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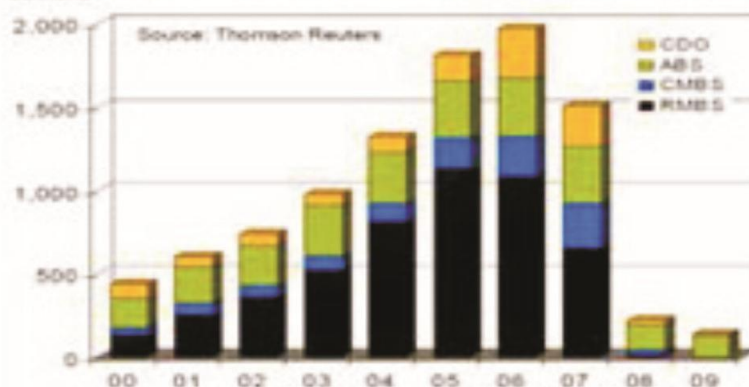
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THE EFFECT OF COVID-19 ON REVENUE DIVERSIFICATION, PROFITABILITY AND RISK OF BANKS IN ZAMBIA

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ABSTRACT

The aim of this study was to evaluate the effect of the COVID-19 pandemic on revenue diversification and performance of banks in Zambia. The study was quantitative in design. Herfindahl Hirschmann Index measures for each bank to account for diversification between interest and non-interest activities were constructed, while the Risk Adjusted Return on Average Assets to measure bank profitability and the Z-Score to measure bank income volatility were computed. SPSS's One-way repeated measures ANOVA was then used to analyse panel data from 16 of the 18 commercial banks in the country.

The study concluded that there was no statistically significant difference in bank revenue diversification following the outbreak of COVID-19 in Zambia. With respect to bank performance, the study found that there was a statistically significant increase in bank profitability as measured by RAROAA in the aftermath of the pandemic. Similarly, the study found that there was a statistically significant increase in bank income volatility following the COVID-19 pandemic.

Although bank profitability increased in the pandemic era, income volatility also increased thereby, exposing banks in the country to insolvency risk. The policy implication is that the Bank of Zambia should encourage banks to diversify their non-interest income sources to enhance their capacity to withstand major disruptions caused by natural and man-made disasters.

KEYWORDS: *Bank revenue diversification, COVID-19, Income volatility, Risk adjusted return on assets, Zambia.*

1. INTRODUCTION

The aim of this study was to evaluate the effect of the COVID-19 pandemic on revenue diversification and performance of banks in Zambia.The research question that guided this study was: *To what extent has the COVID-19 pandemic affected revenue diversification and performance of banks in Zambia?*

This study is important because it establishes the extent to which the COVID-19 pandemic affected revenue diversification and performance of banks in Zambia. Prior to the pandemic, Kayombo (2021) established that although non-interest income diversification improves profitability and reduces income volatility of banks in Zambia, these institutions had continued to divest their non-interest income activities over the previous decade. Therefore, if the COVID-19 pandemic significantly impacted bank revenue diversification, then banks' performance could be adversely affected. Findings from the study should be useful to bank regulators and managers as they plan for future COVID-19 outbreaks and similar pandemics.

To answer the research question above, the specific research objectives that we sought to addresswere:

RO1: Establish the effect of COVID-19 pandemic on bank non-interest income diversification in Zambia.

RO2: Evaluate the effect of the COVID-19 pandemic on profitability of banks in Zambia.

RO3: Assess the effect of the COVID-19 pandemic on income volatility of banks in Zambia.

To address these research objectives, we constructed Herfindahl Hirschmann Index (HHI) measures for each bank to account for diversification between interest and non-interest activities. With respect to bank performance, we used the Risk Adjusted Return on Average Assets (RAROAA) to measure bank profitability and the Z-Score to measure bank income volatility. We then used one-way repeated measures ANOVAin SPSS to analyse panel data for 2018, 2019, 2020 and 2021 from 16 of the 18 commercial banks in the country.

Based on our findings, we conclude that there was no statistically significant difference in bank revenue diversification following the COVID-19 pandemic in Zambia.In other words, banks in the country did not significantly diversify their income sources in response to the COVID-19 pandemic.With respect to bank performance, our study found that there was a statistically significant increase in bank profitability as measured by RAROAA in the aftermath of the pandemic.Similarly, our study found that there was a statistically significant increase in bank income volatility following the COVID-19 pandemic.

