Operational Risk Management and Its Impact on the Banking Sector in Nepal

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ABSTRACT

The liberalization and globalization of financial services, with their support from the development of financial technology, have widened and added to the sophistication of banking activities. This study explores the impact of operational risk management in Nepal's banking sector, drawing upon some principles from operational risk theory. We used structured questionnaires and probability sampling to gather data from 213 banking employees in the Kathmandu valley.

The results show that female respondents had better knowledge of operational risk management due to their closeness to the subject. Identification, management, and control of operational risks all together have a significant effect on the operational risk management of Nepalese commercial banks. Systems failure, inability to use new technologies, and lack of management support are obstacles to doing so. In the banking industry, effective management of operational risks is also considered a significant determinant of employee performance.

These findings indicate that banks' implementation of operational risk management can accelerate growth and provide a range of other benefits to their employees, while also demonstrating the bank's commitment to reducing operational risk. The report concludes by recommending the promotion of employee awareness, training and development programs, and system management in banking to enhance operational risk management.

Keywords: Operating Risk Management, Structural Equation Modeling, Credit Risk, Market Risk, Effective Risk Management.

JEL Classification: D81, G32, E5, E58, G24

1. Introduction

Bank activities are becoming increasingly broad and complicated as a result of the deregulation and globalization of financial services, as well as the increasing sophistication of financial technology (Dodd, 2018). Moreover, use of increasingly highly automated technologies, which has the ability to turn manual processing mistakes into system failure risks, is one example of these new and expanding dangers confronting banks. Banking practices in development indicate that risks other than credit, interest rate, and market risk might be significant (Santomero, 1997). Dhakal et al. (2023) suggests that in operational risk management, financial institutions prioritize investments in financial assets over tangible assets, which may affect the management and mitigation of operational risks tied to physical infrastructure and systems. Therefore, highly automated technology, increased dependence is put on internationally connected systems, and e-commerce is growing, bringing with its possible new threats that are not yet completely understood.

Basle (1998) defined operational risk as the risk of direct or indirect loss as a consequence of insufficient or failing internal processes, people, and systems, or external events affecting the organization. Errors, fraud, fire, and other tragedies can all result in financial loss where particularly banks, are vulnerable to a wide range of failed processes. Similarly, Chernih et al. (2006) said that there is a growing interest in operational risk which resulted in the publication of standards and frameworks during the previous decade. Such frameworks give a generic definition of operational risk as "the risk of loss originating from insufficient or failing internal processes, people, and systems, or from external events".

One of the most common reasons for failure in banks and insurance companies is a lack of understanding of risk management.

Operation Risk Management (ORM) is still experiencing numerous hurdles in the midst of uncertainty, and decision-makers are having difficulty managing risks associated with bank collapses. In addition, a relatively new feature that emerged in risk management during the financial crisis was a shift in investor risk-taking behavior (Aren & Nayman Hamamci, 2023).When a company's workers, systems, and procedures are influenced by external events, operational risk occurs first, followed by credit and market risks. Over the last fifteen years, operational risk has been projected to be one of the leading causes of financial losses in the banking and insurance industries which indicates that the assignment of roles and duties is critical in developing operational risk frameworks and, as such, should be carefully coordinated for revisions (Tuncel & Alpan, 2010; Zango et al., 2015). Nowadays,

the management of operational risk by banks is a phenomenon that is widely accepted by most banking industries worldwide (Shahrin & Ibrahim, 2021). In the banking industry, operational risk is not a novel hazard. In fact, it is something that banks must deal with even before they make their first loan or trade. However, the notion that operational risk management, like credit or market risk, is a discipline with its own management structure, tools, and processes is new (Kaiser, 2020).

