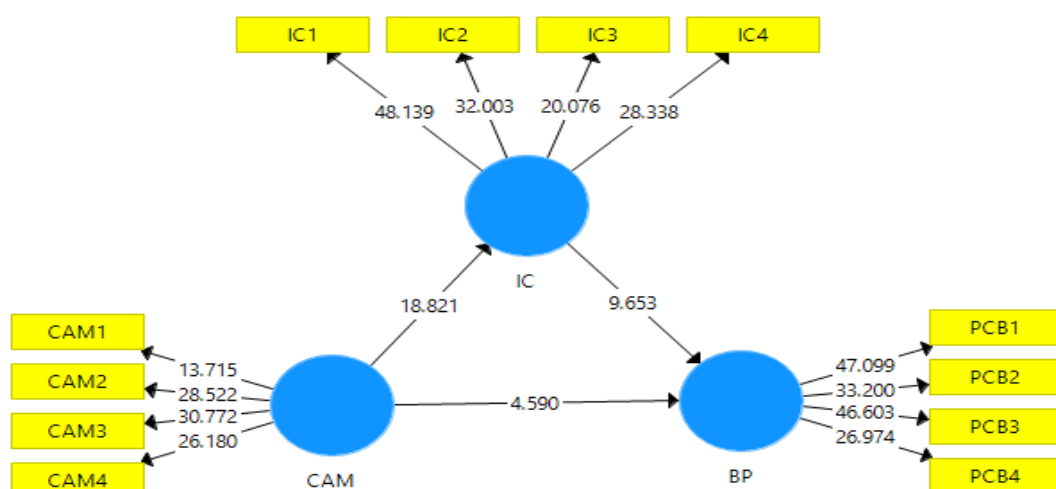
The study used the bootstrapping approach, especially 5,000 bootstrap samples, to ascertain the statistical significance of the hypothesis (F. Hair Jr , 2014; Henseler , 2009). Hypothesis 1 (H1) proposes a substantial and positive correlation between CAM and PCB, which is empirically supported by the data from Table 7 and Figure 2 (= 0.306, t = 4.590, p = 0.000). Thus, hypothesis H1 has been confirmed.

The study's results demonstrated that credit appraisal measurement (CAM) and intellectual capital (IC) had a statistically significant correlation (= 0.692, t = 18.821, p = 0.000), which was consistent with Hypothesis 2. The values of t = 9.653, p = 0.000, and = 0.590 support the validity of hypothesis 3. The study's findings supported the hypothesis that the relationship between credit appraisal measurement (CAM) and performance of commercial banks (PCB) is mediated by intellectual capital (IC). The analysis's findings generated a statistically significant result (= 0.408, t = 9.929, p = 0.000), verifying (Baron & Kenny, 1986) theory of partial mediation.

Table 7. Structural model

Hypothesis	Relationship	Beta	SE	t-Value	p-Value	Decision
H1	CAM → PCB	0.306	0.067	4.590	0.000	Supported
H2	CAM → IC	0.692	0.037	18.821	0.000	Supported
H3	IC → PCB	0.590	0.061	9.653	0.000	Supported
H4	CAM → IC → PCB	0.408	0.041	9.929	0.000	Supported

Figure 2. Hypothesis results



Source: The authors

d. Discussion

The current study examined the relationship between the performance of Nepal's commercial banks and the factors influencing intellectual capital. The results demonstrated a positive relationship between the measurement of credit appraisal and bank performance. It was also shown that the measurement of credit appraisal and intellectual capital had a significant effect on bank performance. The results also demonstrated that intellectual capital functions as a mediator in the relationship between commercial banks' performance and credit appraisal measurement. The empirical results demonstrated that, although measuring credit appraisal is bound to have a positive effect on bank performance; it can be improved if intellectual capitals are employed effectively at every stage of the procedure. This implies that all forms of credit assessment measurement will be more effective if we concentrate on having enough intellectual capital.

The optimal process for measuring credit appraisals identifies and optimizes the intellectual capital growth and development plan of the credit section's frontline workforce. Make a conscious effort to use credit facilities frequently, and focus on accurately measuring creditworthiness and customer satisfaction while utilizing the forms of available intellectual capital (Cabrita & Bontis, 2008). According to the study, there is a substantial and favorable correlation between bank performance and credit appraisal measurement. This implies that banks tend to do better financially when their credit appraisal procedures are more efficient. The study also discovered that other elements that improve bank performance include asset quality, liquidity, and capital sufficiency. The measurement of credit evaluation was determined to have the most impact, nevertheless. According to the study's conclusions, banks can enhance their financial performance by investing in the creation and application of efficient credit appraisal procedures (Simpson & Kohers, 2002).