The remainder of the paper is organised as follows. Section 2 provides a brief review of the prior literature, while the methodology and dataset are described in Section 3. Empirical results are presented in Section 4, and Section 5 offers concluding remarks.

2. LITERATURE SURVEY

The COVID-19 pandemic has caused serious disruption in business operations world over and across all sectors. Being central in all economic activities, the banking sector has not been spared by the effects of the pandemic. This section provides a review of the literature regarding the

effect of the COVID-19 pandemic on bank revenue diversification, profitability, and income volatility.

2.1 COVID-19 PANDEMIC AND BANK REVENUE DIVERSIFICATION

Over the years, banks have gradually increased their product portfolio by diversifying into non-traditional banking services such as insurance,commissions, fees, and foreign exchange transactions. The positive correlation between bank non-interest income diversification and profitability is well established in the banking literature,be it in developed countries (Johnson and Meinster, 1974; DeYoung and Rice, 2004), emerging economies (Sanya and Wolfe, 2011; Meslier, Tacneng and Tarazi, 2014) and developing countries (Senyo, Olivia and Musah, 2015; Ammar and Boughrara, 2019; Kayombo, 2021; Addai, Tang and Agyeman, 2022).

Prior to the pandemic, there was evidence of reduced revenue diversification by banks in Zambia (Kayombo, 2021). However, in the post-pandemic era, there is no evidence of research carried out to establish the extent to which banks diversified their revenue sources in the country.

Although some researchers have suggested that banks that were functionally diversified (reliance on non-interest income) prior to/and or around the outbreak of COVID-19 withstood the negative effects of the pandemic better than their specialised peers (Ochenge, 2022; Simoens and Vennet, 2022; Taylor, 2022), only a handful of studies have been carried out to determine the extent to which banks diversified their non-interest income sources in direct response the pandemic (Kozak, 2021; Li *et al.*, 2021; Le *et al.*, 2022). These studies have concluded that non-interest income diversification cushions banks from the negative effects of the pandemic.

2.2 COVID-19 PANDEMIC AND BANK PROFITABILITY

Studies on the effect of COVID-19 on banks' profitability have revealed different results. Many studies have concluded that the COVID-19 pandemic enhanced banks' profitability by forcing them to diversify their revenue sources (Li *et al.*, 2021; Kozak and Wierzbowska, 2022; Le *et al.*, 2022), thereby increasing income streams.

The second strand of the literature contends that the COVID-19 pandemic had a negative impact on profitability (Elnahass, Trinh and Li, 2021; Katusiime, 2021; Tarawneh *et al.*, 2021; Xie *et al.*, 2021; Taylor, 2022). This could be attributed to continuous lockdowns, restrictions in movement of people, reduced/halted production, sagging demand for goods and services, and barriers in international trade, all of which resulted in reduced economic activity (Gazi *et al.*, 2022).

Thirdly, other researchers concluded that the effect of the pandemic on bank profitability depended on various factors such as size of the bank (Kozak, 2021; Xie *et al.*, 2021; Gazi *et al.*, 2022). In this regard, larger banks were more profitable than smaller ones. Other factors that affected banks' profitability included non-performing loan rates, the amount of liquid assets, the proportion of hedging capital (Katusiime, 2021; Gazi *et al.*, 2022), size of a country's GDP (Xie *et al.*, 2021), and the level of IT spending (Dadoukis, Fiaschetti and Fusi, 2021). In the case of Ugandan banks, Katusiime (2021) found that bank profitability was to a large extent negatively and significantly affected by non-performing loans, market sensitivity risk, and liquidity, while the Treasury Bill interest rate and lending rates had a significant positive effect on bank profitability in the short run.

2.3 COVID-19 PANDEMIC AND BANK INCOME VOLATILITY

Although some studies have been carried out to establish the effect of COVID-19 pandemic on stability of the banking sector in general, there is a dearth of literatureon the impact of the pandemic on bank income volatility, an important measure of bank performance. Elnahass, Trinh and Li (2021), for example, found that the pandemic had detrimental impacts on financial stability in terms of default risk, liquidity risk and asset risk. Other studies have reached similar conclusions (Dadoukis, Fiaschetti and Fusi, 2021; Demirgüç-Kunt, Pedraza and Ruiz-Ortega, 2021; Kozak, 2021).