The necessity for operational risk management in Nepalese commercial banks is significant since operational risk exists across the business environment. It is the oldest risk that any commercial entity, particularly banks, insurance firms, and other financial organizations, faces. Previous research in Nepal on financial risk management concentrated on credit risk management rather than operational risk management (Tuladhar, 2017). Although operational risk is the oldest risk confronting financial organizations, most senior management think that credit risk has a greater influence on a firm. Deregulation and globalization of financial services, along with increasing complexity of financial technology, are broadening and complicating the operations (and risk profiles) of financial institutions(Arkhipov et al., 2021).

The notion of operational risk is used in numerous studies such as the Theory of Operational Risk, Theory of Enterprise Risk Management, Capital Asset Pricing Theory, Extreme Value Theory, and Propagation of Uncertainty Theory. The main aim of this study is to analyze the impact of operating risk management in banking sector by identifying the challenges faced by banking sector in operational risk management and to recommend managerial solution for effective operating risk management in banking sector.

The first chapter includes the introduction section followed by materials and methods in section 2. Likewise, results and discussion are covered in section 3 followed by conclusions and recommendations in section 4.

2. Materials and Methods

Hypotheses Formulation

Many financial institutions have invested tens of millions of dollars in developing a solid framework for monitoring and managing operational risk which covers both internal and external business events, such as fraud, security breaches and natural catastrophes. Additionally, it also contains legal risk, which occurs when the transaction is found to be legally in-applicable, but excludes strategic and reputational risks, which are difficult to quantify (Jednak & Jednak, 2013).

H1. Operational risk identification have significant impact on risk management.

It is important to assess operational loss to see if it is more or less amenable to exact monitoring when compared to market or credit risks. Two different approaches

and models for analyzing the risk faced by financial institutions are top-down and bottom-up models of operational losses. According to the top-down technique, operational risk is quantified at the broadest level feasible by collecting all pertinent financial data, whereas the bottom-up strategy is used to gather the findings of such analyses. (Rippel & Teplý, (2012).

H2. Operational risk assessment and analysis have significant impact on operational risk management.

Organizational data may be used by financial organizations to decide if it is reasonable to spend money on lowering op-erational risk. Imagine that a bank is considering whether or not to put in place a direct process system, which would au-tomatically record transactions made in direct contact with clients. A market risk management system should be used to hold the position so that it can monitor the trader's and the institution's overall system position and risk (Jednak & Jednak, 2013).

H3. Operational risk monitoring and control have significant impact on operational risk management.

Variable and its defination

This section construct related to the study and its variables are defined. Appropriate values for each variable are defined as changed variable hold different value. Though, the variables listed beneath may not be the only variables used in the study and necessary variables are taken as per the essential of the study. Table 1 is showing variable used in the study.

Table 1: Variable and Its Definition

Construct	Observed Variables	Notation	Description
Operational Risk Identification1	Risk Monitoring	ORI3	Bank has developed and applied procedures for the systematic identification of Internal and external events of operational risk
	Risk mapping	ORI4	Bank identifies operational risk through risk mapping
	Self-assessment	ORI5	Bank identifies operational risk using self-assessment Tool

Operational risk Assessment and Analysis1	Quantitative analysis methods	ORA2	Bank assesses its operational risk by using quantitative analysis methods
	Qualitative analysis methods	ORA3	Bank assesses operational risks by using qualitative analysis methods
	Cost and benefits	ORA5	Bank responds to analyze operational Risks, include an assessment of the costs and benefits of addressing operational risks
Operational Risk Monitoring And controlling	Monitoring the effectiveness	ORMC1	Monitoring the effectiveness of operational risk management is an integral part of routine management reporting
	Timely basis	ORMC4	Bank is reporting disclosure of information on timely basis for monitoring the operational risk
	Immediate feedback	ORMC5	Bank monitors the operational risk and provides immediate feedback to the Management
Operational Risk Management1	Periodic report	ORM3	Bank regularly prepares periodic report of operational risk
	Risk control	ORM4	The issue of operational risk control is taken to a great consideration at bank
	Independent control review	ORM5	Bank takes more consideration on operational risks occurring to its systems and procedures

Source: Altaf et al. (2021)

Note: ORM1, ORM2, ORMC2, ORMC3, ORA1, ORA4, ORI1 and ORI2 are rejected as it does not meet the threshold criteria at factor loading during the data analysis which is 0.5.

