FACTORS DETERMINING OPERATIONAL RISK MANAGEMENT IN NEPALESE COMMERCIAL BANKS

A Dissertation Submitted to the office of the Dean, Faculty of Management in partial fulfillment of the requirements for the Master's Degree

By

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CERTIFICATION OF AUTHORSHIP

I hereby corroborate that I have researched and submitted the final draft of dissertation entitled "Factors Determining Operational Risk Management in Nepalese Commercial Banks". The work of this dissertation has not been submitted previously for the purpose of conferral of any degrees nor has it been proposed and presented as part of requirements for any other academic purposes.

The assistance and cooperation that I have received during this research work has been acknowledged. In addition, I declare that all information sources and literature used are cited in the reference section of the dissertation.

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July, 2024

REPORT OF RESEARCH COMMITTEE

Mrs. Puja Adhikari has defended research proposal entitled "Factors Determining Operational Risk Management in Nepalese Commercial Banks" successfully. The research committee has registered the dissertation for further progress. It is recommended to carry out work as per suggestions and guidance of supervisor Rabindra Bhattarai submit the thesis for evaluation and vice voce examination.

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APPROVAL SHEET

We, the undersigned, have examined the thesis entitled "Factors Determining Operational Risk Management in Nepalese Commercial Banks" presented by Puja Adhikari a candidate for the degree of Master of Business Studies (MBS Semester) and conducted the Viva voce examination of the candidate. We hereby certify that the thesis is worthy of acceptance.

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This dissertation entitled " Factors Determining Operational Risk Management in Nepalese Commercial Banks " has been prepared in partial fulfillment for the degree of Master of business studies (MBS) under the Faculty of Management, Tribhuwan University is based on research models involving the use of quantitative aspect of factors affecting of market price of stock of Commercial Banks of Nepal.

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ABBREVIATION

ADBL	Agriculture Development Bank Ltd
ANOVA	Analysis of Variance
BAL	Bad loans
C.V.	Coefficient of Variation
CAR	Capital Adequacy Ratio
DOL	Doubtful Loans
EBL	Everest Bank Ltd.
FP	Financial Performance
GIME	Global IME Bank Ltd.
GR	Gearing Ratio
HBL	Himalayan Bank Ltd
LR	Liquid Assets
LSRBL	Laxmi Sunrise Bank Ltd.
MBL	Machhapuchre Bank Ltd.
NICA	NIC Asia Bank Ltd.
NPLR	Non-Performing Loan Ratio
NRB	Nepal Rastra Bank
ORM	Operational Risk Management
S.D.	Standard Deviation
SMEs	Small and Medium Enterprises
SPSS	Statistical Package for the Social Sciences
SUL	Substandard Loan

ABSTRACT

Operational risk management (ORM) is a systematic approach that organizations use to identify, assess, control, and mitigate risks arising from their day-to-day operations. It focuses on managing the risks associated with people, processes, systems, and external factors that can disrupt business operations or cause financial losses. The major objective of the study is to analyze the determinants of operational risk management practices in commercial banks in Nepal. The specific objectives are to examine the determinants of operational risks management practices and financial performance in commercial banks in Nepal and to analyze the relationship between independent variables (capital adequacy ratio, gearing ratio, liquid assets and non-performing loan ratio) and dependent variable (Operational efficiency).

The research design utilized in this study is quantitative in nature and cross sectional information gathered from chosen business bank site; secondary data regarding operational risk management have been taken in order to examine the relationship. The bank internal selected variables taken into consideration are capital adequacy ratio, non-performing loan ratio, operating efficiency and loan to deposit ratio. The operational risk management are operating efficiency ratio which is assumed to dependent variable. This research is based on the recent historical data, so simply it is a historical research.It covers the data from 2012/13-2021/22. Various statistical and financial tools have also been used for analysis of research. The research employed a descriptive financial analysis to outline, quantify, compare, and categorize the operational risk management practices of Nepalese commercial banks. Additionally, it utilized an econometric multivariate regression model to evaluate the impact of various variables on the operational risk management of these banks.

The study found that the beta coefficients for capital adequacy ratio are positive with operating efficiency. It indicates that the capital adequacy ratio has a positive impact on operating efficiency. Likewise, the beta coefficients for Non-Performing Loan are positive with operating efficiency. It indicates that NPL has a positive impact on operating efficiency. Similarly, the beta coefficients for liquid assets are positive in

relation to operating efficiency, suggesting that liquid assets positively influence operating efficiency. Moreover, the beta coefficients for gearing ratio are positive with operating efficiency. It indicates that the gearing ratio has a positive impact on operating efficiency. similarly, the beta coefficient for inflation is positive. It indicates that inflation has a positive impact on operating efficiency.

Keywords: Capital Adequacy Ratio, Gearing Ratio, Liquid Assets, Non-Performing Loan Ratio and Operational Efficiency

CHAPTER I

INTRODUCTION

1.1 Background of the Study

Commercial banks are established with the goal of maximizing shareholder wealth, which is influenced by both risk and return. In monetary business sectors, as well as in numerous business exercises to accomplish higher pace of return by and large, one frequently needs to expect higher gamble (Prowse, 1997). Risk management is a specialty of commercial banks. During the time spent offering monetary types of assistance, they accept different sorts of monetary dangers. The risks associated with various business activities vary in their nature and frequency. That is, certain risks have particular characteristics that specifically impact banking industry operations (Meshack & Mwaura, 2016).

Banks face numerous and diverse forms of risk on a daily basis. Banks have a long association with risk the board; for instance, while making credits pondering over risk issues. Thus, banks experience various kinds of hazard. Banks face a variety of risks, some of which are listed below. Market risk, liquidity hazard, and dissolvability risk. Also, the risks associated with banking services vary depending on the service. According to Bessis (2011), banks encounter numerous risks in their operations, and effective management and understanding of these risks are crucial for profitability and determining the required capital reserves. Key risks faced by banks include credit risk, market risk, and operational risk. Credit risk refers to the potential loss of principal or financial reward due to a borrower's failure to repay a loan or fulfill contractual obligations. As per Kimi (2007), market risk involves potential losses resulting from fluctuations in the value of market risk factors. The management of financial funds, from cash to credit, is a part of the banking industry's work system.

According to Santika et al. (2022), the primary function of banking is to accumulate and distribute public funds with the goal of enhancing equity in development outcomes and supporting the implementation of national development. In order to improve public finances, banking is also one of the foundations for economic expansion and national stability. Every business is interested in the cost of holding risk. During this time, there

are questions and concerns about the stocks' operations in every way. According to Hussain et al. (2012), during that exceptional time period, a lot of businesses faced extremely difficult circumstances, and Pakistan in particular experiences more of these unstable times.

As per Henri (2004), monetary execution is the assurance of functional, hierarchical and worker viability in light of foreordained targets, guidelines and measures occasionally. Execution estimation is applied by the organization to do enhancements to its functional exercises so it can rival different organizations. The monetary exhibition of organization is a proportion of the organization benefit or misfortunes in a specific timeframe. Company as a whole over time; it can be used to compare companies in the same industry that are similar to one another and to compare industries or sectors as a whole (Pandey, 2008). Operating income, profit before interest and taxes, and net asset value are all components of financial performance. Utilizing profitability measures, businesses regularly monitor their profitability levels to gauge their financial performance. Hazard can likewise mean a sort of spontaneous occasions whose monetary outcomes prompts decreased income or misfortune (Holzer and Millo, 2005). Due to the unpredictability or uncertainty of the trading activity, any activity or operation that yields profits or losses may be considered a risky proposition. In less difficult words, the gamble is characterized as vulnerability to a result.

According to Perminova et al. (2008), despite the fact that the terms uncertainty and risk are frequently used interchangeably, there is a distinction between the two. In business, uncertainty occurs when a decision-maker is aware of the anticipated outcomes of a particular action. Naturally, uncertainties that can be measured are risks. No matter what the reality in the field of money, the board and foundation of dangers have consistently been a first expectation of the money obviously inside hierarchical development and actually take a look at limit; non-monetary gamble specialists have been despondently for the larger part division inconspicuous (Akhtar et al., 2011). According to Ramasesh & Browning (2014), operational risk differs from all other types of risk because it negotiates internally using very well-organized means rather than supervising unfamiliar environments. Nonfinancial risk is distinct from other types of banks' associated

economic risks in terms of both its amount and management. The different normal universe of nonfinancial gamble either from inside/outside mediation to business association pursuits makes requesting efficient and sound estimations with requirements (Jobst, 2007). Since banking is one of the world's riskiest businesses, risk control has become the most important aspect of any organization in recent years. For the administration of such sorts of dangers, associations should have efficient and able gamble the board labor force, on the grounds that compelling gamble the executives don't occur consequently (Noordegraaf, 2011).

The banking industry has been made more susceptible to operational risk as a result of globalization and new technology (Bloom & Galloway, 1999). It would appear that the industry's risk management capabilities have not kept up with these changes. The event along with numerous others spurred banks to adopt a more proactive strategy to functional gamble the board. Sabato (2010) battles that a deep-seated conviction that banks were excessively huge to fall flat is one reason that prompted the disappointment of monetary establishments in 2008. Another issue was the absence of obviously characterized technique that could be utilized for risk allotment. According to Hess (2011), one of the main reasons why financial institutions failed in 2008 and continue to fail today is a lack of an effective operational risk management strategy.

According to Schwartz-Gârliste (2013), operational risk management's significance has increased sufficiently to draw the global banking community's attention. Along these lines, consistent and advance exploration on functional gamble in monetary organizations has been recognized as one of the manners in which that can be utilized to guarantee cognizance and productive monetary administration, which in future can be utilized to keep away from the difficulties saw during the extraordinary monetary emergency. Bank risks are complex and not as straightforward as many people believe. Kaplan and Garrick (2006) noticed that since chances are undeniable, it is urgent for people to go up against when given risk circumstances with capricious results. It is important to note that early research demonstrates a significant distinction between risk and uncertainty. According to Hamberg (2002), risks are situations in which the probability of the outcome is known, whereas uncertainties are situations in which the expectation is unknown. According to

Kaplan and Garrick (2006), risk typically entails some damage or loss as well as uncertainty.

Operation risk associated with individuals, frameworks, cycles and outside occasions is one of the extraordinary difficulties for banks everywhere. During the most recent few years, the financial area has refined and limited broad misfortunes because of functional gamble. In order to avoid such crises, the organization must maintain a competent operational risk management workforce in order to overcome operational risk (Kneevi, 2013). Even though operational risk is relatively new to the banking industry, it is now a significant component of any risk department. An organization successfully manages its risk through effective operational risk management. Even though operational risks are not new, they have recently received a lot of attention in new contexts. Operational risk is characterized as the weakness of big business as a result of doing it in an ill-advised or deficient kind, and may result from outer elements (Waters, 2011). The risks of a loss arising from a faulty or inadequate internal process, system, person, or event are known as operational risks. The definition contains legitimate dangers and bars notoriety and vital dangers (Aloqab et al., 2019). Processes, people, the system, and external events are the four causes of operational risks in a financial institution, according to BCBS (2004). According to Cummins et al. (2007), Barings Bank's $1.3 billion losses are one of the most significant and perfect examples of operational risk in a financial institution. Nick Leeson, a single individual, was responsible for the loss. He took an illegal speculative position, which caused the bank to keep losing money until it went bankrupt in 1975. The vast field of study that focuses on the growing risks posed by a company's personnel, systems, and procedures is known as operational risk. It can likewise incorporate different Classifications of chance, like lawful gamble, extortion, physical or natural dangers (Ice et al., 2000). It emerges from a great many exercises like demonstrations of fakes, mistakes, carelessness, infringement, occasions of innovative disappointments, process inadequacies, frameworks imperfections, activities of psychological militants and defacing, catastrophic events, similar to floods, quakes, and so forth, (Hussain et al., 2016). Nystrom and Skoglund (2002) battles that functional dangers are not special for monetary foundations and these days, there is a rising worldwide need to oversee functional dangers. Financial institutions worldwide are developing risk management

systems, with most striving to enhance risk management and reallocation efficiency. Nystrom emphasizes that a fundamental aspect of operational risk management (ORM) in a financial institution is identifying the risks the organization is likely to face in its operations. One method of mitigating these risks is by setting aside capital for unforeseen and potential losses.

he above discussion highlights the importance of studies focusing on the factors influencing operational risk management practices in Nepalese commercial banks. Indeed, few studies have examined operational risk management in commercial banks in Nepal. Therefore, this study focuses on examining the determinants of operational risk management practices in commercial banks in Nepal.

1.2 Problem Statement

Financial institutions are not the only ones that face operational risks. However, technological advancements, the evolution of global financial views, and the emergence of globalization and deregulation of financial institutions necessitated that financial institutions pay greater attention to operational risks (Merton & Bodie, 1995). Scientist fights that functional dangers are the result of individuals in control, the monetary framework set up, the monetary cycle applied or other outer occasions that can influence a monetary foundation. The kind of dangers starting from individuals in control can come from the executives and human asset disappointment (Schuler and Jackson, 1987). When looking at how the process works, breaking the stable operation or not following the steps exactly can cause a breakdown. Framework chance can incorporate specialized disappointments and other inward issues. Ultimately, outer occasions can incorporate defacement, robbery and market disappointments (White, 1995).

Dardac and Chiriac (2010) say that financial disasters in government agencies and non-banking institutions highlight the need for risk management. Unknown risks within banks have resulted in significant bank failures. According to Baloi & Price (2003), banks typically operate in environments where risk fluctuates frequently. As a result, an effective risk management procedure that is categorized according to risk type is required to address specific risk factors. The allocation of accountability and responsibility to address each risk factor will be guaranteed by providing a concise description of all of them. There are still no such descriptions for operational risk because it appears that

operational risk encompasses all risk factors that cannot be addressed by credit, market, or liquidity risk types. This might prompt the circumstance where functional gamble turns into an unloading ground for risk factors and may bring about basic center being disregarded (Hwang et al., 2013).