With respect to bank income volatility in the pandemic era, only one study by Tran *et al.* (2022) seems to have addressed this topic. The study revealed that the pandemic increased bank income volatility. Various interventions applied to address the effect of the pandemic on human life had a negative impact on the bank's performance causing increased earnings volatility. The specific factors includereduced loan growth and asset quality, and lower earnings ratio.

3. DATA AND METHODOLOGY

We provide a description of the data and data sources used in the study in this section. We also define the measures we adopted to measure bank revenue diversification, profitability and risk. Lastly, we describe the empirical model used.

3.1 DATA AND SOURCES

We collected data for this study from the country's central bank, the Bank of Zambia (BoZ). The data comprised bank level financial statements and extracts from individual banks' prudential returns.These data were adequate for us to compute bank revenue diversification, profitability, and income volatility.

The BoZ provided anonymized data for all the 18 banks in the country. However, we analysed data for 16 banks as two of the banks did not have data for all the years covered by the study. The 16 banks accounted for 98% of total bank net income and 98.6% of total bank average assets, hencewe considered the samplelarge enough to represent characteristics of the sector.

3.2 DIVERSIFICATION MEASURES

As is customary in many similar studies, we constructed Herfindahl Hirschmann Index (HHI) measures for each bank to account for diversification between interest and non-interest activities (Stiroh, 2006; Mercieca, Schaeck and Wolfe, 2007; Sanya and Wolfe, 2011; Meslier, Tacneng and Tarazi, 2014). In general, the higher the HHI is, the lower the level of diversification, and vice versa. We then used the formula belowto calculate the revenue HHI (HHI_{REV}) for each bank:

$$HHI_{REV} = (NON/TOP)^2 + (NET/TOP)^{2,}$$

in which case NON, TOP and NET respectively represent non-interest income, total operating revenue, and net interest income.

3.3 RISK-ADJUSTED PERFORMANCE MEASURES

With respect to assessing the effect of COVID-19 on bank performance, we used the Risk Adjusted Return On Average Assets (RAROAA) to measure bank profitability and the Z-Scoreto measure income volatility as recommended in the literature (Chiorazzo, Milani and Salvini,

2008; Paltrinieri *et al.*, 2020). Stiroh (2006) defines RAROAA as "average profits divided by the standard deviation of profits", which implies profits per unit of risk. Accordingly,we calculated the RAROAA by dividing the return on average assets (ROAA) by its standard deviation.

With respect to risk, our study focused on income volatility as a measure of bank risk. We therefore, used the Z-Score to determine earnings volatility. Having been proposed by Altman in 1968 (Altman, 1968),the Z-Score has been used by many researchersto assess bank income volatility (Stiroh, 2006; Mercieca, Schaeck and Wolfe, 2007; Paltrinieri *et al.*, 2020). Measured by the number of standard deviations a bank is from insolvency, Stiroh (2006) posits that the Z-Score is a substitute for insolvency risk.

We considered the Z-Score to be reliable for measuring bank risk because its computation integrates profitability (mean level of bank profits) and equity (mean equity ratio) characteristics. The accuracy of the Z-Score is also very high in predicting bankrupty at between 80 – 90% (Altman, 2000).

In line with previous studies, we used the following formula to calculate the Z-Score for each bank (Stiroh, 2006; Mercieca, Schaeck and Wolfe, 2007; Paltrinieri *et al.*, 2020):

$$Z\text{-Score} = \frac{ROAA + capitalisation}{SDROAA}$$

wherein ROAA stands for Return On Average Assets, while SDROAA is its standard deviation. Capitalization represents the equity to assets ratio (or capital ratio). Empirically, the higher the Z-Score the greater the bank's stability, with a Z-Score of 1.81 being considered the minimum safe level (Altman, 2000). We have outlined the variable definitions we used in the study in Table 1 below.