Study Area, Population

The study area selected for the study is Kathmandu Valley (see figure 1) which lies in Bagmati province of Nepal spread in a zone of 899 square kilometers, while the zone of the Valley overall is 665 square kilometers. The Kathmandu district is composed of flat plains at 1300 m above mean sea level surrounded by mountains ranging up to 2800 m tall (Wang et al., 2020). The target population is the group for whom information is sought. Thus, the population in research is classified as employees of Nepalese banking sectors in the Kathmandu valley.

Additionally, the researcher decided to focus on the Kathmandu Valley since it is the region that houses the headquarters of all commercial banks and is the capital city of Nepal. The Kathmandu Valley is the center of many enterprises and service operations since other parts of the country lack infrastructure development and services (Dhakal et al., 2023; Maharjan et al. 2022). Thus, this study on operational risk management in the banking industry has produced more accurate and reliable data.

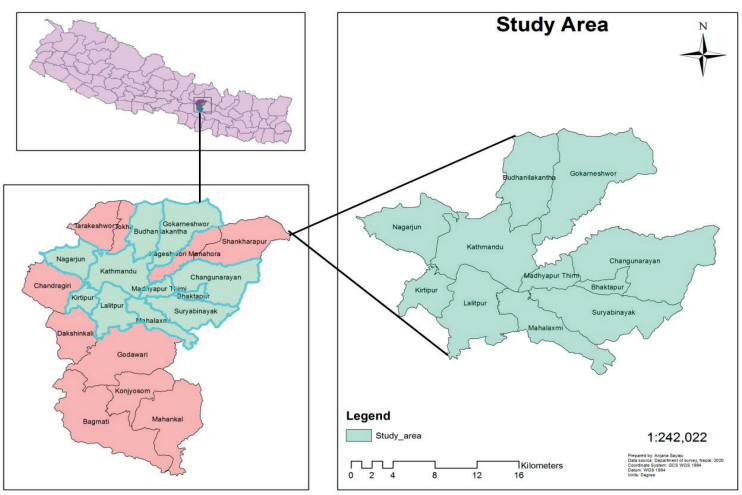

Figure 1: Study Area

Source: Authors'

Since the study's population is known since there are 20 commercial banks in Nepal and more than 7768 people are employed in Kathmandu valley, the researcher chose to employ probability sampling. Purposive sampling is also employed for data collecting, in which researchers choose participants for their surveys based on their own assessment (Khadayat et al., 2024 & Paudel et al., 2018). Moreover, Dhakal et al. (2023) mentioned that the procedure of selecting the number of sample observations

is known as sample size determination. The sample size was calculated by using n = N*X / (X + N – 1), Where, X = $Z\alpha/2^2$ *p*(1-p) / MOE2. $Z\alpha/^2$ is that the critical value of the traditional distribution at α/2 (e.g., for a confidence level of 95%, α is 0.05 and also the critical value is 1.96), MOE is the margin of error, p is that the sample proportion, and N is that the population size. A finite population correction has been applied to the sample size formula where, the researcher opted to add non-respondent error of 5%. The calculation yielded a final sample size of 271, but only 213 samples were considered valid due to missing information in the remaining samples. Therefore, this study chooses to opt for 213 samples for further analysis.The calculation yielded a final sample size of 271, but only 213 samples were considered valid due to missing information in the remaining samples. Therefore, this study chooses to opt for 213 samples for further analysis.