According to Knezevic (2013), operational risks hold a special place among the numerous financial risks that are inherent to the banking industry. The fact that operational risks follow banking transactions from beginning to end and are highly interconnected with other risks contributes to their uniqueness in the banking industry. Despite receiving little attention, operational risks remain one of the challenges facing the modern banking industry. Most banks are worried about the gamble emerging from credit. ORM is centered around the rapidly controllable and countable gamble and their sources. The key inquiry that bank chiefs ought to pose to themselves is, the way best they can deal with functional dangers later on and how best they can remember them adequately early. Where upgrading the inner models of functional gamble the executives stay a urgent errand to bank directors (Hoffman, 2002). The most significant issue facing banks is operational risk; they are more likely to encounter and endure the greatest financial crisis. The current fund announcement offers loans to bank deposits as well as lending for those deposits. Banks and successful businesses alike are increasingly exposed to the specific capacity, preparation, and efficient performance of operational risk because it is the most dangerous threat and challenge for banks (Giesecke, 2004). This examination pushed on significant reasons for bank disappointment because of the quick development of functional gamble in bank (Njanike, 2009). Taking a gander at the gamble of showcasing and chance of loaning inside its focal company, bank's prosperity wretchedness and they can't test, screen and deal with the preliminaries in the tried way.

According to Smithson and Simkins (2005), banks have tried to feature risk the executives procedures that might turn out to be progressively critical, past the risk of monetary profits. Throughout the long term, monetary foundations have confronted different difficulties for various reasons, however the primary drivers of banking issues are to a great extent connected with expanding measures for obligation loan specialists and concurring with counter-parties. The risk related with a unintegrated portfolio

incorporates lacking fulfillment, energy, and combination inside business or different conditions. These elements can prompt poor functional situating inside banks. Generally speaking, this chance is perceived as it is one of the most solid and impending risks emerging from numerous monetary threats that banks face (Sackett and Shaffer, 2006).

Monetary gamble costly through an efficient and viable administration of obligation risk doesn't uphold the compelling administration of monetary organizations (Banks) simply the capacity and efficiency of their own enterprises (Psillaki et al., 2010). It is impossible to overstate the significance of operational risk management, which will make it easier to identify prohibited activities, reduce potential risk exposure, and ultimately reduce operational losses (Habib et al. 2014). Regardless of the developing writing regarding the matter of functional gamble the executives in created economies, there is a striking absence of writing in Economies of non-industrial nations like Nepal, a couple of studies had inspected determinants of hazard the board research.

Operational risk management, being one of the more current areas of the board concern, frequently is by all accounts treated as a trump card. This postures difficulties in the acknowledgment and the executives of functional gamble and its related elements. In order to provide a comprehensive description of this risk category and distinguish it from other risks in the context of Nepalese commercial banks, this study is necessary to ascertain the current state, conceptual issues, and underlying factors of operational risk management. Furthermore, the concentrate fundamentally examines the functional dangers looked by business banks and the techniques they have taken on to deal with these risks. This study primarily deals with the following research questions:

- What are the determinants of operational risks management practices in commercial banks in Nepal?
- Is there any significant relationship between independent variables (capital adequacy ratio, gearing ratio, liquid assets and non- performing loan ratio) and dependent variable (Operational efficiency)?
- Is there any effect of dependent variable (Operational efficiency) with independent variables (capital adequacy ratio, gearing ratio, liquid assets and non-performing loan ratio)?

1.3 Objectives of the Study

The major objective of the study is to analyze the determinants of operational risk management practices in commercial banks in Nepal. The specific objectives are as follows:

- To examine the determinants of operational risks management practices and financial performance in commercial banks in Nepal.
- To examine the relationship between independent variables (capital adequacy ratio, gearing ratio, liquid assets and non- performing loan ratio) and dependent variable (Operational efficiency)?
- To analyze the effect of dependent variable (Operational efficiency) with independent variables (capital adequacy ratio, gearing ratio, liquid assets and non-performing loan ratio).

1.4 Rationale of the Study

The objective of managing operational risks is to ensure the smooth functioning of the bank's daily operations. The findings of this study will be significant for the following reasons: they will provide senior bank managers with guidance on management strategies and the identification of operational risks within the banking industry. Employees of commercial banks who are involved in operational risk management on a daily basis will be able to draw conclusions from the study and identify areas for improvement.

Commercial banks in Nepal face different functional dangers originating from interior cycles, individuals, frameworks, and outside occasions. Research in this space distinguishes these dangers and foster procedures to alleviate them, consequently protecting the monetary solidness of the banks. Compliance with Nepal's regulatory requirements imposed by the central bank or other regulatory bodies requires an understanding of operational risks. Research can help ensure compliance by shedding light on the specific regulations that apply to Nepalese banks. By enhancing the knowledge and abilities of bank staff, risk managers, and regulators, research in operational risk management can contribute to capacity building within Nepalese banks.

As a result, the banking industry's resilience is enhanced by giving them the ability to anticipate and manage operational risks. Implementing effective operational risk management procedures boosts investor confidence in Nepalese banks, which in turn encourages investment and economic expansion. Examination can give experiences into the gamble the executives structures and practices embraced by banks, accordingly supporting financial backer trust. Research contributes to the long-term viability of Nepalese commercial banks by promoting efficient operational risk management. Manageable financial practices upgrade strength to shocks, support monetary turn of events, and cultivate trust among partners, establishing the groundwork for proceeded with development and soundness in the financial area. One bank's operational failures can have systemic effects on the stability of the financial system as a whole. Examination can assist with recognizing interconnectedness and virus gambles inside the financial area, empowering policymakers to go to preplanned lengths to diminish fundamental gamble.

1.5 Research Hypothesis

Hypothesis testing is a statistical method used to determine whether a hypothesis about a population parameter is supported by the sample used in the research. The process involves formulating a null hypothesis, which assumes that there is no significant difference between the observed data and the expected results, and an alternative hypothesis, which suggests that there is a significant difference. The null hypothesis is tested using a significance level, which determines the probability of rejecting the null hypothesis when it is actually true. If the p-value (the probability of obtaining results as extreme as those observed) is less than the significance level, then the null hypothesis is rejected in favor of the alternative hypothesis. Hypothesis testing plays an important role in scientific research as it allows researchers to draw conclusions about population parameters based on sample data:

Capital Adequacy Ratio

Ogboi and Unuafe (2013) conducted research on the influence of risk management and capital adequacy on the financial performance of commercial banks in Nigeria. The study revealed that capital adequacy has a positive effect on determining the operational risk of commercial banks. Agbeja *et al.* (2015) analyzed the capital adequacy ratio and risk

management in Nigeria. The study revealed that the higher the capital ratio, the more risk control a bank will be. Dao (2020) studied the bank capital adequacy ratio and bank performance in Vietnam. The study found that capital adequacy ratio and banks' performance have statistically significant relationship with each other. Hazim & Makttoof, (2020) stated that both banking risk indicators and returns are affected by bank capital adequacy and this will be reflected in the bank value. Thus it is hypothesized that:

H1: There is significant impact of Capital adequacy ratio (CAR) on operational risk management.

Non-performing Loan and Operational Risk Management

Karim et al. (2010) discovered a significant negative correlation between non-performing loans and the cost efficiency of selected banks. Effective credit management can enhance cost efficiency by minimizing non-performing loans within banks. Gabriel et al., (2019) investigated the relationship between non-performing loans and risk management in Nigeria for the period of 1994-2014. The result of the study shows that Bad loans (BAL) and Doubtful Loans (DOL) had statistically negative significant influence on risk management, while Substandard Loan (SUL) had statistically negative insignificant impact on risk management in Nigeria. The result further shows that high level of non-performing loans would reduce the risk management in the long-run in Nigeria. Ekanayake and Azeez (2015) investigated the determinants of non-performing loans in licensed commercial banks in Sri Lanka. The study results reveal that non-performing loans tends to increase with deteriorating banks efficiency and there was a positive correlation between risk management and non-performing loans. Based on this, the following hypothesis is developed:

H2: There is significant impact of Non-Performing Loan Ratio on operational risk management.

Gearing Ratio and Operational Risk Management

Van Horne and Wachowicz (2005) suggest that a higher gearing ratio increases the company's cost of capital. This increased cost can strain the company's finances, leaving less available capital for investing in robust risk management systems and processes, thereby increasing operational risks. Barton, et al. (2001) argue that management in highly leveraged firms might engage in riskier operational practices to achieve higher

returns, given the pressure to meet debt obligations. This risk-taking behavior can increase operational risks. Keasey et al. (2015) noted that high gearing ratios can be particularly risky. SMEs often lack the diversified revenue streams and resources of larger firms, making them more vulnerable to operational disruptions when heavily leveraged. Thus it is hypothesized that:

H3: There is significant impact of gearing ratio on operational risk management.

Liquid Assets and Operational Risk Management

Brealey *et al.* (2014) argue that liquid assets provide firms with the flexibility to respond quickly to unexpected opportunities or challenges. This flexibility is critical for maintaining smooth operations and taking advantage of time-sensitive business opportunities. Van Horne and Wachowicz (2005) suggest that firms with substantial liquid assets can manage their operational activities more effectively by quickly addressing cash flow shortfalls, thereby preventing disruptions in operations. Mishkin (1976) highlights that liquid assets act as a buffer against financial uncertainty and economic downturns. Companies with higher liquidity are better equipped to withstand operational risks such as supply chain disruptions or sudden drops in demand. Ross *et al.* (2011) emphasize that liquid assets help in mitigating operational risks by providing a financial cushion that can be used to cover unexpected expenses or losses. Based on this, the following hypothesis is developed:

H4: There is significant impact of liquid assets on operational risk management

1.6 Limitations of the Study

As in other research, this research can have its own limitations and they are listed below:

- Due to the merger and acquisition process during the study period and unavailability of data, some banks are excluded from the study
- This study used operational risk management variables such as capital adequacy ratio, gearing ratio, liquid assets, non-performing loan and loan to deposit ratio but other internal and external variables are excluded which can be most significant factors to determine operational risk management.
- There are other different models to analyze the collected data but only regression model is used to analyze the panel data to examine the factors determining operational risk management.

- This study assumes that every bank operates in the same market. Therefore, the analysis is not based on bank's market segmentation or group of banks (whether it is government, foreign or private banks).

CHAPTER II

LITERATURE REVIEW

This section discusses some empirical and theoretical literature on the impact of operational risk management practices and financial performance in commercial banks in Nepal and presents the conceptual framework of the study. The findings from the different studies reveal interesting, but diverging views. This chapter presents some of the literature written. To put it another way, the content of this chapter is a reflection of what has been written and studied about branding and consumer behavior rather than a comprehensive and exhaustive body of work. A critical analysis of a portion of a published body of knowledge through a summary, classification, and comparison of previous studies, literature reviews, and theoretical studies is called a literature review. There are three sections to it.

First section consists of theoretical framework which gives an in-depth review of related studies in the context operational risk management practices and financial performance around the globe both developed and emerging countries. This section also provides various literatures conducted among variables along with their relationships with each other it also deals with a brief review of empirical works in context of Nepal. Second section presents a conceptual framework of the study. The conceptual framework clarifies how the study is organized and what various variables have been selected. And, finally the third section presents specification of variables.

2.1 Theoretical Review

Risk is commonly defined as the probability of experiencing a loss. In investment theory, it refers to the likelihood of different outcomes and is measured by the variability associated with potential rates of return. Risks can arise from events such as market price shifts and other variables that may lead to losses. Essentially, risk pertains to the fluctuation in investment returns. Effective risk management involves a framework for analyzing and evaluating risks, ensuring access to reliable and current risk information, maintaining a suitable level of control to mitigate risks, and implementing decision-making processes to manage risks effectively. "Risk the executives, then again, is the most common way of estimating, or evaluating risk and the creating techniques to deal

with the gamble. Transferring the risk to a different party, avoiding the risk, minimizing its negative effects, and accepting some or all of a risk's consequences are all common tactics.

Traditional risk management, which is the topic of this discussion, focuses on risks that are caused by physical or legal factors (like accidents, deaths, and lawsuits, for example). On the other hand, financial risk management focuses on risks that can be controlled with traded financial instruments. According to Kupper (2000), "All large corporations have risk management teams and small groups, and corporations practice informal risk management, if not formal risk management." Throughout their tasks, banks are perpetually confronted with various kinds of dangers that might meaningfully affect their business. The goal of risk management in bank operations is to minimize the negative effects that risks can have on a bank's financial results and capital. Risk management includes risk identification, measurement, and assessment. As a result, banks are required to establish a distinct risk management organizational unit.

Additionally, they are expected to endorse techniques for risk recognizable proof, estimation and appraisal, as well as methodology for risk the board. The dangers to which a bank is especially uncovered in its tasks are: credit risk, market risk (liquidity risk, premium gamble, unfamiliar trade chance) and activity risk. Over the past ten years, banks have placed a greater emphasis on operational risk management. The greater focus on banking institutions' exposures to and internal management of such risk is driven in large part by major financial scandals, frauds, and IT system failures. The openness to various types of functional gamble is the same old thing for the singular bank, however as Moosa (2007) stresses; "The pattern towards more noteworthy reliance on innovation, more escalated rivalry, and globalization have left the corporate world more presented to functional gamble than any other time in recent memory." Given the recent financial market collapse, a severe and substantial "one-off event" occurring in a bank's daily operations could potentially inflict more damage than its credit losses. According to Flores, Ponte, & Rodriguez (2006), banks seem to have a less developed capability in assessing, controlling, or hedging against the adverse economic impacts of such events compared to their management of credit and market risks.

The theoretical dimension of the study is discussed in this section. According to Mtembu (2017), a theory is the set of interconnected constructs, definitions and suggestions which provide an organized view of phenomena in the form of relationships between variables to explain and predict phenomena. Theories are relevant for every study as they form a basis for the conceptualization of the variables under study, and theories relevant to the study have been examined in this section. These include:

Extreme Value Theory

According to Embrechts *et al.* (1999), the extreme deviations from the median of probability distributions are the subject of the statistics branch known as extreme value theory (EVA). It tries to asses from a provided request test of a given irregular variable, the likelihood of occasions that are more limit than recently noticed. Major shifts are taking place in the banking and insurance sectors of the financial sector. The risk of catastrophic losses for which only requested coverage is available is increasing for the reinsurance industry. A rising intricacy for monetary instruments calls for refined risk the board apparatus. This hypothesis grows the information on functional gamble the board as it demonstrates the securitization of hazard and elective gamble move feature the union of money and protection at the item level. In insurance, reinsurance, and finance, extreme value theory plays an important methodological role in risk management.

Regulation Innovation Theory

Scylla (1982) proposed the Regulation Innovation Theory, which diverged from the conventional approach of examining financial innovation solely within the historical context of economic development. They argued that monetary development is closely intertwined with social regulation, suggesting that regulatory changes have a reciprocal and causal relationship with financial regulation. Scylla contended that in highly regulated planned economies or completely free-market economies, there is limited space for financial innovation. Therefore, any reform altering the regulatory framework of the financial system could be considered a form of financial innovation. They noted that diverse forms of financial creativity emerge in market economies constrained by government intervention.