Our findings also demonstrate that the main goals of intellectual capital are to determine whether sufficient intellectual staff is needed and to plan training sessions for the growth and development of the staff that is already on hand, with an emphasis on which employees' skills and knowledge increase through training procedures, which is particularly crucial for front-line employees in different departments (Sydler, 2014). The intellectual capital procedure involves an evaluation of the credit appraisal measurement and projected future better outcomes in order to maximize the bank's financial performance (Cabrita & Bontis, 2008). The study also discovered that bank risk management procedures operate as a mediator in the relationship between intellectual capital and credit appraisal measurement.

Thus, banks with higher levels of intellectual capital are also more likely to have risk management procedures in place that work, which results in better methods for measuring creditworthiness (Sydler, 2014). Banks should make investments in growing and preserving their intellectual capital if they want to enhance the procedures used in credit evaluation measurement. Numerous advantages may result from this, such as less loan losses, higher-quality loan portfolios, and increased reputation. There is a strong correlation between intellectual capital and credit assessment measurement, of which this study is just one example among many (Haris, 2019). The majority of the studies points to the strength of this relationship and the various advantages banks can gain from investing in their intellectual capital.

Bank performance is positively impacted by intellectual capital. A bank's intangible assets, such as its connections, knowledge, and experience, are referred to as its intellectual capital. It is an important tool that banks can use to make more informed loan decisions (Albertini & Berger-Remy, 2019). Higher levels of intellectual capital enable banks to

evaluate borrower creditworthiness more accurately, which can minimize loan losses and increase profitability. Higher intellectual capitalization makes banks more inventive and better equipped to serve their clients' requirements. Revenues and market share may rise as a result of this. Employees and investors find banks with higher amounts of intellectual capital to be more appealing.

This may result in more competitive labor markets and reduced capital costs. There is a positive correlation between intellectual capital and bank performance (Giampaoli , 2021). The banks with higher levels of intellectual capital also had higher ROE and ROA (return on equity). Where improved levels of intellectual capital at banks were associated with lower non-performing loan rates and improved profitability. The study also discovered that bank risk management procedures operate as a mediator in the relationship between intellectual capital and bank performance. Accordingly, banks that own greater amounts of intellectual capital are also more likely to have implemented efficient risk management procedures, which improve their financial performance (Saeidi , 2021). The study's conclusions imply that in order to boost their financial performance, banks should make investments in creating and preserving their intellectual capital.

The relationship between the measurement of credit evaluation and bank performance can be mediated by intellectual capital. This suggests that the relationship between credit assessment measurement and bank performance may be explained in part by intellectual capital. Intellectual capital can influence the caliber of loan decisions, which is one way it can mediate this relationship (Albertini & Berger-Remy, 2019). Higher levels of intellectual capital enable banks to evaluate borrower creditworthiness more accurately, which can minimize loan losses and increase profitability. The influence of intellectual capital on innovation is another way in which it can mediate this relationship. Higher levels of intellectual capital in banks can lead to the development of novel and creative credit products and services that can draw in new clients and keep hold of current ones. Finally, because of its influence on risk management, intellectual capital can also operate as a mediator in the interaction between the measurement of credit evaluation and bank performance (Haris , 2019). Banks can lower their overall risk exposure by implementing effective risk management procedures, which are more likely to be in place at greater intellectual capital levels.

The study discovered that the association between the measurement of credit evaluation and bank performance is mediated by intellectual capital. This indicates that the relationship between credit assessment measurement and bank performance can be explained in part by intellectual capital (Islam , 2021). Additionally, the study discovered that banks with higher levels of intellectual capital had a stronger association between different level of customer and bank performance. This implies that for banks that are already operating profitably, intellectual capital is more crucial.

5. Conclusion, limitations and future work

The objective of this study was to look into the factors that affect credit appraisal measurement and intellectual capital and how they relate to Nepal's commercial banks' performance. These results imply that a bank in Nepal's intellectual capital strategy depends on a number of crucial steps in the credit appraisal measurement. The efficacy of credit appraisal measurement methods in Nepal is greatly dependent on how well-versed banking staff is in the procedure and process. In order to identify, skill, experience, training and education of staff sharpens the quality of credit appraisal method and current market requirements, frequency of uses, and operational support, as well as to maintain standards of

quality and customer satisfaction, banks must also actively engage in uplift intellectual capital.

