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## **Identification of major operational risks in digital banking of public and private sector banks in Haryana**

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### **Abstract**

In the twenty-first century, everything becomes digitised. When the global epidemic of COVID-19 struck, almost everything was put under lockdown. As a result, banks have begun to employ technology by giving a full bank on our smartphones, transforming traditional banking into digital banking. The banking business has developed as a result of competition, lifestyle changes, and technological advancements. Banks are currently seeking to employ digitisation to give their clients with higher-quality services. Operational risk has a significant impact on how banks operate. As organisations grow in complexity and size, their operations become more risky. Poor operational performance prevents banks from achieving high profitability ratios. By selecting 10 banks (5 public and 5 private) to analyse the internal and external factors contributing to operational risk. The questionnaire had 20 items, and the Cronbach's alpha was 0.980, indicating great reliability. Factors and T tests, ANOVA were used to analyse various types of operational risks in the banking business. The findings of the study showed operational vulnerabilities in digital banking highlights concerns about cybersecurity, technological obsolescence, and procedural inadequacies.

**Keyword operational risk ,Digital banking, various types**

# Introduction

The concept of "digital banking" refers to financial transactions that are completed totally online without the use of paper reducing the amount of paperwork and allowing bank customers to access banking services and products online or through an electronic platform. To totally eliminate the need for consumers to visit a branch, digital banking means digitising all parts of banking operations and replacing the bank's physical location with a permanent online presence. Digital banking has revolutionised the way we use banks, allowing us to conduct transactions swiftly, simply, and easily. Significant changes in banking operations have been brought about by online banking, which has changed the manner that banking was previously performed. Digital banking entails the digitisation of conventional banking operations, procedures, and products in order to provide online customer service. Online banking has significantly altered banking operations and transformed the banking industry. The Basel Committee describes operational risk as the "risk of loss resulting from inadequate or failed internal process, people, and systems, or external events." This includes fraud, data system malfunctions, human mistake, personnel management problems, business disputes, mishaps, fires, and floods. Measurement of operational risk began in 1988. Operational risk began to rise as a result of financial institutions' and their operations' growing complexity. Organisations in the early stages of the financial industry did not pay much attention to operational risk. However, it has become more and more common in all financial institutions these days. The three components of operational risk are people, processes, and systems. The two main factors contributing to the increasing importance of operational risk management are increased automation and an expansion of global financial linkages. To lower operational risk, internal control systems must be strengthened. To cover unanticipated losses, capital must be set aside. Operational risks can be broadly split up into the following four groups: Risks associated with information technology include system failure, online viruses and poor communication; Human Resources Risk: Incompetent Staff, overburden of work; Risk associated with asset loss and business interruption. Damage could result from earthquake, fire, flood, or the natural disasters, relationship risk, and regulatory requirements, claims, consumer satisfaction, legal actions etc. Inadequate management of bank operations which presents almost every financial activity and transaction, may significantly raise the possibility that certain risk may go unnoticed and unmanaged.

## Review of literature

**Do et al. (2022)** explored how regional banks deal with natural calamities. Data was obtained from 907 regional financial institutions and the US Spatial Hazard Events and Losses Database between 2010 and 2019. A baseline model using the Z-score was utilised to analyse the correlation between natural disasters and banks' distance-to-default. Natural catastrophes can negatively impact bank stability by increasing capital and deposit volatility, leading to higher lending margins and loan loss provisions.

**Saputra, et al. (2022)** estimated the greatest potential losses and transaction risk

for digital banking on the basis of extreme value at risk method. This study used extreme value theory, extreme value-at-risk, peak-over-threshold, threshold percentage, extreme entropy bootstrapping, and the generalised Pareto distribution as techniques. Furthermore, to manage the data, this study uses a variety of software programs, including Excel and R. To reduce the danger of digital banking, it's important to consider the maximum probable loss. To protect against future losses, banks must have cash reserves.

**Samreti and kumar (2021)** examined the present status of e-banking in India .The objective of the study was found the current status of financial innovations and opportunities and challenges in E-Banking. Data collected from secondary resources found that Digital banking become preferred mode of banking in India and Online or mobile banking growing rapidly.