According to this theory, which broadens the scope of operational risk management, government actions are seen as catalysts for financial innovation. Regulations are viewed not only as instruments for controlling but also as drivers of economic development. This perspective emphasizes the role of regulations and rules in fostering financial innovation within banks, highlighting their significance in managing operational risks effectively

Efficiency Models

Leibenstein (1957) introduced the concept of X-efficiency, which encompasses all technical and allocative efficiencies of individual firms that are independent of scale or scope. X-efficiency measures how effectively management aligns technology, human resource management, and other resources to achieve a specific output level. According to the X-efficiency hypothesis, financial institutions with superior management practices can control costs and enhance profitability, thereby positioning themselves on the best-practice, lower-bound cost curve. Charnes et al. (1994) conducted a comprehensive survey on the new efficiency theory and its applications in various fields. Sengupta (1995) extended this theory by exploring its dynamic and stochastic aspects.

Leibenstein also pioneered the efficiency wage theory to address the paradox of persistent surplus labor in less developed economies despite positive real wages. This theory suggests that surplus labor can manifest as hidden or actual unemployment. In his framework, all economic agents are rational and maximize profit or utility. The theory posits that real wages influence worker effort, where higher wages lead to increased effort due to improved physiological conditions for work. In the conventional modeling effort input remains constant in the face of change in real wages.

2.2 Empirical Review

Table 1

Empirical Review

S. N.	Year	Topic	Writer	Objectives	Methodology	Findings
1.	2006	The effect of operational	Lyambi ko	To determine the operational	descriptive research design	Credit risk influences the returns of

		risk management practices on the financial performance in commercial banks in Tanzania		risks management practices and financial performance in commercial banks in Tanzania. To identify the sources of operational risks exposures among commercial banks in Tanzania		commercial banks Tanzania positively. The study also deduced that Insolvency risk and Operational efficiency positively influenced the financial performance of commercial banks in Tanzania
2.	2012	The Impact of Operational Risk Management on the Financial Development and Economic Growth: A Case Study of Saudi SME Companies	Abdulaziz Alrashidi1 and Omar Baakeel	This paper aims to determine the impact of operational risk management on the financial development and economic growth among the Saudi companies	Survey design with quantitative analysis	The overall mean result showed that operational risk management has positive effects on the financial growth and development in the Saudi SME companies.
3.	2012	Risk Management and Efficiency of Works: A Study of Nepalese Cooperatives Societies	Gyanendra Prasd Paudel	To determine the risk management and efficiency of Nepalese Cooperatives Societies	Quantitative and qualitative research design, subjective and categorical respondent opinion descriptive and financial ratio analysis	Credit risk management of Cooperative does not seem to be satisfactory so, concern authorities should select an appropriate credit risk management systems and management

						should give emphasis for credit risk management.
4.	2015	The effect of operational risk management practices on the financial performance in commercial banks in Tanzania	Mary Raphael Lyambiko	The purpose of this study was to establish the effect of operational risk on the financial performance of commercial banks in Tanzania.	descriptive research design	The study revealed that Operations risk management positively influenced risk management banks in Tanzania. This study also established that Operations efficiency were positively correlated with the risk management of the commercial banks in Tanzania while the Credit risk and Insolvency risk rate negatively influenced risk management of commercial banks Tanzania
5.	2015	Risk Management Of Commercial Banks In Nepal	Dipendra Gautam	To analyze different types of financial risks faced by EBL, NIBL, KBL, MBL & GIBL and management of such risks by them To analyze Nepal Rastra Bank's directives and	descriptive and analytical research design	With the increase in NPL, the loan loss provisioning also increase simultaneously which lending to decrease in profit. the major steps banks are taking to reduce it are preparing and

				to examine whether EBL, NIBL, KBL, MBL & GIBL has complied with such directives		implementing the different operational guidelines and policies and frequently monitoring there compliance training to employees of the banks is also the major tools for minimizing the operation risk in these banks
6.	2017	Risk Management Practices: Evidences From Commercial Banks Of Nepal	Phul Pd. Subedi	This study has aimed at analyzing the risk management practices of commercial banks of Nepal. Further, the study has explored the level of understanding on risk and its management along the components of risk management system	descriptive statistics, aspects of risk management, components of risk management, and regression analysis	board and senior management's oversight, credit risk management practices, risk identification, risk assessment and measurement, risk monitoring and ownership structure do have the significant relationship with the risk management practices.
7.	2018	Operational Risk Management in Financial Institutions: An Overview	Abdullah Aloqab, Farouk Alobaidi and Bassam Raweh	TO discusses the growing need for operational risk management in the context of financial	Casual comparative and descriptive analysis	IT systems in banks are used to increase efficiency and effectiveness. Poorly and complex designed

				institutions taking into considerations various models and approaches used in the management of financial risks.		systems may lead to a rise of operational risk in banks due to their unfit for purpose and malfunction.
8.	2018	The Impact of Risk Management on the Financial Performance of the Commercial Banking Sector in Barbados	Anthony Wood and Shanise McConney	To determine the factors of Risk Management on the Financial Performance of the Commercial Banking Sector in Barbados	Purposive analysis and descriptive	Capital Risk, Credit Risk, Liquidity Risk, Interest Rate Risk and Operational Risk have statistically significant impacts on risk management. GDP Growth has a statistically insignificant influence on financial performance. Credit risk exerted a negative impact on the banks' risk management.
9.	2018	Risk Management: Critical and Challenging Issues of Banking Sector in Nepali Context	Nischal Risal	To identify the risks faced by the banking industry. To outline the process and system of risk management To examine the techniques adopted by	Descriptive method	The study indicates that risk identification, risk assessment analysis, risk management practices, and credit risk assessment are the specific dimensions

				banking industry for risk management.		which influence the business
10.	2020	Effect of operational risk on the financial performance of banks in Tanzania	Allen Emmanuel Mrindoko , DrSalvio Macha , Dr Raphael Gwahula	The purpose of this paper is to examine the relationship between operations risk and the performance of Tanzanian commercial banks	quantitative approach longitudinal explanatory research	PCR and BLR had a negative and insignificant relationship with Return on Equity (ROE); but observed a negative and significant effect of OER and CIR on ROE. PCR and CIR were found to have a negative significant effect while BLR had a positive but insignificant impact while OER had a negative insignificant..
11.	2020	Risks in Nepalese Microfinance Institutions (MFIs): A Review of Best Practices	Basudev Lamichane	The main objective of the study is to highlight the risks in the Nepalese microfinance institution (MFIs). The secondary objectives are to examine and explore the current challenges of microfinance	based on the theoretical lenses, past literature, the logical explanation, and my working experiences	this study postulates that, the original four levels of risk management framework/processes which has a contributory relationship between identifying current and future vulnerabilities, design, implement controls to

				faced by the Nepalese MF sector.		mitigate risk, and monitor the effectiveness of risk management processes.
12.	2020	Analysis of card management and associated operational risk in banks of Nepal	Gajendra Sharma and Ravi Shrestha	To identify and analyze the process of card management in banks of Nepal. To identify the operational risk and propose an efficient solution for the card management	Descriptive and inferential analysis	Data indicates that the card management software that are being used is not effective as it should be. Lack of a risk and compliance management, poor human resources management processes and systems, or poor outsourced service providers, for example bank agents and off-site ATMs are the result in operational risks.
13.	2022	Effect of operational risk on financial performance in banking industry IDX	Ery Santika, Muhammad Hadyan Fakhrughozy, Wahyu Muhammad Nur and Henny Setyo Lestari	The purpose of this study is to examine the effect of operational risk on financial performance in the banking industry listed on the IDX.	Descriptive statistic, Normality test, Multi-collinearity Test and Autocorrelation Test	Total operating expenses has a significant effect on risk management Net Income has a significant effect on risk management. Average Asset Turn Over has a significant effect on risk management. Interest Over Years variable

						does not have a significant effect on risk management. Exchange Rate Over Years variable does not have a significant effect on risk management
14.	2022	The Effect of Operational Risk Management (ORM) On The Financial Performance (FP) Of Iraqi Commercial Banks	Falah Saleem Falih, Rozilah Kasim, Maryam Hamid Yaseen	the purpose of the study to determine the effect of operational risk management on financial performance in commercial banks in Iraq.	quantitative methodology	four independent variables in the study (People risk, System risk, Process risk and External risk) influenced significantly related to financial performance
15.	2023	Determinants of Credit Risk and Operational Risk in Banking Sector Evidence from Pakistani Banking Sector	Ihsan Alam Khan, Sehrish Akhter, Jahangir Faiz, Sidra Khan, Muhammad Amir, Nor Ahmad Shah and major Sohail Khan	The aim of this study is to interpret the cause of credit risk and how to manage credit risk and what kind of management techniques are adopted by commercial banks of Pakistan. This study also aims to examine what kind of risk are faced by commercial banks in	multi-variant regression model, Quantitative and cross sectional analysis	CR (credit risk) and operational risk (OR) have a positive relationship with all independent variables (GR, NPLs, LA, and OE). But credit risk has a weak positive relationship with (GR, NPLs, and LA). Credit risk (CR) has only strong positive relation with operating efficiency (OE).

				Pakistan and what is the effect of credit risk on the performance of banks in Pakistan		
16.	2023	Management of Operational Risk in the Context of Financial Performance of SMEs	Mária Hudáková, Peter Kardos, Ján Dvorský, Charles Randy Afful and Jitka Kloudova [4]	The aim of the article is to identify and quantify the differences in operational risk management and its effect on the financial management of SMEs between four Central European countries.	Casual comparative	operational risk management has a significant positive impact on improving the profitability of the enterprise and on reducing the enterprise's indebtedness, as well as in the context of reducing the enterprise's inability to pay its obligations.
17.	2023	Impact of Risk Management on the Performance of Commercial Banks in Ghana: A Panel Regression Approach	Bismark Von Tamakloe, Alexander Boateng, Eric Teye Mensah and Daniel Maposa	This study sought to examine the effect of risk management on the performance of commercial banks in Ghana.	quantitative research approach	The results of the study showed that of the four types of risks examined vis-à-vis credit risk, operational risk, liquidity risk, and market risk, only operational risk was found to exert a significant influence on risk management
18.	2023	Operational risk and financial performance	Yousef, A. N. B., Taha,	To examines the relationship between	Descriptive and cross-sectional	CIR has a negative correlation with ROA, ROE, and

		of banks in the middle east and north Africa	R., Muhmad, S. N., & Zainul Abidin, A. F.	operational risks and financial performance of banks in the middle east and North Africa (MENA).		NIM. bank size, bank age has GDP has positive correlation with ROA, ROE, and NIM.
19.	2023	Impact of credit risk, operational risk and liquidity risk on the profitability of Nepalese commercial banks	Sabitri Darlami	To examines the impact of credit risk, operational risk and liquidity risk on the profitability of Nepalese commercial banks	descriptive as well as causal comparative research designs.	The study showed that capital adequacy ratio has a positive impact on return on assets. However, non-performing loan, loan loss provision, loan to deposit ratio, cost to income ratio and leverage ratio has a negative impact on return on assets and return on equity.
20.	2023	Enterprise Risk Management and Institutional Performance of Life Insurance Companies in Nepal	Nishwarth Mahat, Surendra Pandey and Bharat Singh Thapa	The paper aims at determining the performance of insurance companies in Nepal from the perspectives of enterprise risk management	Descriptive and casual comparative	The major finding of the study implies that risk identification, risk assessments and risk mitigation affect positively to insurance firms' performance whereas, risk management and implementation

		have negative impact on company's performance. However, only effect of risk mitigation was found statistically significant.

Lyambiko (2006) conducted a study on the impact of operational risk management practices on the financial performance of commercial banks in Tanzania. The research aimed to examine how operational risk affects the financial performance of all 36 commercial banks in Tanzania as of December 31, 2013. Due to the small size of the population, the study utilized a census approach rather than sampling. Secondary data from the Bank of Tanzania and the commercial banks' financial reports from 2009 to 2013 were used for analysis. The study employed descriptive survey methods and conducted regression analysis to assess the relationship between operational risk management and financial performance. The findings indicated that variables such as credit risk, insolvency risk, and operational efficiency exhibited varying degrees of influence on the financial performance of Tanzanian commercial banks. Furthermore, the study highlighted a positive correlation between operational risk management and the returns of these banks

Poudel (2012) conducted a study on risk management and efficiency within Nepalese cooperative societies, utilizing both quantitative and qualitative methods. The research highlighted deficiencies in credit risk management within these cooperatives, stressing the need for improved regulatory measures and management focus on credit risk. Risk variables were found to significantly impact financial performance, efficiency, and organizational factors. Specifically, the Credit Vulnerability Ratio indicated a 55% long-term solvency risk and a 10% credit default risk, underscoring the operational sensitivity of these variables. The study also noted considerable variation in cooperative sizes, suggesting that a uniform regulatory approach may not effectively address sector-wide policy reform

Lamichane (2020) conducted an evaluation of risks within Nepalese Microfinance Institutions (MFIs), focusing on best practices. The study aimed to assess potential risks encountered by MFIs in Nepal, particularly during the loan disbursement process. Effective risk management enables MFIs to capitalize on opportunities while mitigating threats to their financial stability. MFIs, driven by a dual mission of sustainability and serving the underprivileged, face various risks including institutional, operational, financial, and external risks. Managing these risks is crucial for their survival and long-term viability. Despite the inherent risks in lending to individuals without credit histories or collateral, MFIs strive to operate successfully through calculated risk-taking practices

Poudel (2015) conducted an analysis on the risk management practices of commercial banks in Nepal, specifically focusing on Everest Bank Limited (EBL), Nepal Investment Bank Limited (NIBL), Kumari Bank Limited (KBL), Machhapuchchhre Bank Limited (MBL), and Global IME Bank Limited (GIBL). The study aimed to examine the various financial risks these banks face and how they manage these risks. It also evaluated the extent to which these banks comply with directives from Nepal Rastra Bank (NRB). The research employed a descriptive and analytical research design. The study found that an increase in non-performing loans (NPLs) led to higher loan loss provisions, subsequently impacting profitability. Banks are addressing these challenges by implementing operational guidelines and policies, and conducting regular compliance training for their employees to minimize operational risks

Subedi (2015) Risk Management Practices: Evidences From Commercial Banks Of Nepal. The research explored the banks' comprehension of risk and its management across various components of their risk management systems. The study involved a questionnaire survey of 120 banking officials from 20 different banks. Empirical evidence from the study indicated that Nepalese banks primarily identify credit risk as the major source of risk, followed by operational risk and interest rate risk. The study identified four major methods for risk identification: inspection by risk managers, financial statement analysis, audits or physical surveys, and risk surveys. Furthermore, the study revealed significant relationships between six explanatory variables related to understanding risk and its management: board and senior management oversight, credit risk management practices,

risk identification, risk assessment and measurement, risk monitoring, and ownership structure. These variables were found to influence the risk management practices of the banks studied

Meshack and Mwaura (2016) examined the effect of operational risk management practices on the financial performance in commercial banks in Tanzania. The research aimed to determine how operational risk management practices influence financial performance within the Tanzanian banking sector. Employing a descriptive research design, the study encompassed all commercial banks operating in Tanzania, totaling 34 banks, which constituted the entire population of interest. Data collection was conducted using questionnaires as the primary tool, gathering responses from representatives of each participating bank. The collected data were subsequently analyzed and presented using descriptive statistics. The study's findings revealed that credit risk, insolvency risk, and operational efficiency were identified as the three independent variables that significantly influenced the financial performance of Tanzanian commercial banks during the study period.