The study's shortcomings stem from the fact that managing and measuring intellectual capital can be challenging, despite its role as a mediator in the relationship between bank performance and credit appraisal measurement. Knowledge, skill, connections, and other intangible assets make up the diverse collection of intangible assets that make up intellectual capital. Measuring these assets and monitoring how they affect bank performance can be challenging. It might be challenging to safeguard intellectual property. Intellectual capital is easily copied or stolen, unlike tangible goods. Because of this, banks may find it challenging to preserve their competitive advantage and to get the most out of their intellectual capital investments. Employees who depart the bank may lose their intellectual capital. This is so because employee knowledge and expertise frequently serve as the physical manifestation of intellectual capital. Employees take their knowledge and experience with them when they depart the bank. The bank may find it challenging to preserve its intellectual capital and to operate profitably as a result. Even with these restrictions, banks can still benefit greatly from intellectual capital. Banks should expect to experience a number of benefits from investing in the development and upkeep of their intellectual capital, including less loan losses, better profitability, increased innovation, and increased competitiveness.

Future research could be the methods by which intellectual capital affects the way that bank performance and credit evaluation measurement are related. In what ways might the correlation among intellectual capital, credit evaluation measurement, and bank performance fluctuate across various circumstances, such as different nations or bank type, What are the greatest ways for banks to build and maintain their intellectual capital so they can measure credit evaluation more accurately and perform better financially overall. These are common further research carry on this field. Subsequent investigations may delve into the causal pathways by which intellectual capital impacts the correlation between credit assessment measurement and bank performance. Scholars could investigate the relationship between intellectual capital and the effectiveness of credit assessment procedures, the caliber of loan choices, and banks' capacity to recognize and control risk. Future studies should also look at how diverse contexts—such as different nations, bank types, and economic situations—affect the relationship between intellectual capital, credit assessment measurement, and bank performance. Finding the variables that mediate or moderate the link between these variables would be much easier as a result. Subsequent investigations may concentrate on pinpointing optimal methodologies for banks to cultivate and oversee their intellectual property, with the aim of refining their credit evaluation assessment procedures and augmenting their overall fiscal outcomes. This can entail creating frameworks for managing and assessing intellectual capital as well as figuring out the best ways to train and retain qualified credit analysts.

6. Theoretical and practical implications

By lowering loan losses and boosting firm performance, credit appraisal measurement can help banks perform better. This is due to the fact that credit appraisal method enables banks to automate a number of their procedures, make strong standard operating procedures for lending loan and loan related activities. Credit appraisal measurement can also assist banks in reaching a larger consumer base, which may result in increased income. By enhancing and utilizing the abilities and knowledge of their staff, intellectual capital can help banks function better. Employee productivity and efficiency could increase as a result, which would benefit the bank's bottom line. In addition, intellectual capital can assist banks in luring and keeping top talent, which can also help them perform better.

It aids in the development of a strong system for managing intellectual capital. The bank should be able to identify, quantify, and manage its intellectual capital assets with the aid of this technology. A procedure for monitoring the effect of intellectual capital on the bank's financial performance ought to be part of the system. Invest in the education and training of your staff. This will assist in guaranteeing that staff members possess the abilities and know-how required to add to the intellectual capital of the bank. The goal of training programs should be to increase staff members' understanding of risk management, financial markets, and credit appraisal. Establish an innovative and knowledge-sharing culture. This will support the development of fresh, creative goods and services as well as the encouragement of staff members to share their knowledge and experience with one another.

By giving staff member's chances to work together and by rewarding them for sharing ideas, the bank can foster a culture of information sharing. Establish a robust culture of risk management. This will lessen the likelihood of theft or copying of the bank's intellectual property. By putting rules and procedures in place to safeguard its intellectual property and by teaching staff members about the value of risk management, the bank may create a strong culture of risk management.

Apart from these broad suggestions, banks can take other targeted actions to boost their credit evaluation measurement procedures and improve their overall financial performance by using their intellectual capital. Analyze data to determine and evaluate credit risk. Banks can create models using data analytics that will improve their ability to recognize and evaluate credit risk. This can reduce loan losses and assist banks in making better lending decisions. Create innovative services and products for credit appraisal. Banks can create new credit appraisal services and solutions that are suited to their clients' needs by using their intellectual capital. This can aid banks in bringing in new business and keeping hold of current clientele. Invest in technologies for credit appraisal. To automate and expedite their credit evaluation procedures, banks can invest in credit appraisal technology which can perform higher intellectual level. Banks may find this useful in increasing the effectiveness and precision of their credit appraisal procedures.

In conclusion, intellectual capital as well as credit appraisal measurement can both significantly enhance bank performance. The influence of credit appraisal measurement on bank performance, however, depends on the level of intellectual capital the bank performance be higher or lower. Employee ability and expertise can increase efficiency and market reputation of bank improved to enable successful use of credit appraisal measurement.

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