**Diener and spacek (2021)** Examined management's views on hurdles to digital transformation in banks. A qualitative exploratory research design was used in this study. Data was collected from interviews with 34 bank managers. The study identified four key impediments to the bank's digital transformation: employee knowledge of clients, product market involvement approaches, leadership technology, and standards. Banks can promote digitalisation by developing internal strategies and collaborating with other financial institutions.

**Oye (2020)** explored how operational risk management affects commercial bank financial performance in Nigeria. The study used quota sampling to choose 20 licensed commercial banks in Nigeria and discovered that risk taking is an unavoidable part of banking, thus bank management must strike a balance in order to maximise earnings. Inadequate operational risk management can

cause irregular financial performance. This study revealed that frequent scheduled training is essential to manage operational risk.

**Padmaja (2017)** This study examined the attitudes of public sector bank staff towards using electronic banking services. The research design used in this study was both descriptive and analytical. Data was collected from 205 workers of a public sector bank. The Wallis Kruskal test was used to evaluate the data. The study found that employees were dissatisfied with the introduction of digital banking. To stay up-to-date with cutting-edge technologies, bankers should provide adequate training and awareness campaigns for their staff. Additionally, development and training activities should be implemented to assure knowledge of global technology.

### **Objectives of the study**

The paper aim to study the various types of operational risk in banking sector of Haryana state.

### **Methodology**

In this study target sample size was 420 from employees of five private and five public sector banks of Haryana state. Stratified sampling method was used in this study. The study's questionnaire was intended to align with its aims. This study utilises a five-point likert scale.

Correlation, regression and Hypothesis testing will be done with the help of ANOVA, Cross Tab with the help of SPSS. The Reliability was checked with the help of Cron bac Alpha.

**Table 1: Bank-wise detail major operational risk**

		Bank_Name										Total
		SBI	Bank of Baroda	Canara Bank	Union Bank	PNB	HDFC	ICICI	Kotak Mahindra	Axis Bank	IndusInd Bank	
Data_Entry_and_Accounting_Errors	Strongly Disagree	0	1	8	3	5	3	1	3	0	1	25
	Disagree	19	0	10	3	6	0	2	6	19	0	65
	Neutral	2	7	5	7	2	5	8	7	0	9	52
	Agree	16	24	10	21	24	24	24	13	17	23	196
	Strongly Agree	5	10	9	8	5	10	7	13	6	9	82
Total		42	42	42	42	42	42	42	42	42	42	420
Poor_Communication_Systems	Strongly Disagree	0	0	2	1	5	2	0	1	0	0	11
	Disagree	16	3	12	9	5	3	4	4	16	4	76
	Neutral	17	8	9	6	5	4	8	8	15	10	90
	Agree	3	20	7	15	11	10	12	17	5	18	118
	Strongly Agree	6	11	12	11	16	23	18	12	6	10	125
Total		42	42	42	42	42	42	42	42	42	42	420
Cyber_Threats	Strongly Disagree	0	0	2	6	4	0	2	1	0	0	15
	Disagree	17	0	15	7	7	3	3	4	17	0	73
	Neutral	18	13	7	5	3	4	5	6	15	17	93
	Agree	5	19	7	8	9	5	5	18	8	17	101
	Strongly Agree	2	10	11	16	19	30	27	13	2	8	138
Total		42	42	42	42	42	42	42	42	42	42	420
Outdated_Systems	Strongly Disagree	0	2	7	2	6	2	3	2	0	2	26
	Disagree	29	0	10	8	5	1	1	3	29	0	86
	Neutral	4	6	6	7	1	3	5	6	2	8	48
	Agree	4	21	11	13	12	14	10	17	7	19	128
	Strongly Agree	5	13	8	12	18	22	23	14	4	13	132
Total		42	42	42	42	42	42	42	42	42	42	420
Breach_of_Confidentiality	Strongly Disagree	0	0	10	3	9	2	3	4	0	0	31
	Disagree	15	0	10	9	4	2	2	5	15	0	62
	Neutral	20	13	4	4	0	3	7	10	18	15	94
	Agree	5	18	8	15	14	17	14	17	6	18	132
	Strongly Agree	2	11	10	11	15	18	16	6	3	9	101
Total		42	42	42	42	42	42	42	42	42	42	420
Poor_Client_Record_Maintenance	Strongly Disagree	1	0	19	0	0	0	1	1	2	0	24
	Disagree	30	1	20	4	1	0	0	5	29	2	92
	Neutral	8	11	0	36	12	0	3	7	6	14	97