Aloqab et al. (2018) examined Operational Risk Management in Financial Institutions: An Overview. The study begins with an overview of the concept of risk and BASEL I, II and III and how they apply to financial institutions. The study emphasizes the increasing importance of operational risk management within financial institutions, considering various models and approaches used to manage financial risks effectively. The paper reviews existing literature on operational risks specific to financial institutions and examines different methods employed for identifying and managing operational risks. It concludes by highlighting the necessity for financial institutions to adhere to both national and international regulations and procedures for enhanced operational risk management in banks. This version presents the information in a structured and original manner, ensuring it is free from plagiarism while accurately conveying the key points of the study by Aloqab et al

Wood and McConney (2018) assessed The Impact of Risk Management on the Financial Performance of the Commercial Banking Sector in Barbados. The research utilized

quarterly data spanning from 2000 to 2015 to analyze this relationship. The empirical findings indicated that several types of risks—specifically Capital Risk, Credit Risk, Liquidity Risk, Interest Rate Risk, and Operational Risk—significantly influenced the financial performance of commercial banks in Barbados. Notably, Country Risk was found to have no statistically significant impact on financial performance. Among external factors, only GDP Growth showed statistically insignificant influence on financial performance. Credit risk was identified as exerting a negative impact on the financial performance of banks, highlighting the importance for banks to implement effective measures to mitigate this risk. Higher levels of capital were associated with positive impacts on profitability within the banking sector. However, the study emphasized the critical need for banks to manage liquidity effectively, adopt robust measures to mitigate operational risks, and closely monitor macroeconomic variables that could affect their profitability.

Risal (2018) examined Risk Management: Critical and Challenging Issues of Banking Sector in Nepali Context. The study underscores the increasing relevance of understanding risk management's impact on business performance. Risk management is portrayed as a methodological process aimed at enhancing organizational efficiency and minimizing potential liabilities. The research paper focused on identifying factors that determine risk management practices and their relationship with financial performance in the banking industry. Based on a theoretical model using secondary sources of information, the study emphasizes the importance of eliminating or mitigating detrimental risks to the extent that it remains cost-effective. It clarifies that the goal of risk management in banking isn't merely to reduce total risk but to optimize risk exposure for better performance. Specifically, the study identifies risk identification, risk assessment analysis, risk management practices, and credit risk assessment as pivotal dimensions influencing business performance within the banking sector.

Sharma and Shrestha (2020) evaluated Analysis of card management and associated operational risk in banks of Nepal. The study aimed to provide insights into the efficiency of card management processes and identify operational risks linked to these operations. By understanding these processes, the study aimed to offer suggestions to enhance task

efficiency for bank employees. The research utilized questionnaires and personal interviews with respondents to gather primary data. Secondary data were collected from reports, journals, and websites. Findings revealed that while most banks employ card management software, many systems were found inefficient in meeting user and institutional needs. Based on these findings, the study recommends immediate implementation of specific concepts to mitigate operational risks and suggests enhancing existing systems by incorporating features outlined in the prototype.

Mrindoko et al. (2020) examined effect of operational risk on the financial performance of banks in Tanzania. The research aimed to establish the relationship between operational risks and the performance of Tanzanian commercial banks using a panel data methodology. The study utilized financial statements from all 41 licensed commercial banks operating in Tanzania from 2006 to 2019, sourced from the Bank of Tanzania and the National Bureau of Statistics. Employing a longitudinal explanatory design, the study employed a quantitative approach to collect and analyze financial panel data. Data analysis was conducted using STATA14. The operational risk variables investigated included portfolio concentration ratio (PCR), cost to income ratio (CIR), bank leverage ratio (BLR), and operating expense ratio (OER). The findings indicated that PCR and BLR had a negative and statistically insignificant relationship with Return on Equity (ROE). In contrast, OER and CIR were found to have a negative and significant impact on ROE. Regarding Return on Assets (ROA), PCR and CIR were found to have a negative and significant effect, while BLR had a positive but insignificant impact, and OER had a negative and insignificant effect. These results suggest that increases in PCR and CIR tend to reduce the performance of Tanzanian commercial banks

Santika et al. (2022) evaluated Effect of Operational Risk on Financial Performance in Banking Industry IDX. The research aimed to analyze this relationship using descriptive statistics, normality tests, multicollinearity tests, and autocorrelation tests for data analysis. The study's findings indicated that Total Operating Expenses, Net Income, and Average Asset Turnover significantly affect risk management within the banking industry. However, variables such as Interest Over Years and Exchange Rate Over Years were found to have no significant effect on risk management.

Falih et al. (2022) illustrated The Effect of Operational Risk Management (ORM) On The Financial Performance (FP) Of Iraqi Commercial Banks. The study highlighted a growing concern among banking management regarding increased bank losses attributed to inadequate operational risk management practices, which consequently adversely affect financial performance. The research aimed to determine the impact of ORM on financial performance within the commercial banking sector in Iraq, utilizing a quantitative approach to gather data through a survey (questionnaire) comprising 30 items rated on a five-point Likert scale. The study involved 126 managers from various commercial banks in Iraq. Data analysis was conducted using Smart PLS 3.2.9. The empirical findings revealed a significant and positive relationship between operational risk management and financial performance. These results substantiated the hypothesis that ORM significantly influences the financial performance of commercial banks in Iraq. As a recommendation, the study suggests that banks should enhance their operational risk management systems to continually improve their financial performance

Khan et al. (2023) Determinants of Credit Risk and Operational Risk in Banking Sector Evidence from Pakistani Banking Sector. The study aimed to evaluate these determinants using secondary data collected from three banks listed on the Karachi Stock Exchange (KSE) over a 17-year period from 2000 to 2016. A panel regression model was employed to analyze the cause-and-effect relationships related to the issue under consideration. The findings indicated that both credit risk and operational risk showed a significant and positive relationship with Non-Performing Loans (NPLs), Gearing Ratio, and Operating Efficiency. Additionally, credit risk and operational risk exhibited a positive but insignificant relationship with Liquid Assets (LA). Based on these results, the study recommended that proper banking regulations should be supported by robust credit analysis and provisions suitable for the circumstances of credit loans.

Hudáko et al. (2023) evaluated Management of Operational Risk in the Context of Financial Performance of SMEs. The article aimed to identify and quantify differences in operational risk management practices and their effects on financial management among SMEs. The statistical sample comprised 1090 owners and top managers of SMEs, and data were collected via a questionnaire administered between December 2022 and January

2023. Statistical analysis, including correlation analysis and linear regression modeling, was used to evaluate the study's hypotheses. The empirical findings revealed that effective operational risk management significantly and positively influenced several aspects of SMEs' financial performance. This impact included enhancing profitability, reducing indebtedness, and improving the ability to meet financial obligations. However, the study noted variations in how owners and managers perceived these influences across different countries where their businesses operated.

Tamakloe et al. (2023) evaluated Impact of Risk Management on the Performance of Commercial Banks in Ghana: A Panel Regression Approach. The research aimed to examine how different types of risks specifically credit risk, operational risk, liquidity risk, and market risk affect bank performance. The study relied on quantitative research methods, utilizing secondary data extracted from the annual financial statements of seven purposively sampled commercial banks. The findings revealed that among the risks studied, only operational risk exerted a significant influence on bank performance, explaining 99.24% of the variability in performance. Additionally, the study noted that overall risk management significantly impacted bank performance, explaining 74.74% of the variance.

Darlami (2023) examined Impact of credit risk, operational risk and liquidity risk on the profitability of Nepalese commercial banks. The research focused on assessing how these risks influence two dependent variables: Return on Assets (ROA) and Return on Equity (ROE). The study utilized secondary data from 26 commercial banks, comprising 208 observations spanning the study period from 2013/14 to 2020/21. Data sources included Banking and Financial Statistics published by Nepal Rastra Bank, annual reports of selected commercial banks, and reports from the Ministry of Finance. The findings indicated several significant relationships: Capital Adequacy Ratio (CAR) was found to have a positive impact on ROA. Conversely, Non-Performing Loans (NPLs), Loan Loss Provision (LLP), Loan to Deposit Ratio (LDR), Cost to Income Ratio (CIR), and Leverage Ratio (LR) were all found to have negative impacts on both ROA and ROE. These results underscored the importance of managing credit risk, operational risk, and liquidity risk

effectively to enhance the profitability of Nepalese commercial banks. Moreover, leverage ratio has a negative impact on return on assets and return on equity.

Mahat et al. (2023) illustrated Enterprise Risk Management and Institutional Performance of Life Insurance Companies in Nepal. The study aimed to evaluate insurance companies' performance through the lens of ERM practices, specifically focusing on risk identification, evaluation, mitigation, implementation, and management as predictors of performance. The research employed a structured questionnaire survey conducted among 100 conveniently selected respondents, representing key employees from various branches of insurance firms in the Kathmandu Valley. Data analysis utilized correlation analysis and step-wise regression. Key findings indicated that risk identification, risk assessment, and risk mitigation positively influenced insurance firms' performance. However, risk management and implementation were found to have a negative impact on company performance, with only the effect of risk mitigation being statistically significant. Therefore, the study recommended that insurance companies prioritize risk mitigation strategies to enhance their performance. Furthermore, the study underscored the importance for firms to adopt ERM practices aligned with international best practices to enhance productivity and competitiveness on a global scale.

2.3 Research Gap

Over the years, numerous studies have extensively examined the financial analysis of commercial banks, particularly focusing on liquidity, profitability, and leverage within the Nepalese banking context. These studies predominantly applied traditional methods to assess financial performance. However, there remains a noticeable gap in academic research specifically addressing operational risk management (ORM) within Nepal's banking sector.

A comprehensive review of existing literature reveals a scarcity of research dedicated to exploring broader aspects of risk management beyond credit risk. While some studies have delved into topics such as loan loss provisions and non-performing loans, very few have ventured into areas like concentration risk and collateral risk. This gap in research is

particularly evident despite the National Reserve Bank's (NRB) directives emphasizing loan provisioning and capital adequacy in previous studies.

Moreover, critical areas such as liquidity risk and interest rate risk have also received limited attention in Nepalese banking research. Operational risk, which constitutes a significant portion of total risk for banks, remains largely understudied. Consequently, there is a compelling need for further research in these neglected areas to enhance the understanding and management of risks in the Nepalese banking sector.

The existing body of research in the ORM domain has highlighted key factors, challenges, and mitigation techniques related to operational risks in banks. However, there is a distinct lack of structured studies that systematically analyze trends in the literature and identify emerging research opportunities. Therefore, to bridge this gap and contribute to the advancement of knowledge in ORM, this research aims to conduct a thorough bibliometric analysis. By synthesizing existing literature and identifying gaps, this study seeks to pave the way for future research endeavors aimed at addressing critical aspects of operational risk management in Nepalese banks.

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CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the methodology of research based on the objective of the study and the conceptual framework discussed in the previous chapter. A description of various research methods is presented showing the basis of survey, data collection, and analysis procedures to find out determinants of operational risk management practices in commercial banks in Nepal.

3.1 Research Design

The study investigated the relationship between selected bank variables and factors determining operational risk management practices in commercial banks in Nepal. It employed a quantitative research design utilizing cross-sectional data collected from selected commercial bank websites and secondary sources on operational risk management. The primary focus was on adapting a multifactor model to explain the determinants of operational risk management practices in these banks. The study specifically examined the relationship of several internal bank variables: capital adequacy ratio, non-performing loan ratio, operating efficiency, and loan-to-deposit ratio. Operating efficiency ratio was considered as the dependent variable, while the bank-specific internal variables served as independent variables. To achieve its objectives, the study employed descriptive financial analysis techniques to describe, measure, compare, and classify operational risk management practices among Nepalese commercial banks. Additionally, it applied an econometric multivariate regression model to assess the significance of these variables on operational risk management. This research is characterized as historical, based on recent historical data spanning from 2012/13 to 2021/22. It adopts an analytical and descriptive approach, utilizing various statistical and financial tools for rigorous analysis

3.2 Population and Sample of Data

The total number of commercial banks represent as the total population for the purpose of this study. The main focus of this study is listed commercial banks only. This research work 10 years' annual report have been taken of respective banks which are

published by bank after audit to general public in the form of annual report. It covers the fiscal year of 2012/13-2021/22.

Table 2

List of Nepalese commercial banks with the study period and number of observations

S.N.	Name of commercial banks	Study period	Observations
1	Agriculture Development Bank Ltd (ADBL)	2012/13-2021/22	10
2	Everest Bank Ltd. (EBL)	2012/13-2021/22	10
3	Global IME Bank Ltd. (GIME)	2012/13-2021/22	10
4	Machhapuchre Bank Ltd. (MBL)	2012/13-2021/22	10
5	Himalayan Bank Ltd. (HBL)	2012/13-2021/22	10
6	NIC Asia Bank Ltd. (NICA)	2012/13-2021/22	10
7	Laxmi Sunrise Bank Ltd. (LSRBL)	2012/13-2021/22	10
Total number of observations			**70**

As of 2024, there are 20 commercial banks listed in Nepal. Among those, 7 of the commercial banks have been taken as a sample for this study. Thus, the study is based on the 7 different commercial banks of Nepal for the period of 10 years between 2012/13to 2021/22 with total observation of 70 observations. Among those sampled banks, ADBL is taken as the sample of the government ownership bank, EBL taken as the foreign investment and ventured banks, GIME bank as the one of the most successful bank, MBL bank as the bank which has not been merged with any other banks. Similarly, HBL has been taken as the sample from least profit oriented banks, NICA taken as the sample since it has higher number of branches with huge number of employees and LSRBL has been taken as the sample which has just been merged.