Research instruments and Data Analysis Technique

For the data collection, a structured questionnaire had been created and was set to KOBO Toolbox to conduct a survey on operational risk management in Kathmandu Valley. 5-point likert scale was adopted. The data was pre-tested among 13 respondents, and their comments were recorded, therefore essential revisions were made in accordance with it for the researchers' final data collection. Finally, the data collection is done using the KOBO tool box, primary data from questionnaire surveys have been acquired, and the researcher has connected questionnaires to suit the study's objectives. Likewise, data analysis is done through descriptive analysis and inferential analysis by using SPSS and AMOS. In descriptive analysis mean, median, and other style analysis were performed as well as inferential analysis, which includes structural equation modeling (SEM) based on a variety of latent components. Similarly, Microsoft Excel was used for data entry and research tallying.

SEM is used for inferential statistics in this study which is commonly used to explain numerous statistical associations at the same time; using visualization and model validation, and complicated models can be easily described using this method (Singh et al., 2022). In this study, Cornbrach's Alpha is used to measure the consistency between variables, convergent and discriminant validity was employed to ensure the validity of data. In addition, model fit indices were evaluated to validate the model in this study. However, SEM is also an extension of classic linear modeling techniques such as multiple regression analysis and Analysis of Variance (ANOVA). In a nutshell, it is a mix of factor analysis and multiple regression analyses performed concurrently (Dash & Paul, 2021). As a result, this study focuses multivariate analysis which is perfect to examine huge datasets and identifying cause-effect relationship between variables. CB-SEM was adopted as it explains the covariance between the observed variables by a thorough investigation of numerous covariance statistics, such as mean, standard

deviation, etc. by both graphical relationship and numerical result accordingly.

3. Results and Discussion

This section contains the socio-demographic characteristics of the 213 sample that was surveyed from different com-mercial banks. It indicates that out of 213 responders, majority are female (58.22%) who usually falls under 24-27 age group and holding master's degree as their highest academic qualification. It suggests that the majority of the workforce in the banking industry estate is female and young, with excellent educational credentials. Gorzeń-mitka (2015) revealed that women are more aware of the linkages between risk management and planning, whilst males are more aware of the ties between risk management and reporting. Moreover, it had been also revealed that majority of the banking employees possesses working experience of 1-3 years: minimal (1.89%) of respondents have 10- 11 years of experience and are operation manager (78.87%) which indicates that the bulk of the respondents in the banking industry of Nepal during the survey tenure were employees of operations department (see table 2).

Table 2: Variables

Variable	In Number	In Percentage
Sex		
Male	89	41.78%
Female	124	58.22%
Age		
20-23	32	15.02%
24-27	92	43.19%
28-31	35	16.43%
32-35	15	7.04%
36-39	14	6.57%
40-43	16	7.51%
44-47	5	2.34%
48-51	4	1.89%
Education Level		
Higher Secondary	5	2.35%
Bachelor's Level	94	44.13%
Master's and Above	110	51.64%
Experience		
Below 1year	3	1.4%
1year-3year	123	57.74%

4year-5year	57	26.76%
6year-7year	14	6.57%
8year-9year	6	2.82%
10year-11year	4	1.89%
12year-13year	6	2.82%

General Understanding on Operating risk management

The broad knowledge of operating risk management is discussed in this section. The outcome shows that nearly all banking personnel (98.59%) are aware of risk management, which is an indication of increased banking efficiency. According to research, banks offer training and development programs (88.26%), system updates and upgrades (82.16%), various meetings and follow-ups (72.77%), job rotation (43.19%), and other measures by (0.47%) to mitigate operational risk in the banking industry. Socially responsible and sustainable banks are those that take part in such activities(Sharma & Choubey, 2022). The findings showed that 67.41% of banks often take initiative regarding operating risk management.

Challenges and Solution in Adoption of operation risk management

The challenges to operating risk management adaptation are discussed in this section. The modal response to the question of whether they anticipate any challenges in adapting operating risk management practices. The findings revealed that 96.24% of organizations anticipate challenges, while 3.76 percent of total respondents on behalf of organizations do not believe there are any challenges in adapting operating risk management.