	Agree	2	25	2	2	27	16	0	12	2	25	113
	Strongly Agree	1	5	1	0	2	26	38	17	3	1	94
Total		42	42	42	42	42	42	42	42	42	42	420
Low_Staff_Motivation	Strongly Disagree	0	0	4	0	0	0	1	0	0	0	5
	Disagree	19	0	23	10	3	1	1	2	18	2	79
	Neutral	17	17	9	7	4	4	3	7	15	19	102
	Agree	4	15	3	22	19	21	3	20	7	14	128
	Strongly Agree	2	10	3	3	16	16	34	13	2	7	106
Total		42	42	42	42	42	42	42	42	42	42	420
Unfulfilled_Contractual_Obligations	Strongly Disagree	0	0	10	0	0	0	0	0	0	0	10
	Disagree	27	2	20	7	1	0	1	6	28	2	94
	Neutral	7	12	5	21	4	0	3	6	5	14	77
	Agree	4	20	6	12	19	15	12	14	4	20	126
	Strongly Agree	4	8	1	2	18	27	26	16	5	6	113
Total		42	42	42	42	42	42	42	42	42	42	420
Non_Compliance_with_Security_Standards	Strongly Disagree	1	0	13	4	0	0	2	1	2	0	23
	Disagree	19	5	18	7	4	0	0	5	18	6	82
	Neutral	7	16	6	10	7	3	3	7	6	17	82
	Agree	12	12	2	19	19	24	12	11	12	13	136
	Strongly Agree	3	9	3	2	12	15	25	18	4	6	97
Total		42	42	42	42	42	42	42	42	42	42	420
Internal_Fraud	Strongly Disagree	0	4	13	0	0	0	0	2	0	4	23
	Disagree	13	1	18	10	1	0	0	4	13	1	61
	Neutral	21	13	5	18	4	0	1	4	18	17	101
	Agree	5	14	5	7	26	22	13	18	6	13	129
	Strongly Agree	3	10	1	7	11	20	28	14	5	7	106
Total		42	42	42	42	42	42	42	42	42	42	420
Lacking_Disaster_Recovery_Plan	Strongly Disagree	0	0	2	1	1	0	0	4	0	0	8
	Disagree	16	2	10	3	3	0	1	7	16	2	60
	Neutral	11	15	3	9	3	8	7	8	11	15	90
	Agree	9	17	16	13	22	16	5	12	9	17	136
	Strongly Agree	6	8	11	16	13	18	29	11	6	8	126
Total		42	42	42	42	42	42	42	42	42	42	420
Market_Conditions	Strongly Disagree	0	0	6	0	0	0	0	2	0	0	8
	Disagree	17	0	6	4	1	3	1	9	17	0	58
	Neutral	15	17	5	10	6	4	7	6	14	17	101
	Agree	7	22	17	23	21	20	19	10	5	23	167