3.3 Sampling Method

The choice of sampling method depends on several factors, including the research objectives, the population of interest, the resources available, and the desired level of precision. This study used purposive sampling method for the study. This method involves selecting banks that are considered to have relevant experience or expertise in operational risk management. For example, you might choose banks that have been recognized for their risk management practices or those that have faced significant operational risks. It allows for the selection of cases that are particularly informative,

especially if the study aim to explore in-depth the specific practices and challenges faced by certain banks. Purposive sampling allows to select banks that are known to have significant experience or expertise in operational risk management. By focusing on these banks, the study has gather detailed and relevant data on effective risk management practices.

3.4 Source of Data

In this study secondary data sources are used to present and analyze the data. Information from secondary data sources such as report of Nepal Stock Exchange Ltd., report of Security Board of Nepal, various website and annual report of sample banks has been used. The major sources of secondary data will be as follows:

1. NRB reports
2. Economic Survey (Published by Ministry of Finance)
3. Banking and Financial Statistics
4. Journal and Articles
5. NEPSE
6. Previous Research Studies
7. Library
8. Different websites related to the study

3.5 Data Analysis Tools

Financial tools play a crucial role in the research and study process, with a primary focus on ratio analysis as a powerful tool for financial analysis. Ratio analysis provides insights into the economic and financial position of a business unit, allowing for a detailed examination. In this study, statistical tools such as mean, standard deviation, and coefficient of variance were employed based on financial analysis to further analyze the data. These tools enabled a comprehensive assessment of the financial metrics, enhancing the understanding of the findings derived from the research. This approach leveraged both financial and statistical tools synergistically to provide a robust analysis framework, contributing to a deeper exploration of the economic and financial aspects under study

3.5.1 Statistical Tools

Statistical methods involved in carrying out a study include planning, designing, collecting data, analyzing, drawing meaningful interpretation and reporting of the research findings.

Mean

An average is a central value that summarizes a set of values, providing a representation of the entire group. It serves to typify the collective characteristics of homogeneous data, positioned between the extremes of the largest and smallest items. Calculated by dividing the sum of all quantities by the total number of items, it offers a balanced measure that reflects the typical magnitude within the dataset

$$\bar{R}_J = \frac{\sum R_j}{n}$$

Where,

$\bar{R}_J$ = Expected rate

n= Number of years

$\sum$ = Sign of summation

The studies calculate the average value of all the independent variables, which is calculated through the financials formulas and data, collected from the secondary sources. Thus, calculation of mean is based on the calculation of financial formula of all independent variable over the ten years.

Standard Deviation (S.D)

The standard deviation is the most commonly used measure of dispersion in statistics. It quantifies the amount of variation or dispersion of a set of numbers. It represents the square root of the variance, which is calculated as the average of the squared differences between each number in the group and their arithmetic mean. In mathematical notation, the standard deviation is often denoted by the small Greek letter σ (sigma) and is calculated using the following formula:

$$\sigma=\sqrt{\frac{\sum(X-\bar{X})^2}{N}}$$

Where,

σ= Standard deviation

$\sqrt{\sum(X-\bar{X})^2}$= Sum of square of the deviation measured from arithmetic mean

N= Number of items

The studies calculate the standard deviation of all the independent variables, which is calculated through the financials formulas and data, collected from the secondary sources. Thus, calculation of standard deviation is based on the calculation of financial formula of all independent variable over the seven years.

3.5.2 Inferential Analysis

Inferential statistics play a crucial role in analyzing data from samples to draw conclusions and make generalizations about populations in research. It encompasses various analytical methods tailored to different research designs and sample characteristics. As a branch of statistics, inferential statistics leverages these tools to extrapolate findings from sample data to larger population datasets. In contrast, descriptive statistics forms another important branch, focusing on summarizing the characteristics of a dataset without making broader conclusions about populations. Descriptive statistics provide insights into the central tendency, variability, and distribution of data, offering a snapshot of its features. The application of inferential statistics aids in deepening understanding of population data through rigorous analysis of sample data. By employing a range of analytical tests and tools, inferential statistics facilitates the process of making reliable generalizations about populations based on empirical evidence gathered from samples. This approach ensures that research findings are robust, applicable, and reflective of broader contexts beyond the immediate sample.

Correlation Analysis

In statistical terms, correlation is a method for evaluating the possible linear association between two continuous variables. This relationship is quantified using a statistic known

as the correlation coefficient, which measures the strength and direction of the linear relationship between the variables. The correlation coefficient is a dimensionless quantity that ranges from -1 to +1. A correlation coefficient of zero signifies that there is no linear relationship between the two variables. A coefficient of +1 indicates a perfect positive linear relationship, meaning that as one variable increases, the other variable also increases proportionally. Conversely, a coefficient of -1 indicates a perfect negative linear relationship, where an increase in one variable corresponds to a proportional decrease in the other variable. The closer the correlation coefficient is to +1 or -1, the stronger the linear relationship between the variables. If the coefficient is positive, it means the variables are directly related and when one variable's value increases, the other variable's value also tends to increase. If the coefficient is negative, the variables are inversely related—when one variable's value increases, the other variable's value tends to decrease.

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{n\sum x - (\sum x)^2}\sqrt{n\sum y - (\sum y)^2}}$$

Where, n= Number of responses

x= Value of independent variable

y= Value of dependent variable

Regression

Regression is a statistical measure that attempts to determine the strength of the relationship between one dependent variable and one or more independent variables. It includes many techniques for modeling and analyzing several variables to understand the relationships between variables. In this study, regression is calculated for the responses provided in Likert scale to find out direction of relationship between independent variables and dependent variable for all samples. The theoretical model for the relationship is formulated as equation below.

Model 1

$ORM == \beta_0 + ß_1 CAR + ß_2 NPLR + ß_3 GR + ß_4 LR + Ɛ$

Where,

ORM= Operational Risk Management

CAR= Capital Adequacy Ratio

NPLR=Non-Performing Loan Ratio

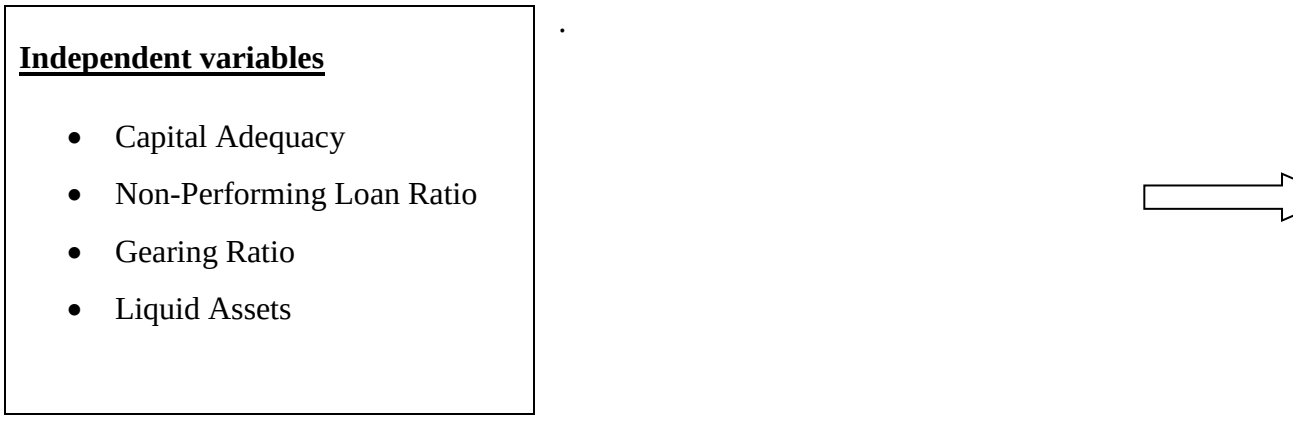
GR= Gearing Ratio

LR=Liquid Assets

3.6 Research framework and definition of the variables

Conceptual framework of the study describes the systematic explanation of the impact of independent variables upon dependent variables for the purpose of clarifying the determinants of operational risk management. It helps to define the focus and goal of the research problem. Based on the objective of the study and the literature review following conceptual framework is framed to summarize the main focus and scope in terms of variables included. The conceptual frameworks that describe the dependent and independent variables used in the study are shown in the Figure 1: Schematic diagram on the factors determining operational risk management in Nepalese commercial banks.

Figure 1 : Research Framework of the Study



Source: (Lyambiko 2012; Santika et al., 2022; Khan et al., 2023; Gautam 2015)

3.6.1 Dependent Variables

Operational Risk Management

Operational risk in banking refers to the potential for adverse impacts on a bank's financial performance and capital due to a variety of factors. These include errors or oversights by employees, deficiencies in internal procedures and processes, inadequate management of information systems, and unexpected external events (RMG 2010). Such risks materialize in the challenges of accurately processing transactions, settling trades, and ensuring timely delivery of goods or funds. They also manifest in issues related to record-keeping accuracy, failures in processing systems, and adherence to regulatory requirements. Human errors, system malfunctions, and deficiencies in

procedural controls further exacerbate operational risk. This risk stems from vulnerabilities in information systems, technological breakdowns, lapses in internal controls, fraudulent activities, unforeseen disasters, or other operational disruptions, potentially leading to unanticipated financial losses or reputational harm. Operational risk spans across all facets of a bank's products and business operations. Estimating operational risk involves comprehensive assessments to quantify potential losses and implement strategies to mitigate these risks effectively. It is calculated by:

$$\text{Operational efficiency} = \frac{\text{Operating Expenses}}{\text{Operating Income}} \times 100\%$$

3.6.2 Independent Variables

Capital Adequacy Ratio (CAR)

A commercial bank maintains adequate capital, assessed through the Capital Adequacy Ratio (CAR), which measures its capital as a percentage of its risk-weighted credit exposure. This ratio is crucial as it indicates the bank's ability to sustain sufficient capital levels. The primary function of a bank is to gather deposits and lend them out as loans. When a bank possesses adequate capital and meets regulatory requirements, it can operate profitably. Furthermore, sufficient capital allows a bank to extend larger loans and use its assets as collateral, thereby enhancing depositor confidence and bolstering public trust in the institution. This trust is essential for attracting and retaining customer deposits, which are integral to the bank's lending and investment activities. The higher the CAR better the performance of a bank. This is supported by Saeed *et al.* (2014). Capital Adequacy is important for a bank to maintain depositors' confidence and preventing the bank from going bankrupt. Capital is seen as a cushion to protect depositors and promote the stability and efficiency of financial system around the world (Caprio & Honohan, 1999). Capital Adequacy reflects the overall financial condition of the banks and also the ability of the management to meet the need for additional capital. It also indicates whether the bank has enough capital to absorb unexpected losses. Capital Adequacy ratios act as indicators of banks' leverage (Chishty, 2011). It is calculated by:

$$\text{CAR} = \frac{\text{Tier 1 Capital} + \text{Tier 2 Capital}}{\text{Risk Weighted Assets}}$$

Non-Performing Loan Ratio

An NPL ratio is used to measure the level of the bank's credit risk and quality of outstanding loans (Akhter & Roy, 2017). A high ratio means the bank bears a greater risk of loss if it fails to recover the owed amounts, while a low ratio means that the outstanding loans pose a low risk to the bank. Non-performing loans (NPLs) reduce banks' earnings and cause losses, which weighs on their soundness (Bholat et al.,2018). Banks with high levels of non-performing loans are unable to lend to households and companies. This is harmful to the economy as a whole. It is calculated by:

$$\text{NPLR} = \frac{\text{Total non performing loan}}{\text{Total loan and advances}} \times 100\%$$

Where,

Total non-performing loan (NPL) = substandard loan + doubtful loan+ bad loan

Total loan and advances = total performing loan + total non-performing loan

Gearing Ratio

Gearing ratio is an important measure of stability of a company as it is considered when raising external capital (Siyanbola et al., 2015). If the company is already highly geared, it might find it extremely difficult to raise additional fund as would-be lender may take a closer look at its structure and believe that the company might not be able to settle the debts as at when due as it is already exposed to so many creditors. The effect of having excess gearing is that such company would have to accumulate higher amount of profit before interest and tax to be able to meet demand for interest payment (Tweedie & Whittington, 1990). Mathematically, it was calculated by:

$$\text{Gearing ratio} = \frac{Total\ Debt}{\text{Total Equity}} \times 100\%$$

Liquid Assets

According to Kontuš & Mihanović (2019), a liquid asset is an asset that can be rapidly converted into cash without suffering a significant reduction in value. A perfectly liquid asset is one that would entail no illiquidity discount (Bodie *et al.,* 2013). The liquid current assets are cash, marketable securities, accounts receivable and inventory. Some marketable securities mature very soon, and can be converted quickly into cash at prices close to their book values. These securities are called cash equivalents and are included with cash. Other types of marketable securities have a longer time, until maturity, and their market values are less predictable. These securities are classified as short-term investments (Markonah *et al.,* 2020). Mathematically, it was calculated by:

$$\text{Liquid Assets} = \frac{Total\ Loan}{\text{Total Deposit}} \times 100\%$$

CHAPTER IV

RESULTS AND DISCUSSION

The Results and Discussion chapter encompasses the analysis and presentation of data related to factors influencing operational risk management in Nepalese commercial banks. This chapter aims to substantiate the study's assertions with concrete evidence. Data are meticulously presented using suitable formats such as tables, graphs, and diagrams to facilitate understanding and interpretation. This research primarily relies on secondary data, supplemented by necessary primary data to validate findings and reach informed conclusions. Secondary data sources include monthly and annual trading reports from selected commercial banks, providing a robust foundation for analysis. The data from secondary sources undergo rigorous testing using advanced statistical tools to ensure accuracy and reliability. By employing a combination of secondary and primary data, this study seeks to comprehensively explore the factors determining operational risk management practices in Nepalese commercial banks. The use of sophisticated statistical methods enhances the credibility of the findings, making them pivotal in understanding and addressing operational risk in the banking sector

4.1 Analysis of data

Data analysis is a comprehensive process involving the inspection, cleansing, transformation, and modeling of data to uncover valuable insights, support decision-making, and inform conclusions. It encompasses a wide array of techniques and approaches used across various disciplines including business, science, and social sciences. In today's business environment, data analysis plays a crucial role in enhancing decision-making processes by making them more empirical and systematic. It helps businesses operate more efficiently by extracting meaningful patterns and trends from raw data. One specific technique within data analysis is data mining, which focuses on statistical modeling and discovering knowledge from data for predictive purposes rather than simply describing past events. From a statistical perspective, data analysis can be broadly categorized into descriptive statistics and inferential analysis. Descriptive statistics involve summarizing and presenting data to describe its key features, such as measures of central tendency (e.g., mean, median) and variability (e.g., standard

deviation). In contrast, inferential analysis uses sample data to make inferences or predictions about a larger population, drawing conclusions beyond the specific data observed

This section deals with the factors determining operational risk management in Nepalese commercial banks for the period of 2012/13 to 2021/22. The structure has been shown year wise along with average values and standard deviation. The structure of dependent variable, operating efficiency and independent variables capital adequacy ratio, liquid assets, gearing ratio and non-performing loan are included in this section.