Table 3 : Major Challenges in Adoption of Operating Risk Management

Factor	No. of respondents	Percentage
System failure and environmental considerations	148	69.48
Complexity and difficulty in adoption of technology	145	68.08
Cost of implementing programs and software	125	58.69
Lack of Management support	108	50.7
Lack of Infrastructure	105	49.3
Creating complex working structure and working progress	95	44.6
Staff resistance and provoking risk management	60	28.17

Source: Field study

Table 3 shows the major challenges in adoption of operating risk management. The study revealed that operating risk management in banking sector is due to system failure and environmental considerations (69.84%), Complexity and difficulty in adoption of technology (68.08%), Cost of implementing programs and software (58.69%), Lack of Management support (50.7%), Lack of Infrastructure (49.3%), Creating complex working structure and working progress (44.6%), Staff resistance and provoking risk management (28.17%) are some challenges of adoption and implementing operating risk management in banking sector of Nepal. Moreover, respondents were also asked the question about from whom such challenges have arrived? In this aspect, respondents opined that governmental and organizational policies are majors aspects from where such challenges rises. Likewise, the challenges to operating risk management during adaptation are manageable (84.51%) where government policy (76.06%) and organizational policy (70.89%) plays an integral part. Figure 2 shows the strategies undertaken by banks for minimizing operating risk. The result indicates that risk reduction, risk acceptance, risk transference and risk avoidance are widely used strategies for mitigating operating risk by banks.

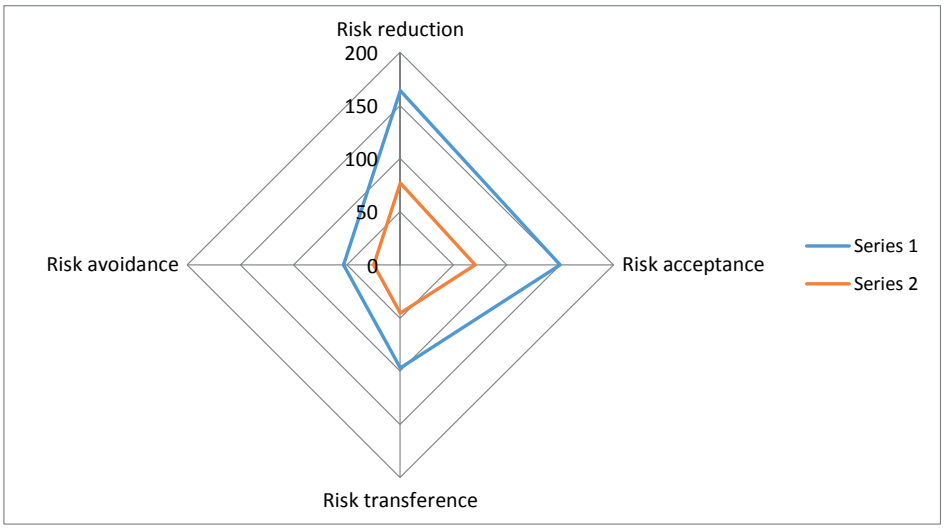

Figure 2: Strategies Undertaken by Banks **Source: Field Survey**

Inferential Analysis

In the context of researcher data analysis, this section includes descriptive statistics, Explanatory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), Measurement Model, Path Analysis, and Hypothesis Testing.

Descriptive Summary Statistics and Exploratory Factor Analysis

The data was summarized using the mean, standard deviation, skewness, and kurtosis. The mean and standard deviation of the collected data are 3.9812 to 4.2723 and

0.65095 to 0.75124, respectively, suggesting that the majority of the standard deviation values are low, indicating that the responses do not differ much from the mean data. Skewness is a component of a random variable's probability distribution that exposes its symmetry (Doanne & Seward, 2011). The data in this research exhibits a negative skewness, which means there is a longer tail on the left side of the distribution, spanning from -1 to +1. Kurtosis values range from -3 to +3, indicating that the data is typical and usually acceptable.