	Strongly Agree	3	3	8	5	14	15	15	15	6	2	86
Total		42	42	42	42	42	42	42	42	42	42	420
Lack_of_Standardized_Procedures	Strongly Disagree	0	0	2	0	0	1	0	3	0	0	6
	Disagree	14	1	7	3	2	1	1	7	14	1	51
	Neutral	16	18	7	8	7	4	6	9	15	20	110
	Agree	7	15	16	9	15	16	12	15	9	14	128
	Strongly Agree	5	8	10	22	18	20	23	8	4	7	125
Total		42	42	42	42	42	42	42	42	42	42	420
Client_Knowledge_Deficiency	Strongly Disagree	1	0	5	0	0	1	0	0	1	0	8
	Disagree	18	1	3	4	0	1	1	7	18	1	54
	Neutral	15	14	7	9	7	1	6	12	14	14	99
	Agree	7	17	16	18	14	16	16	12	7	19	142
	Strongly Agree	1	10	11	11	21	23	19	11	2	8	117
Total		42	42	42	42	42	42	42	42	42	42	420
Insecure_E_Transmission	Strongly Disagree	0	0	3	1	0	1	0	2	0	0	7
	Disagree	17	0	9	5	2	1	0	6	17	0	57
	Neutral	8	15	4	7	2	0	8	7	7	17	75
	Agree	15	20	16	16	27	20	12	15	14	21	176
	Strongly Agree	2	7	10	13	11	20	22	12	4	4	105
Total		42	42	42	42	42	42	42	42	42	42	420
External_Fraud	Strongly Disagree	0	0	9	1	1	0	1	2	0	0	14
	Disagree	20	1	13	3	2	4	1	6	21	1	72
	Neutral	11	13	2	12	5	1	3	12	10	13	82
	Agree	11	15	8	14	19	18	14	13	11	16	139
	Strongly Agree	0	13	10	12	15	19	23	9	0	12	113
Total		42	42	42	42	42	42	42	42	42	42	420
Tech_Adaptation_Challenges	Strongly Disagree	2	0	5	3	0	1	0	4	3	0	18
	Disagree	21	2	14	5	1	2	1	5	21	1	73
	Neutral	10	12	5	7	4	3	4	8	7	15	75
	Agree	8	18	11	10	20	14	19	14	9	16	139
	Strongly Agree	1	10	7	17	17	22	18	11	2	10	115
Total		42	42	42	42	42	42	42	42	42	42	420
Modelling_Risk	Strongly Disagree	0	0	9	3	0	1	0	0	0	0	13
	Disagree	14	1	12	2	1	2	1	10	15	1	59
	Neutral	16	11	4	8	6	4	3	7	15	11	85
	Agree	9	21	9	9	21	17	18	15	9	22	150
	Strongly Agree	3	9	8	20	14	18	20	10	3	8	113

Total		42	42	42	42	42	42	42	42	42	42	420
Political_and_Social_Risks	Strongly Disagree	0	0	6	3	1	0	1	3	1	0	15
	Disagree	17	1	16	5	0	3	0	6	17	0	65
	Neutral	10	14	2	6	1	1	5	3	7	17	66
	Agree	14	21	8	14	23	15	15	19	15	20	164
	Strongly Agree	1	6	10	14	17	23	21	11	2	5	110
Total		42	42	42	42	42	42	42	42	42	42	420
System_Incompatibility	Strongly Disagree	1	0	9	2	1	1	1	4	2	0	21
	Disagree	17	1	11	5	0	3	0	5	17	1	60
	Neutral	13	20	4	7	2	2	5	6	11	20	90
	Agree	11	15	9	16	20	14	16	14	12	16	143
	Strongly Agree	0	6	9	12	19	22	20	13	0	5	106
Total		42	42	42	42	42	42	42	42	42	42	420

**Table2: Group Statistics**

	Type_of_Bank	N	Mean	Std. Deviation	Std. Error Mean
Major_Operational_Risk	Public Bank	210	3.4500	.77495	.05348
	Private Bank	210	3.7905	.72169	.04980

The group statistics in Table 2 highlight a discernible disparity in the perception of major operational risks between Public and Private Banks, with Private Banks exhibiting a higher mean score (3.7905) compared to Public Banks (3.4500), alongside relatively low standard deviations (.77495 for Public and .72169 for Private), indicating a moderately concentrated consensus within each group and suggesting that Private Banks may perceive or experience heightened operational risk levels within the digital banking landscape.