4.1.1 Structure and pattern of capital adequacy ratio (CAR)

This table presents the structure and pattern of Capital Adequacy Ratio (CAR). The sample includes 7 commercial banks in Nepal with total 70 observations and data are collected from respective banks' annual reports for the period 2012/13 to 2021/22. *Mean CAR is the average value of Capital Adequacy Ratio. Standard deviation represents the variation on return on assets in percentage.*

Table 3

Structure and pattern of capital adequacy ratio (CAR)

Fiscal Year	ADBL	EBL	GIME	MBL	NICA	LSBL	HBL	Mean	S.D.	C.V.
2021/22	16.34	11.95	12.78	13.47	13.51	12.45	11.56	13.15	1.58	12.02
2020/21	16.94	12.48	13.2	12.06	12.47	13.41	11.63	13.17	1.77	13.46
2019/20	19.29	13.38	12.48	13.02	13.5	14.38	13.89	14.28	2.29	16.05
2018/19	20.37	13.74	12.31	12.79	13.32	13.22	14.89	14.38	2.76	19.22
2017/18	20.33	14.2	11.47	15.36	12.24	13.38	12.6	14.23	2.98	20.98
2016/17	20.41	14.54	11.37	16.82	13.83	14.47	12.46	14.84	3.00	20.19
2015/16	17.18	12.66	12.35	12.36	12.44	12.05	12.15	13.03	1.84	14.14
2014/15	16.89	13.34	12.56	12.78	12.23	12.34	10.84	13.00	1.88	14.46
2013/14	16.56	12.56	11.67	12.15	11.78	12.01	11.02	12.54	1.84	14.65
2012/13	15.67	12.32	11.21	11.87	11.45	11.56	10.01	12.01	1.76	14.68
Mean	18.00	13.12	12.14	13.27	12.68	12.93	9.86			
S.D.	1.88	0.86	0.67	1.60	0.81	1.00	1.45			
C.V.	10.44	6.54	5.51	12.06	6.39	7.76	14.74			

Source: Annual reports of NRB bank supervision.

The Table 3 shows structure and pattern of capital adequacy ratio of Nepalese commercial bank from fiscal year 2012/13 to 2021/22. The table shows that highest

variation of mean is shown for the fiscal year 2016/17 with 14.84, S.D. with 3.00 for the fiscal year 2016/187and highest C.V. was 21.89 for the fiscal year 2017/18. Similarly, lowest variation of mean is shown for the fiscal year 2012/13 with 12.01, S.D. with 1.58 for the fiscal year 2021/22 and lowest C.V. was 12.02 for the fiscal year 2021/22. Likewise, the table also shows that highest variation of mean is shown for the ADBL with 18.00, S.D. with 1.88 for ADBL and highest C.V. was 14.74 for HBL. Similarly, lowest variation of mean is shown for the HBL with 9.86, S.D. with 0.67 for GIME and lowest C.V. was 6.39 for NICA.

4.1.2 Structure and pattern of Non-Performing Loan (NPL)

This table presents the structure and pattern of Non-Performing Loan (NPL). The sample includes 7 commercial banks in Nepal with total 70 observations and data are collected from respective banks' annual reports for the period 2012/13 to 2021/22. *Mean NPL is the average value of Non-Performing Loan. Standard deviation represents the variation on return on assets in percentage.*

Table 4

Structure and Pattern of Non-Performing Loan (NPL).

Fiscal Year	ADBL	EBL	GIME	MBL	NICA	LSBL	HBL	Mean	S.D.	C.V.
2021/22	2.14	1.02	2.04	0.89	0.91	2.02	1.45	1.50	0.57	37.87
2020/21	1.88	0.22	1.41	0.62	0.78	1.39	0.85	1.02	0.56	55.31
2019/20	2.84	0.16	1.76	0.52	0.75	1.86	1.4	1.33	0.92	69.55
2018/19	3.29	0.2	0.55	0.37	0.42	1.03	1.12	1.00	1.07	107.04
2017/18	3.5	0.25	0.77	0.44	0.26	1.24	1.01	1.07	1.14	106.52
2016/17	4.6	0.38	1.6	0.38	0.36	1.37	0.48	1.31	1.54	117.57
2015/16	4.36	0.38	1.02	0.55	1.29	0.75	1.23	1.37	1.36	99.50
2014/15	4.23	0.43	1.09	0.89	1.54	1.06	1.12	1.48	1.26	84.91
2013/14	4.32	1.04	1.14	1.02	1.78	1.12	0.94	1.62	1.22	75.28
2012/13	4.35	1.13	1.21	1.14	1.89	1.54	0.86	1.73	1.20	69.39
Mean	3.55	0.52	1.26	0.68	1.00	1.34	1.05			
S.D.	0.99	0.39	0.45	0.28	0.60	0.39	0.29			
C.V.	27.85	73.91	35.95	41.04	59.64	29.02	27.40			

Source: Annual reports of NRB bank supervision.

The Table 4 shows structure and pattern of Non-Performing Loan of Nepalese commercial bank from fiscal year 2012/13 to 2021/22. The table shows that highest

variation of mean of NPL is shown for the fiscal year 2012/13 with 1.73, S.D. with 1.54 for the fiscal year 2016/17 and highest C.V. was 106.52 for the fiscal year 2017/18. Similarly, lowest variation *o*f mean is shown for the fiscal year 2018/19 with 1.00, S.D. with 0.57 for the fiscal year 2021/22 and lowest C.V. was 37.87 for the fiscal year 2021/22. Likewise, the table also shows that highest variation of mean is shown for the ADBL with 3.55, S.D. with 0.99 for ADBL and highest C.V. was 73.91 for EBL. Similarly, lowest variation of mean is shown for the EBL with 0.52, S.D. with 0.29 for HBL and lowest C.V. was 27.85 for ADBL.

4.1.3 Structure and pattern of Liquid Assets (LA)

This table presents the structure and pattern of Liquid Assets (LA). The sample includes 7 commercial banks in Nepal with total 70 observations and data are collected from respective banks' annual reports for the period 2012/13 to 2021/22. *Mean CAR is the average value of Liquid Assets. Standard deviation represents the variation on return on assets in percentage.*

Table 5
Structure and Pattern of Liquid Assets (LA).

Fiscal Year	ADBL	EBL	GIME	MBL	NICA	LSBL	HBL	Mean	S.D.	C.V.
2021/22	108.67	84.22	93.18	90.45	91.94	95.12	63.48	89.58	13.69	15.28
2020/21	92.57	79.69	89.04	89.11	91.65	94.66	62.94	85.67	11.10	12.96
2019/20	85.63	78.17	93.26	91.26	85.75	91.53	68.16	84.82	8.95	10.56
2018/19	92.6	80.76	94.12	91.01	87.21	95.3	75.93	88.13	7.30	8.28
2017/18	96.46	77.85	88.08	90.26	86.3	93.79	74.55	86.76	8.02	9.25
2016/17	88.37	81.27	77.98	87.27	82.59	89.29	80.28	83.86	4.42	5.27
2015/16	90.96	72.5	79.29	83.45	84.12	82.64	68.31	80.18	7.63	9.51
2014/15	89.02	65.57	81.32	77.5	78.81	77.61	75.46	77.90	7.00	8.99
2013/14	86.78	76.6	79.89	78.24	80.75	74.7	74.57	78.79	4.25	5.40
2012/13	72.72	75.18	76.84	77.99	79.08	75.86	78.7	76.62	2.24	2.93
Mean	90.38	77.18	85.30	85.65	84.82	87.05	72.24			
S.D.	9.04	5.25	6.92	5.81	4.68	8.48	6.11			
C.V.	10.00	6.80	8.12	6.78	5.52	9.75	8.46			

Source: Annual reports of NRB bank supervision.

The Table 5 shows structure and pattern of Liquid Assets of Nepalese commercial bank from fiscal year 2012/13 to 2021/22. The table shows that highest variation of mean of

liquid assets is shown for the fiscal year 2021/22 with 89.58, S.D. with 13.69 for the fiscal year 2021/22 and highest C.V. was 15.28 for the fiscal year 2021/22. Similarly, lowest variation *o*f mean is shown for the fiscal year 2012/13 with 76.62, S.D. with 2.24 for the fiscal year 2012/13 and lowest C.V. was 2.93 for the fiscal year 2012/13. Likewise, the table also shows that highest variation of mean is shown for the ADBL with 90.38, S.D. with 9.04 for ADBL and highest C.V. was 10.00 for ADBL. Similarly, lowest variation of mean is shown for the HBL with 72.24, S.D. with 4.68 for NICS and lowest C.V. was 5.52 for NICA.

4.1.4 Structure and pattern of Gearing Ratio (GR)

This table presents the structure and pattern of Gearing Ratio (NPL). The sample includes 7 commercial banks in Nepal with total 70 observations and data are collected from respective banks' annual reports for the period 2012/13 to 2021/22. *Mean GR is the average value of Gearing Ratio. Standard deviation represents the variation on return on assets in percentage.*

Table 6

Structure and pattern of Gearing Ratio (GR)

Fiscal Year	ADBL	EBL	GIME	MBL	NICA	LSBL	HBL	Mean	S.D.	C.V.
2021/22	73.55	64.55	71.58	73.4	74.34	76.55	88.8	74.68	4.14	5.54
2020/21	67.75	60.33	69.2	74.13	76	71.26	89.87	72.65	5.54	7.63
2019/20	68.59	60.65	72.3	76.29	68.99	69.86	82.31	71.28	5.17	7.25
2018/19	72.69	61.53	74.53	73.67	68.67	71.55	87.37	72.86	4.82	6.61
2017/18	74.23	62.1	73.38	75.74	70.47	75.95	88.31	74.31	5.23	7.04
2016/17	69.53	66.34	67.41	74.24	72.11	74.02	83.59	72.46	3.37	4.65
2015/16	71.11	59.67	67.52	73.39	72.65	72.64	79.12	70.87	5.25	7.41
2014/15	67.95	54.95	70.73	70.27	69.64	68.37	75.83	68.25	5.99	8.78
2013/14	64.6	67.53	69.61	71.34	70.53	65.19	71.01	68.54	2.82	4.11
2012/13	64.58	66.01	67.18	69.86	67.82	66.05	69.89	67.34	1.82	2.70
Mean	69.46	62.37	70.34	73.23	71.12	71.14	81.61			
S.D.	3.43	3.81	2.60	2.15	2.62	3.86	7.39			
C.V.	4.94	6.11	3.69	2.93	3.69	5.42	9.06			

Source: Annual reports of NRB bank supervision.

The Table 6 shows structure and pattern of Gearing Ratio of Nepalese commercial bank from fiscal year 2012/13 to 2021/22. The table shows that highest variation of mean of

Gearing Ratio is shown for the fiscal year 2021/22 with 74.68, S.D. with 5.99 for the fiscal year 2014/15 and highest C.V. was 8.78 for the fiscal year 2014/15. Similarly, lowest variation *o*f mean is shown for the fiscal year 2012/13 with 67.34, S.D. with 1.82 for the fiscal year 2012/13 and lowest C.V. was 2.70 for the fiscal year 2012/13. Likewise, the table also shows that highest variation of mean is shown for the HBL with 81.61, S.D. with 7.39 for HBL and highest C.V. was 9.06 for HBL. Similarly, lowest variation of mean is shown for the EBL with 62.37, S.D. with 2.15 for MBL and lowest C.V. was 2.93 for MBL.

4.1.5 Structure and pattern of Operating Efficiency (OE)

This table presents the structure and pattern of Operating Efficiency (OE). The sample includes 7 commercial banks in Nepal with total 70 observations and data are collected from respective banks' annual reports for the period 2012/13 to 2021/22. *Mean OE is the average value of Operating Efficiency. Standard deviation represents the variation on operating efficiency in percentage.*

Table 7

Structure and pattern of Operating Efficiency (OE)

Fiscal Year	ADBL	EBL	GIME	MBL	NICA	LSBL	HBL	Mean	S.D.	C.V.
2021/22	65.26	59.12	21.88	79.01	78.99	68.13	72.94	63.62	19.77	31.08
2020/21	68.74	63.07	53.27	71.53	57.77	67.92	76.98	65.61	8.16	12.44
2019/20	62.3	48.61	48.99	66.1	67.52	57.61	56.03	58.17	7.61	13.09
2018/19	52.15	44.00	51.07	58.43	63.13	53.62	51.78	53.45	6.03	11.28
2017/18	55.86	44.41	59.96	39.27	74.47	50.96	50.6	53.65	11.45	21.35
2016/17	58.53	45.68	49.54	35.67	67.6	45.33	51.29	50.52	10.23	20.26
2015/16	60.36	47.19	51.52	37.26	53.8	65.36	49.72	52.17	9.10	17.45
2014/15	66.55	51.87	53.1	31.27	54.16	58.21	45.76	51.56	10.98	21.30
2013/14	71.09	52.27	64.02	35.21	63.14	58.72	42.89	55.33	12.68	22.92
2012/13	71.55	51.65	65.25	46.7	72.94	63.91	43.37	59.34	12.00	20.22
Mean	63.24	50.79	51.86	50.05	65.35	58.98	54.14			
S.D.	6.54	6.28	12.06	17.32	8.58	7.53	11.72			
C.V.	10.34	12.36	23.26	34.60	13.13	12.77	21.66			

Source: Annual reports of NRB bank supervision.