TABLE 1 VARIABLE DEFINITIONS

Variable	Proxy	Definition
Panel A: Dependent Variables		
RAROAA	Risk adjusted return on average assets	Return on average assets divided by the standard deviation of return on average assets.
Z-Score	Z-Score	The Z-Score is a substitute for insolvency risk, measured by the number of standard deviations a bank is from insolvency.
Panel B: Diversification Variables		
HHI$_{REV}$	Herfindahl Hirschmann Index	Measures degree of diversification between interest and non-interest income.
NON	Non-interest income	Income generated from non-bank lending activities.
TOP	Total operating revenue	Non-interest income plus net interest income.
NET	Net interest income	Total interest income minus total interest expense.
Panel C: Bank-specific variables		
NIR	Non-interest income ratio	Non-interest income divided by total income.

Adapted from (Ammar and Boughrara, 2019)

3.4 DATA ANALYSIS

After computing the variables namely HHI, RAROAA and Z-Score for the sample data, we used One-way repeated measures ANOVA to test for any differences in means among individual banks'revenue diversification and performance during the period around the outbreak of COVID-19 (i.e., the year just before, during and after the outbreak) that we could attribute to the COVID-19 pandemic. According to Denis (2019), such a design, in which "subjects are measured repeatedly across conditions or time, are known as within-subjects designs or repeated measures". Accordingly, we analysed the data on each of the three variables namely, revenue diversification, profitability and income volatility using SPSS' General Linear Model Repeated Measures function.

Although there were three dependent variables, we did not find the Multivariate Analysis of Variance (MANOVA)technique suitable because our dependent variables were not related (Pallant, 2020). We therefore, carried out separate ANOVA tests on each variable. To overcome the increase in Type I error that arises when several One-way repeated ANOVA tests are carried out, we incorporated a Bonferroni adjustment in each test.

The null hypothesis (H_0) is that the population means are equalthroughout the period in respect of each of the dependent variables, implying that the intervention i.e., COVID-19 pandemic, did not affect the dependent variables. Accordingly, we designed threesets of hypotheses as shown below:

    (i)   Revenue diversification as measured by the HHI

$H_0: \mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

$H_1: \mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

    (ii)   Profitability based on RAROAA

$H_0: \mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

$H_1: \mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

    (iii)   Income volatility measured by Z-Score

$H_0: \mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

$H_1: \mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

where μ = population mean in terms of revenue diversification, profitability, and income volatility respectively in the two years prior to the outbreak of COVID-19 in the country (i.e., 2018 and 2019), and thereafter (i.e., 2020 and 2021).

The alternative hypothesis (H_1) is that the related population means are not equal (i.e., at least one mean is different to another mean). The implication is that if we reject the null hypothesis, then we can assume that COVID-19influenced banks' revenue diversification, profitability, and income volatility, respectively.

4. EMPIRICAL RESULTS

4.1 MODEL ASSUMPTIONS

Pallant (2020) outlines assumptions that apply to parametric tests in general. These include dependent variables measured on a continuous scale, use of random sampling, independence of observations, and normally distributed populations from which samples are drawn. For the results of repeated measures ANOVA to be valid, the five specific assumptions that must be metare dependent variables measured on a continuous scale, approximately normally distributed dependent variables, sphericity, no significant outliers and that the independent variable should consist of at least two categorical 'related groups' or 'matched pairs'(Lund Research Ltd, 2018).

The dependent variables in our study i.e., HHI, RAROAA and Z-Scores are all continuous variables, while the independent variable consisted of three categories of data covering the pre and post COVID-19 pandemic era. We have discussed the rest of the assumptions under the relevant section below.

4.2 EXTENT OF BANK REVENUE DIVERSIFICATION IN ZAMBIA

The hypothesis we tested here was in relation to whether the COVID-19 pandemic had a statistically significant effect on bank revenue diversification in Zambia i.e.:

$H_0: \mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

$H_1: \mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

We tested the data for normality using the "Analyse Descriptive Statistics Explore" function in SPSS. As shown in Table 2 below, results of the Kolmogorov-Smirnov statistic, which assesses the normality of the distribution of scores, gives non-significant scores (sig. value of more than .05), indicating normality (Pallant, 2020).

Additionally, there is no evidence of outliers as there areminimal differences between the means (2018: 54.75; 2019: 57.88; 2020: 57.81; 2022: 58.88) and the 5% trimmed means (2018: 24.28; 2019: 57.69; 2020: 57.46; 2022: 58.75) respectively.