Table3: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Major_Operational_Risk	Equal variances assumed	1.601	.206	-4.659	418	.000	-.34048	.07308	-.48412	-.19684
	Equal variances not assumed			-4.659	415.899	.000	-.34048	.07308	-.48412	-.19683

The independent samples t-test results in Table 3 reveal a statistically significant difference in the perception of major operational risks between Public and Private Banks ( $t = -4.659$ ,  $df = 418$ ,  $p < .001$ ), with a mean difference of  $-.34048$ , indicating that Private Banks perceive or encounter significantly higher operational risks than Public Banks; Levene's Test for Equality of Variances ( $F = 1.601$ ,  $p = .206$ ) confirms homogeneity of variances, thereby validating the robustness of these findings across the banking sectors

Table4: Independent Samples Effect Sizes

		Standardizer <sup>a</sup>	Point Estimate	95% Confidence Interval	
				Lower	Upper
Major_Operational_Risk	Cohen's d	.74880	-.455	-.648	-.261
	Hedges' correction	.75014	-.454	-.647	-.260
	Glass's delta	.72169	-.472	-.668	-.275

a. The denominator used in estimating the effect sizes.  
 Cohen's d uses the pooled standard deviation.  
 Hedges' correction uses the pooled standard deviation, plus a correction factor.  
 Glass's delta uses the sample standard deviation of the control group.

The effect sizes in Table 4 underscore a substantial difference in perceived major operational risks between Public and Private Banks, with Cohen's d at  $.74880$  (95% CI:  $-.648$  to  $-.261$ ), Hedges' correction at  $.75014$ , and Glass's delta at  $.72169$ , all indicating a medium-to-large effect size, thus confirming that Private Banks experience a notably elevated level of operational risk compared to Public Banks, with each measure validating the robustness and practical significance of this differential within the digital banking domain.

Table 5.ANOVA

Major_Operational_Risk					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	113.955	9	12.662	39.154	.000
Within Groups	132.588	410	.323		
Total	246.543	419			

The ANOVA results in Table 5 reveal a highly significant variation in major operational risk perceptions across different groups ( $F = 39.154$ ,  $df = 9$ ,  $p < .001$ ), with a substantial proportion of variance attributed to between-group differences (Sum of Squares = 113.955), indicating that operational risk perceptions differ markedly across the groups analyzed, thereby highlighting meaningful heterogeneity that warrants further exploration of specific factors contributing to these intergroup disparities within the digital banking environment.

Table 6: Major\_Operational\_Risk Tukey HSD

Bank_Name	N	Subset for alpha = 0.05		
		1	2	3
SBI	42	2.8583		
Axis Bank	42	2.8988		
Canara Bank	42	2.9381		
Union Bank	42		3.6250	
Kotak Mahindra	42		3.7143	
IndusInd Bank	42		3.7321	
Bank of Baroda	42		3.8179	
PNB	42		4.0107	4.0107
HDFC	42			4.2952
ICICI	42			4.3119
Sig.		1.000	.062	.312
Means for groups in homogeneous subsets are displayed.				
a. Uses Harmonic Mean Sample Size = 42.000.				

Table 6 Tukey HSD analysis delineates statistically distinct stratifications in major operational risk means across banks, with SBI, Axis Bank, and Canara Bank forming a homogeneous low-risk subset, while high-risk strata emerge with HDFC and ICICI, suggesting heterogeneous operational risk profiles among banks, thereby reflecting significant inter-bank divergence in vulnerability, and with p-values nearing insignificance within certain strata (e.g.,  $p = 0.062$ ), this implicates nuanced disparities in operational resilience between institutions.

## **Conclusion**

The study shows that operational vulnerabilities in digital banking highlights concerns about cybersecurity, technological obsolescence, and procedural inadequacies. Public and private banking institutions differ in their approach to client-centric inefficiencies and infrastructural incongruities, which contribute to systemic weakness. The analysis of operational vulnerabilities in banking institutions reveals a complex interplay of asymmetric susceptibilities, including systemic deficiencies, technological obsolescence, cybersecurity threats, and adaptive inertia. Institutional resilience is shaped by organisational frameworks, regulatory landscapes, and dynamic demands. In the Final form the research underlines outdated staff structures, cybersecurity lapses, and procedural shortcomings, with public banks demonstrating heightened concerns about traditional inefficiencies like poor employee supervision and key staff dependence, while private banks exhibit amplified apprehensions about advanced technological risks, intentional system disruptions, and IT system mis-implementation, thereby delineating a complex and asymmetric risk landscape shaped by organisational dynamics.

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