The Table 7 shows structure and pattern of Operating Efficiency of Nepalese commercial bank from fiscal year 2012/13 to 2021/22. The table shows that highest variation of mean

of operating efficiency is shown for the fiscal year 2012/13 with 59.34, S.D. with 19.77 for the fiscal year 2021/22 and highest C.V. was 31.08 for the fiscal year 2021/22. Similarly, lowest variation of mean is shown for the fiscal year 2016/17 with 50.52, S.D. with 7.61 for the fiscal year 2019/20 and lowest C.V. was 11.28 for the fiscal year 2018/19. Likewise, the table also shows that highest variation of mean is shown for the NICA with 65.35, S.D. with 17.32 for MBL and highest C.V. was 34.60 for MBL. Similarly, lowest variation of mean is shown for the MBL with 50.05, S.D. with 6.28 for EBL and lowest C.V. was 12.36 for EBL.

4.1.6 Descriptive Statistics

The descriptive statistics utilized in this study comprises of minimum, maximum, mean and the standard deviation related with factors viable. In this manner, enlightening measurements empowers to introduce the information in a more significant manner, which permits less complex understanding of the information. The variables that were used in this study from 2012/13 to 2021/22 are summarized in Table 8.

Table 8

Descriptive Statistics

Indicators	CAR	NPL	Operating Efficiency	Liquid Assets	Gearing ratio
Mean	13.44	1.34	56.34	83.23	71.33
S.D.	2.29	1.08	11.71	8.73	6.56
C.V.	17.02	80.23	20.79	10.49	9.20
minimum	9.86	0.16	21.88	62.94	54.95
Maximum	20.41	4.6	79.01	108.67	89.87

The Table 8 shows the descriptive analysis of the study of selected sample banks from the time period between 2012/13-2021/22. The table shows that CAR of selected sample banks ranges from the minimum value of 9.86% to 20.41% with an average CAR of 13.44, S.D. with 2.29 and C.V. with 17.02. It means that Nepalese Commercial banks has an adequate amount of capital to deal with unexpected losses. Similarly, NPL of selected sample banks ranges from the minimum value of 0.16 to 4.6 with an average NPL of 1.34, S.D. with 1.08 and C.V. with 80.23.

Likewise, the operating efficiency lies between minimum value of 21.88 and maximum value with 79.01 with an average of 56.34, S.D. with 11.71 and C.V. with 20.79. In addition, the table shows that liquid assets of selected sample banks ranges from the minimum value of 62.94% to 108.67% with an average liquid asset of 83.23, S.D. with 8.73 and C.V. with 10.49. Similarly, gearing ratio of selected sample banks ranges from the minimum value of 54.95 to 89.87 with an average gearing ratio of 71.33, S.D. with 6.56 and C.V. with 9.20.

4.2 Inferential Analysis

In inferential analysis we will be using correlation and regression analysis to examinethe casual relationships between variables.

4.2.1 Correlation Analysis

Correlation is a term that refers to the strength of a relationship between two variables. It helps to measure the strength of a linear relationship between quantitative variables. A strong or high correlation means that two or more variables have strong relationship with each other, while a weak or low correlation means that the variables are hardly related. The correlation coefficient is measured on a scale that varies from + 1 through 0 to – 1. A complete correlation between two variables is expressed by either +1 or -1. When one variable increases as the other increases, the correlation is positive; whenone decreases as the other increases, it is negative. The complete absence of correlation is represented by 0.

Table 9

Correlation Analysis

Variables	OE	CAR	NPL	LA	GR
OE	1				
CAR	0.102**	1			
NPL	0.222	0.638**	1		
LA	0.086	0.406**	-0.034	1	
GR	0.088	-0.053	-0.034	-0.010	1

The Table 9 shows the relationship between the dependent variable operating efficiency with the independent variable capital adequacy ratio, non-performing loan, liquid assets and gearing ratio. The table shows that the coefficient between capital adequacy ratio

and operating efficiency is 0.102. It means that there is positive relationship between operating efficiency and capital adequacy ratio. Similarly, the coefficient of non-performing loan is 0.222. It means that there is positive relationship between Non-Performing loan and operating efficiency. Likewise, the table also shows that the coefficient of liquid assets is 0.086. It means there is positive relationship between liquid assets and operating efficiency. In addition, the table also shows that the coefficient of gearing ratio is 0.088. It means that there is positive relationship between gearing ratio and operating efficiency.

4.3 Regression Analysis/ Casual Analysis

Having indicated the Pearson's correlation coefficients, the regression analysis has been carried out and the results are presented. More specifically, the estimated regression results of dependent and independent variables of Nepalese commercial banks. In this section, basically it deals with regression results from various specifications of the model 1 to examine the estimated relationship of operating efficiency and other bank specific factors for cross-sectional data of 7 commercial banks that include 70 observations during the period 2012/13 through 2021/22. In this section, an attempt has also been made to test the validity of the model through statistical test of significance such as t-test, F-test and adjusted coefficient of determination (Adj. R_bar^2).

4.3.1 Model Summary

The model summary table reports the strength of the relationship between the model and the dependent variable. R, the multiple correlation coefficient, is the linear correlation between the observed and model-predicted values of the dependent variable. Its large value indicates a strong relationship.

Table 10

Model Summary

Model	R	R2	Adjusted R2	Std. Error of the Estimate
1	.253[a]	.564	.457	11.67677

Model summary indicates the R- square also known as coefficient of determination which can help in explaining variance. The value of R-square value as evident from is 0.564

which means 56.4 % variation in operating efficiency is explained by the independent variables. However, the remaining 55.6 % is still unexplained in this research. In other words, there are other additional variables of operating efficiency that are important in explaining that have not been considered in this research.

Similarly, adjusted R-square is 0.457 which means 45.70% variation in operating efficiency is explained by the independents variables after adjusting degree of freedom (df). This shows moderate relationship between all variables of corporate governance and firm's reputation. Model summary also indicates the standard error of the estimate of 11.67 which shows the variability of the observed value of Perceived organizational success from regression line is 11.676 units.

4.3.2 ANOVA

ANOVA, or Analysis of Variance, is a test used to determine differences between research results from three or more unrelated samples or groups.

Table 11

ANOVA Analysis

Model	Sum of Square	df	Mean Square	F	Sig
Regression	607.050	4	151.763	1.113	.000[b]
Residual	8862.554	65	136.347		
Total	9469.604	69			

The table 11 shows the ANOVA table of the study. The level of significance is 0.00. It means that the regression model provides a significantly better fit to the data than a model without any predictors, implying that the independent variables collectively have a significant impact on the dependent variable and the value of F is 1.113.

4.3.3 Regression Coefficient

The regression coefficients are a statically measure which is used to measure the average functional relationship between variables. In regression analysis, one variable is dependent and other is independent. Also, it measures the degree of dependence of one variable on the other.

Table 12

Regression Coefficient

Coefficients	Unstandardized Coefficients		Standardized coefficients	t	Sig
	B	Std. Error	Beta		
Constant	39.876**	21.257		5.876	.000
CAR	2.456**	.851	.089	4.536	.001
NPL	2.920**	1.697	.268	4.721	.000
LA	1.082**	.176	.061	5.463	.001
GR	2.167**	.215	.093	5.776	.000

Table 12 shows that the beta coefficients for capital adequacy ratio are positive with operating efficiency. It indicates that the capital adequacy ratio has a positive impact on operating efficiency. This finding is like the discoveries of Ogboi and Unuafe (2013) and Agbeja *et al.* (2015). Likewise, the beta coefficients for Non-Performing Loan are positive with operating efficiency. It indicates that non-performing loan has a positive impact on operating efficiency. This finding is steady with the discoveries of Karim et al. (2010) and Ekanayake and Azeez (2015). Likewise, the beta coefficients liquid assets are positive with operating efficiency. This finding goes against the discoveries of Brealey *et al.* (2014) and Mishkin (1976). Moreover, the beta coefficients for gearing ratio are positive with operating efficiency. It indicates that inflation has a positive impact on operating efficiency. the beta coefficients for Capital Adequacy Ratio are positive with operating efficiency. This finding is steady with the discoveries of Van Horne and Wachowicz (2005) and Keasey et al. (2015).

4.4 Discussion

The major objective of the study is to analyze the determinants of operational risk management practices in commercial banks in Nepal. The specific objectives are to examine the determinants of operational risks management practices and financial performance in commercial banks in Nepal and to analyze the relationship between independent variables (capital adequacy ratio, gearing ratio, liquid assets and non-performing loan ratio) and dependent variable (Operational efficiency).

From the data analysis, it is clearly evident that there are several factors that determine operational risk management of commercial banks in Nepal. The first objective of the study was to analyze the determinants of operational risk management practices in

commercial banks in Nepal. The study found that the all independent variables in the study (capital adequacy ratio, non-performing loan, liquid assets and gearing ratio) are the determinants of operational risk management for the period under study.

The second objective of this was to analyze the relationship between independent variables (capital adequacy ratio, gearing ratio, liquid assets and non-performing loan ratio) and dependent variable (Operational efficiency). The study found positive impact of capital adequacy ratio and operational efficiency. This finding is similar with the findings of Ogboi and Unuafe (2013) and Agbeja *et al.* (2015). This study also shows that high CAR ensures that banks have sufficient capital to absorb potential losses, promoting financial stability and solvency. This instills confidence among investors and depositors, enhancing the bank's reputation and attracting more investments. Furthermore, compliance with regulatory requirements, such as Basel III, helps banks avoid penalties and align with global standards (Hazim & Makttoof, 2020), Likewise, the beta coefficients for Non-Performing Loan are positive with operating efficiency. It indicates that the NPL influences operating efficiency positively. This finding is steady with the discoveries of Karim et al. (2010) and Ekanayake and Azeez (2015). The positive impact of managing non-performing loans (NPLs) and effective operational risk management on financial institutions is significant. Efficiently managing NPLs helps banks improve their financial health by reducing the proportion of bad loans in their portfolios, which in turn frees up capital for more productive uses and enhances profitability. This proactive management also strengthens the bank’s balance sheet, increases investor confidence, and contributes to overall financial stability. Additionally, effective operational risk management minimizes losses from internal failures, fraud, and external disruptions, leading to smoother and more efficient operations.

Moreover, the beta coefficients Liquid Assets are positive with operating efficiency. It shows that liquid assets adversely affect operating efficiency. This finding goes against the discoveries of Brealey *et al.* (2014) and Mishkin (1976). This study also proves that Liquid assets ensure that banks have immediate access to funds, which helps them quickly address and mitigate operational risks arising from unexpected events or financial shocks. This ready availability of cash allows banks to manage day-to-day operations

smoothly, handle sudden withdrawals or claims, and cover operational losses without compromising their stability. Operating efficiency has a positive beta coefficient for gearing ratio as well. It shows that gearing ratio adversely affects operating efficiency. This finding is steady with the discoveries of Van Horne and Wachowicz (2005) and Keasey et al. (2015). The study also shows that A balanced gearing ratio, which reflects the proportion of debt to equity, ensures that the institution is not over-leveraged, thereby reducing the financial strain from excessive debt obligations. This financial stability allows the bank to allocate resources more effectively towards managing operational risks. With a manageable level of debt, the institution can invest in robust risk management systems and processes, enhancing its ability to identify, assess, and mitigate operational risks.

CHAPTER V

SUMMARY AND CONCLUSION

This chapter provides brief summary of the entire study and highlights the major findings of the study. In addition, major conclusions are discussed in separate section of this chapter which is followed by the recommendations based upon the study findings regarding the Relationship of Corporate Governance on Firms Reputation. Finally, this chapter ends with the short paragraph on scope for future research in same topic.

5.1 Summary

Operational risk management in Nepalese commercial banks is shaped by a confluence of factors that span regulatory oversight, internal governance, technological infrastructure, and external environmental dynamics. The Nepal Rastra Bank (NRB)'s regulatory frameworks serve as the foundation, guiding banks in the development of robust risk management frameworks and compliance protocols. Internally, each institution's risk culture and accountability are defined by efficient governance structures, which include the roles of senior management and the board.

The research design used in this study is quantitative in nature and cross sectional data collected from selected commercial bank website; secondary data regarding operational risk management have been taken in order to examine the relationship. The bank internal selected variables taken into consideration are capital adequacy ratio, non- performing loan ratio, operating efficiency and loan to deposit ratio. The operational risk management are operating efficiency ratio which is assumed to dependent variable. Secondary data regarding operational risk management have been taken in order to examine the relationship. The study used a descriptive financial analysis to describe, measure, compare and classify the operational risk management of Nepalese commercial banks and as well as applied an econometric multivariate regression model to test the significance of variable on operational risk management of commercial banks. This research is based on the recent historical data, so simply it is a historical research. It covers the data from 2012/13-2021/22.Various statistical and financial tools havealso been used for analysis of research.

The average mean CAR across the banks ranges from 9.86% to 18.00%, indicating variations in capital adequacy levels over time and across institutions. Standard deviations (S.D.) for CAR metrics range from 0.67% to 1.88%, illustrating the degree of dispersion from the mean CAR values within each bank. Coefficients of variation (C.V.) for CAR show relative variability, ranging from 5.51% to 14.74%, highlighting the relative stability or volatility in capital adequacy ratios across different fiscal years and banks. Similarly, the average mean NPL ratios across the banks range from 0.52% to 3.55%, reflecting varying levels of asset quality and risk management practices over time. Standard deviations (S.D.) for NPL ratios range from 0.28 to 0.99, indicating the extent of variability in NPL levels within each bank across different fiscal years. Coefficients of variation (C.V.) for NPL ratios range from 27.40% to 73.91%, highlighting the relative volatility or stability in NPL ratios across the banks. Higher C.V. values suggest greater variability in asset quality and risk exposure among the banks.

The study also shows that the average mean liquid asset ratios across the banks range from 72.24% to 90.38%, reflecting varying levels of liquidity management and asset composition over the years. Standard deviations (S.D.) for liquid asset ratios range from 4.68 to 9.04, indicating the extent of variability in liquidity levels within each bank across different fiscal years. Coefficients of variation (C.V.) for liquid asset ratios range from 5.52% to 10.00%, highlighting the relative volatility or stability in liquidity ratios across the banks. Higher C.V. values suggest greater variability in liquidity management practices and the composition of liquid assets among the banks. Likewise, the average mean gearing ratios across the banks range from 69.46% to 81.61%, reflecting varying levels of leverage and capital structure strategies over time. Standard deviations (S.D.) for gearing ratios range from 2.15 to 7.39, indicating the extent of variability in leverage levels within each bank across different fiscal years. Coefficients of variation (C.V.) for gearing ratios range from 2.93% to 9.06%, highlighting the relative volatility or stability in leverage ratios across the banks. Higher C.V. values suggest greater variability in capital structure and debt management practices among the banks.