The purpose of exploratory factor analysis (EFA) is to find the least number of hypothesized constructs that may explain the observed covariation among a collection of variables (Iantovics et al., 2019). In EFA KMO and Bartlett's tests are performed. The result indicates that Kaiser Meyer Olkin (KMO) value is 0.801 which more than 0.6 (Ganiyu et al., 2020) and significant level for the Bartlett's test of sphericity is 0.000, which is less than 0.05, suggesting that there is no problem with data reliability and validity.

Communalities and Common Method Bias (CMB)

The extraction value of all variables (see Table 1) is more than 0.5, indicating that the entire variable meets the extractive collective requirement (Altaf et al., 2021). Similarly, for common method bias, Harman's single factor test is used to see if there is any common technique bias in the study. The result indicates that Extraction Sums of Squared Loadings is 41.665% which is less than 50% (Jakobsen & Jensen, 2015) implying that there is no issues of CMB in datasets.

Confirmatory Factor Analysis (CFA) and Measurement Model

CFA shows the fitness indicators CMN/DF, RMR, RMSEA, GFI, IFT, TLI, and CFI are used to assess if the model fit is acceptable or not. The model fit for this study is exceptional since all of the indicators meet the requirements of CMINDF (1.679<5), RMR (0.019<0.08), GFI (0.943>0.80), CFI (0.975>0.90), TLI (0.965>0.90), IFI (0.975>0.90), and RMSEA (0.057<0.08) which indicates that the model is fit and is acceptable.

Similarly, measuring model was examined in the study using reliability, convergent validity, and discriminant validity. For convergent validity following conditions should be meet:

i. Average variance explained (AVE) should be greater than 0.50.

ii. Construct reliability (CR) should be greater than 0.70.

iii. CR should be greater AVE.

Similarly, for discriminant validity following condition should be meet.

i. AVE should be greater than ASV and MSV.

ii. √AVE should be greater than r, (correlation).

Table 4 shows that all the conditions for both convergent validity and discriminant validity has been met. So, there is no issue of validity in the model. Moreover, table 5 shows the correlation among variable which indicates that variables are correlated with each other. Finally, construct reliability is shown by CR and has its value >0.708 which indicates that model is reliable.

Table 4: Reliability and Validity

Constructs	Indicators	Factor Loading	Cronbach's Alpha	CR	AVE	MSV
ORI	ORI3	.688	0.824	0.829	0.618	0.312
	ORI4	.777				
	ORI5	.777				
ORA	ORA2	.880	0.856	0.870	0.695	0.207
	ORA3	.876				
	ORA5	.660				
ORMC	ORMC1	.727	0.824	0.829	0.619	0.412
	ORMC4	.708				
	ORMC5	.792				
ORM	ORM3	.671	0.808	0.811	0.590	0.412
	ORM4	.822				
	ORM5	.713				

Table 5: Construct Correlation

ORI	ORA	ORM	ORMC	
ORI	0.786			
ORA	0.455	0.834		
ORM	0.559	0.297	0.768	
ORMC	0.527	0.234	0.642	0.787

Test of Hypothesis

In the table 6, all the hypotheses H1, H2 and H3 are accepted which implies that there is significant relationship between variables. During the inferential analysis of the study, SEM is used to analyze regression analysis, variable analysis, and the normalization pattern. It was tested by using both SPSS and AMOS software,. The various components were evaluated using latent variables vs. observable variables. The model's fit reveals that it is in outstanding condition. A significant link between

latent and observable variables is shown by a p value of less than 0.01. A p-value of less than 0.01 means that all of the hypotheses in this study are widely accepted, whereas a p-value more than 0.01 suggests that all of the hypotheses in this study are rejected. Figure 3 shows the path analysis between latent construct variables, observed variables and error terms.