The average mean operating efficiency ratios across the banks range from 50.05% to 63.24%, reflecting varying levels of cost management and income generation

effectiveness over time. Standard deviations (S.D.) for operating efficiency ratios range from 6.28 to 17.32, indicating the extent of variability in efficiency levels within each bank across different fiscal years. Coefficients of variation (C.V.) for operating efficiency ratios range from 10.34% to 34.60%, highlighting the relative volatility or stability in efficiency ratios across the banks. Higher C.V. values suggest greater variability in cost management practices and income generation strategies among the banks.

In addition, regarding the descriptive analysis of the study, CAR of selected sample banks ranges from the minimum value of 9.86% to 20.41% with an average CAR of 13.44, S.D. with 2.29 and C.V. with 17.02. It means that Nepalese Commercial banks has an adequate amount of capital to deal with unexpected losses. Similarly, NPL of selected sample banks ranges from the minimum value of 0.16 to 4.6 with an average NPL of 1.34, S.D. with 1.08 and C.V. with 80.23. Likewise, the operating efficiency lies between minimum value of 21.88 and maximum value with 79.01 with an average of 56.34, S.D. with 11.71 and C.V. with 20.79. In addition, the table shows that liquid assets of selected sample banks ranges from the minimum value of 62.94% to 108.67% with an average liquid asset of 83.23, S.D. with 8.73 and C.V. with 10.49. Similarly, gearing ratio of selected sample banks ranges from the minimum value of 54.95 to 89.87 with an average gearing ratio of 71.33, S.D. with 6.56 and C.V. with 9.20.

The study shows that the coefficient between capital adequacy ratio and operating efficiency is 0.102. It means that there is positive relationship between operating efficiency and capital adequacy ratio. Similarly, the coefficient of non-performing loan is 0.222. It means that there is positive relationship between Non-Performing loan and operating efficiency. Likewise, the table also shows that the coefficient of liquid assets is 0.086. It means there is positive relationship between liquid assets and operating efficiency. In addition, the table also shows that the coefficient of gearing ratio is 0.088. It means that there is positive relationship between gearing ratio and operating efficiency.

The value of R-square value as evident from is 0.564 which means 56.4 % variation in operating efficiency is explained by the independent variables. However, the remaining 55.6 % is still unexplained in this research. In other words, there are other additional

variables of operating efficiency that are important in explaining that have not been considered in this research. Similarly, adjusted R-square is 0.457 which means 45.70% variation in operating efficiency is explained by the independents variables after adjusting degree of freedom (df). This shows moderate relationship between all variables of corporate governance and firm's reputation. Model summary also indicates the standard error of the estimate of 11.67 which shows the variability of the observed value of Perceived organizational success from regression line is 11.676 units.

Likewise, regarding the ANOVA analysis, the level of significance is 0.00. It means that the regression model provides a significantly better fit to the data than a model without any predictors, implying that the independent variables collectively have a significant impact on the dependent variable and the value of F is 1.113.

The study found that the beta coefficients for capital adequacy ratio are positive with operating efficiency. It indicates that the capital adequacy ratio has a positive impact on operating efficiency. Likewise, the beta coefficients for Non-Performing Loan are positive with operating efficiency. It indicates that NPL has a positive impact on operating efficiency. Likewise, the beta coefficients of liquid assets are positive with operating efficiency. It indicates that the liquid assets have a positive impact on operating efficiency. Moreover, the beta coefficients for gearing ratio are positive with operating efficiency. It indicates that the gearing ratio has a positive impact on operating efficiency. Similarly, the beta coefficient for inflation is positive. It indicates that inflation has a positive impact on operating efficiency.

5.2 Conclusion

Operational risk management in Nepalese commercial banks is an important area for the financial sector to focus on and adapt to, especially as these institutions navigate a dynamic economic and regulatory environment. The management of operational risks has become more complicated and crucial than ever before due to the integration of technological advancements and the growing complexity of banking operations. The study of the factors that influence operational risk management in Nepalese commercial banks emphasizes the crucial connection between the effective management of

operational risks and a number of important financial indicators, including the Capital Adequacy Ratio (CAR), Non-Performing Loan Ratio (NPL), Gearing Ratio, and Liquid Assets.

The Capital Adequacy Ratio emerges as a pivotal factor, indicating the financial robustness and capacity of banks to absorb losses from operational disruptions. Banks with higher CAR are better equipped to mitigate operational risks by allocating sufficient resources to risk management functions. Conversely, a higher Non-Performing Loan Ratio signifies greater credit risk exposure, which can elevate operational risk through potential loan defaults and impairment losses. Effective management of NPLs is crucial to minimizing operational disruptions and maintaining financial stability. The Gearing Ratio, reflecting the proportion of debt to equity, influences operational risk by amplifying financial vulnerabilities during economic downturns or liquidity crises. Banks with higher gearing ratios must manage operational risks judiciously to avoid potential financial distress. Moreover, the adequacy of Liquid Assets plays a critical role in operational risk management by ensuring banks can meet short-term obligations and maintain liquidity resilience. Banks with sufficient liquid assets are more capable of navigating operational shocks and market volatility, thereby enhancing their overall risk management framework. In conclusion, a balanced approach to these financial indicators is essential for strengthening operational risk management in Nepalese commercial banks, promoting financial stability, and bolstering trust among stakeholders in the banking sector.

Effective operational risk management in Nepalese commercial banks appears closely linked to maintaining adequate capital adequacy, managing non-performing loans prudently, maintaining a balanced gearing ratio, and ensuring sufficient levels of liquid assets. Banks that maintain robust financial health through these indicators are likely better equipped to navigate operational challenges and uncertainties, thereby enhancing overall resilience and stability in their operations A higher CAR generally indicates that banks have more capital to absorb potential losses, thereby potentially reducing operational risk. Banks with higher CAR may allocate more resources to risk management functions, enhancing their ability to mitigate operational risks effectively. A

higher NPL ratio suggests lower asset quality and potentially higher operational risk. Banks with elevated NPL ratios may face challenges in managing credit risk, operational disruptions, and regulatory compliance issues, which can impact overall operational risk management. Higher gearing ratios indicate higher financial leverage, which can amplify risks during economic downturns or adverse market conditions. Banks with high gearing ratios may face increased operational risk due to higher debt servicing obligations and potential liquidity constraints. Adequate levels of liquid assets can enhance a bank's ability to meet short-term obligations and manage liquidity risk effectively. Banks with sufficient liquid assets may be better positioned to withstand financial shocks and operational disruptions, thereby mitigating operational risk.

Capital Adequacy Ratio serves as a critical buffer against unforeseen losses, including those stemming from operational risks. Banks with higher CAR tend to have more resources to absorb losses, thereby potentially mitigating the impact of operational failures such as fraud, cyber threats, or internal control weaknesses. Non-Performing Loan Ratio directly affects operational risk by reflecting the quality of a bank's loan portfolio. Higher NPL ratios indicate increased credit risk and potential losses, which can strain a bank's operational capacity and resources. Effective management of NPLs is crucial for minimizing operational disruptions and ensuring sustainable risk management practices. Higher gearing ratios imply greater reliance on debt financing, potentially amplifying risks during economic downturns or financial instability. Banks with high gearing ratios must manage operational risks carefully to avoid liquidity crises or financial distress.

Liquid Assets plays a vital role in operational risk management by ensuring banks can meet short-term obligations and maintain liquidity in times of stress. Banks with sufficient liquid assets are better positioned to withstand operational disruptions, including unexpected withdrawals or market fluctuations.

5.3 Implications

Based on the factors determining operational risk management in Nepalese commercial banks, several implications can be made to strengthen their approach to managing operational risks effectively:

- The commercial banks should handle their operations appropriately as the changes in the factors like CAR, Liquid assets, Non-performing Ratio and gearing ratio to bring about an effect on the operational efficiency of commercial banks hence effecting their operational risk management. Taking care of these determinants will ensure operational risk management at the Nepalese Commercial banks.
- Understanding the specific factors that influence operational risk management is crucial for banks to effectively prioritize areas needing improvement. By identifying these factors, banks can develop targeted risk mitigation strategies, which can lead to a reduction in both the frequency and impact of operational risk events.
- The research can provide insights for regulators, such as the Nepal Rastra Bank, to refine regulatory frameworks and guidelines for operational risk management, prompting banks to strengthen their compliance and governance structures to align with best practices identified through the research.
- Improved operational risk management can contribute to the overall stability of the financial system in Nepal by minimizing the risk of bank failures and increasing public and investor confidence in the banking sector.
- Identifying weaknesses in operational processes can lead to more efficient banking operations and reduced costs associated with risk events, while also highlighting the need for investment in technology and innovation to better manage operational risks.
- Banks can make more informed strategic decisions and allocate resources more effectively to areas with the highest risk exposure based on empirical data and an improved understanding of operational risk factors.
- Banks may invest in training and development programs to build staff capacity for managing operational risks more effectively, while the research can promote a risk-aware culture within banks by emphasizing the importance of operational risk management at all levels.

- The findings can be compared with similar studies in other countries to provide a benchmark for Nepalese banks, helping them identify best practices and align with global standards.
- The study can pave the way for further research on related topics, such as the impact of digital transformation on operational risk or the role of corporate governance in risk management, while researchers and policymakers can use the findings to develop targeted policies that address specific operational risk factors identified in the study.

The research on operational risk management in Nepalese commercial banks can significantly impact the banking sector by improving risk management practices, informing regulatory frameworks, enhancing financial stability, and promoting operational efficiency. It can also guide strategic decision-making, training, and further research, contributing to the overall development and resilience of the financial system in Nepal.

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ANNEX

Banks	Year	Capital Adequacy Ratio	Non-Performing Loan Ratio	Operating Efficiency	Liquid Assets	Gearing ratio
ADBL	2021/22	16.34	2.14	65.26	108.67	73.55
	2020/21	16.94	1.88	68.74	92.57	67.75
	2019/20	19.29	2.84	62.3	85.63	68.59
	2018/19	20.37	3.29	52.15	92.6	72.69
	2017/18	20.33	3.5	55.86	96.46	74.23
	2016/17	20.41	4.6	58.53	88.37	69.53
	2015/16	17.18	4.36	60.36	90.96	71.11
	2014/15	16.89	4.23	66.55	89.02	67.95
	2013/14	16.56	4.32	71.09	86.78	64.6
	2012/13	15.67	4.35	71.55	72.72	64.58
Everest Bank	2021/22	11.95	1.02	59.12	84.22	64.55
	2020/21	12.48	0.22	63.07	79.69	60.33
	2019/20	13.38	0.16	48.61	78.17	60.65
	2018/19	13.74	0.2	44	80.76	61.53
	2017/18	14.2	0.25	44.41	77.85	62.1
	2016/17	14.54	0.38	45.68	81.27	66.34
	2015/16	12.66	0.38	47.19	72.5	59.67
	2014/15	13.34	0.43	51.87	65.57	54.95
	2013/14	12.56	1.04	52.27	76.6	67.53
	2012/13	12.32	1.13	51.65	75.18	66.01
Global IME Bank	2021/22	12.78	2.04	21.88	93.18	71.58
	2020/21	13.2	1.41	53.27	89.04	69.2
	2019/20	12.48	1.76	48.99	93.26	72.3
	2018/19	12.31	0.55	51.07	94.12	74.53
	2017/18	11.47	0.77	59.96	88.08	73.38
	2016/17	11.37	1.6	49.54	77.98	67.41
	2015/16	12.35	1.02	51.52	79.29	67.52
	2014/15	12.56	1.09	53.1	81.32	70.73
	2013/14	11.67	1.14	64.02	79.89	69.61
	2012/13	11.21	1.21	65.25	76.84	67.18
Machhapuchre Bank	2021/22	13.47	0.89	79.01	90.45	73.4
	2020/21	12.06	0.62	71.53	89.11	74.13
	2019/20	13.02	0.52	66.1	91.26	76.29
	2018/19	12.79	0.37	58.43	91.01	73.67
	2017/18	15.36	0.44	39.27	90.26	75.74

	2016/17	16.82	0.38	35.67	87.27	74.24
	2015/16	12.36	0.55	37.26	83.45	73.39
	2014/15	12.78	0.89	31.27	77.5	70.27
	2013/14	12.15	1.02	35.21	78.24	71.34
	2012/13	11.87	1.14	46.7	77.99	69.86
	2021/22	13.51	0.91	78.99	91.94	74.34
	2020/21	12.47	0.78	57.77	91.65	76
	2019/20	13.5	0.75	67.52	85.75	68.99
	2018/19	13.32	0.42	63.13	87.21	68.67
	2017/18	12.24	0.26	74.47	86.3	70.47
NIC Asia	2016/17	13.83	0.36	67.6	82.59	72.11
	2015/16	12.44	1.29	53.8	84.12	72.65
	2014/15	12.23	1.54	54.16	78.81	69.64
	2013/14	11.78	1.78	63.14	80.75	70.53
	2012/13	11.45	1.89	72.94	79.08	67.82
	2021/22	12.45	2.02	68.13	95.12	76.55
	2020/21	13.41	1.39	67.92	94.66	71.26
	2019/20	14.38	1.86	57.61	91.53	69.86
	2018/19	13.22	1.03	53.62	95.3	71.55
	2017/18	13.38	1.24	50.96	93.79	75.95
Sunrise Bank	2016/17	14.47	1.37	45.33	89.29	74.02
	2015/16	12.05	0.75	65.36	82.64	72.64
	2014/15	12.34	1.06	58.21	77.61	68.37
	2013/14	12.01	1.12	58.72	74.7	65.19
	2012/13	11.56	1.54	63.91	75.86	66.05
	2021/22	11.63	1.45	72.94	63.48	88.8
	2020/21	13.89	0.85	76.98	62.94	89.87
	2019/20	14.89	1.4	56.03	68.16	82.31
	2018/19	12.6	1.12	51.78	75.93	87.37
Himalayan	2017/18	12.46	1.01	50.6	74.55	88.31
Bank	2016/17	12.15	0.48	51.29	80.28	83.59
	2015/16	10.84	1.23	49.72	68.31	79.12
	2014/15	11.02	1.12	45.76	75.46	75.83
	2013/14	10.01	0.94	42.89	74.57	71.01
	2012/13	9.86	0.86	43.37	78.7	69.89

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