Table 6: Test of Hypothesis

Hypothesis	Estimate	S.E	C.R.	P	Significant
H1: Operating risk identification → Operating risk management	.131	.027	4.942	***	Significant
H2: Operating risk assessment → Operating risk management	.061	.021	2.850	.004	Significant
H3: Operating risk monitoring and control → Operating risk management	.113	.022	5.111	***	Significant

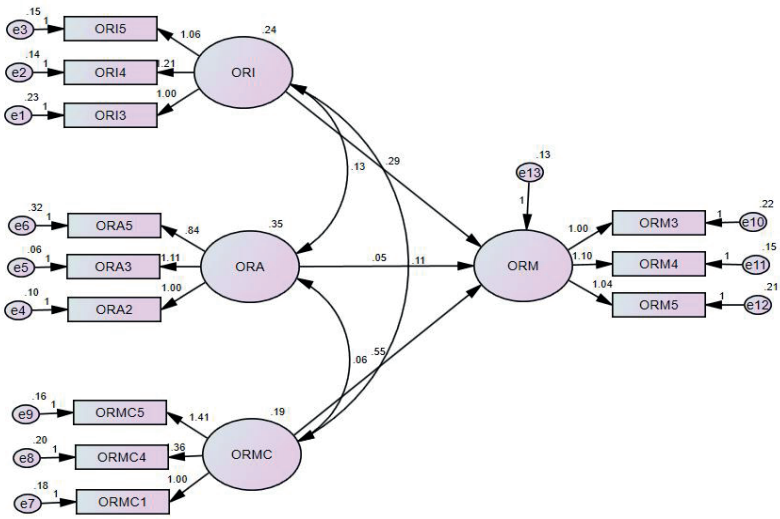

Figure 3: Structural Model Source: Authors'

Discussion

Hypothesis 1, operating risk identification has positive impact on operating risk management. Böcker and Kluppelberg (2005) on their study indicates that the only way to efficiently manage operational risk is to identify and minimize it, which necessitates the development of appropriate quantification tools. Because the determinants of operational risk are not well defined, identifying operational risk is a difficult task. Likewie, operating risk assessment (H2) also has positive impact on operating risk

management, demonstrate that, assessing operational risk is critical for attaining goals because it provides a foundation for deciding how operational risk should be handled. Hypothesis 3 indicates that operating risk monitoring and control has positive impact on Operating risk management. Control efforts, according to banks, must be included in all levels of the bank's functions.(Altaf et al., 2021). Dhakal et al. (2023) indicated that banks operate in a diverse society and economy, facing significant challenges due to the alarming context of non-performing assets. This diverse operational landscape necessitates that financial institutions adopt flexible and comprehensive banking practices to meet the varying needs of individuals and businesses.

The hypothesis' acceptance demonstrates that Nepalese banks are correctly detecting and prioritizing operational risk. Commercial banks have established methods for recognizing operational risk in their goods and operations, and they are effectively identifying external and internal occurrences.

4. Conclusions

Banking employees in the Kathmandu Valley are aware of operational risk management and suggest that its adoption by Nepalese commercial banks could lead to rapid performance growth. However, major challenges include system failures, environmental issues, difficulties in adopting technology, high costs of deploying programs and software, lack of management support, and inadequate infrastructure. To address these challenges, the banking industry should focus on risk tolerance, risk acceptance, risk transfer, and risk reduction. Additionally, commercial banks in the Kathmandu Valley should conduct sufficient workshops and training sessions while implementing improved policies related to operational risk management.

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Conflict of Interest

The authors declare no conflict of interest

Ethical approval

Ethical approval for the study has granted from Quest Research Management Cell,Quest International College. This paper is the part of MBA research.

Informed consent

Informed consent was granted with the respondents before proceed the survey with them.

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