TABLE 2: HHI TESTS OF NORMALITY

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
2018 HHI (measured in %)	.193	16	.113	.841	16	.010
2019 HHI (measured in %)	.178	16	.185	.909	16	.112
2020 HHI (measured in %)	.208	16	.063	.864	16	.022
2021 HHI (measured in %)	.133	16	.200[*]	.949	16	.480
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Our One-way repeated measures ANOVA as shown in Table 3 below indicates that all four multivariate tests (i.e., Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root) have a *p*-value greater than 0.05 (i.e., sig. of 0.065). We therefore,accept the nullhypothesisand conclude that there is no statistically significant difference in bank revenue diversification following the COVID-19 pandemic.In other words, banks in Zambia did not diversify their income sources in a significant way in response to the COVID-19 pandemic.

TABLE3: HHI MULTIVARIATE TESTS

Multivariate Tests[a]							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
HHI	Pillai's Trace	.415	3.080[b]	3.000	13.000	.065	.415
	Wilks' Lambda	.585	3.080[b]	3.000	13.000	.065	.415
	Hotelling's Trace	.711	3.080[b]	3.000	13.000	.065	.415
	Roy's Largest Root	.711	3.080[b]	3.000	13.000	.065	.415
a. Design: Intercept Within Subjects Design: HHI							
b. Exact statistic							

The Mauchly's Test of Sphericity in Table 4below shows that the test of sphericity at 0.14 is not statistically significant. This implies that we have no reason to doubt the assumption of sphericity; therefore, we can interpret the univariate effects without violating the assumption of sphericity (Denis, 2019).

TABLE 4: HHI MAUCHLY'S TEST OF SPHERICITY

Mauchly's Test of Sphericity[a]								
Measure: Diversification								
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]			
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound	
HHI	.545	8.319	5	.140	.756	.898	.333	
Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.								
a. Design: Intercept Within Subjects Design: HHI								
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.								

Just like the multivariate tests in Table 3above, all the univariate tests in Table 5, with a *p*-value of more than 0.05 (sig. of between 0.35 and 0.98), do not support rejection of the null hypothesis, suggesting that the HHI population meanis the same in 2018, 2019, 2020 and 2022. Therefore, the COVID-19 pandemic could not have influenced banks to diversify their revenue sources beyond the pre-COVID-19 levels.

Furthermore, the pairwise comparison shown in Table 6 below strengthens the case for not rejecting the null hypothesis, as the significance levels between all the years is more than 0.05, even after the Bonferroni adjustment for multiple comparisons.

TABLE 5: HHI UNIVARIATE TESTS

Tests of Within-Subjects Effects							
Measure: Diversification							
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
HHI	Sphericity Assumed	153.172	3	51.057	3.117	.035	.172
	Greenhouse-Geisser	153.172	2.269	67.499	3.117	.051	.172
	Huynh-Feldt	153.172	2.695	56.838	3.117	.041	.172
	Lower-bound	153.172	1.000	153.172	3.117	.098	.172
Error(HHI)	Sphericity Assumed	737.078	45	16.380			
	Greenhouse-Geisser	737.078	34.038	21.654			
	Huynh-Feldt	737.078	40.423	18.234			
	Lower-bound	737.078	15.000	49.139			

The inability of banks in Zambia to diversify their revenue sources in a significant manner in the aftermath of the COVID-19 pandemic could be attributed to inadequate time and/or resourcessince most of them had reduced their non-interest income activities during the ten years prior to 2018 (Kayombo, 2021).For example, while net interest income increased by 85% from 2019 to 2021, non-interest income grew at a slower pace of 78% during the same period (Bank of Zambia, 2022a). Additionally, the economic downturn that resulted from the pandemic could have prevented banks from diversifying their revenue sources as many supply chains were disrupted.

Pairwise Comparisons						
Measure: Diversification						
(I) HHI	(J) HHI	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-3.125	1.136	.089	-6.574	.324
	3	-3.062	1.507	.361	-7.638	1.513
	4	-4.125	1.732	.185	-9.383	1.133
2	1	3.125	1.136	.089	-.324	6.574
	3	.063	1.074	1.000	-3.199	3.324
	4	-1.000	1.678	1.000	-6.096	4.096
3	1	3.063	1.507	.361	-1.513	7.638
	2	-.062	1.074	1.000	-3.324	3.199

	4	-1.062	1.324	1.000	-5.084	2.959
4	1	4.125	1.732	.185	-1.133	9.383
	2	1.000	1.678	1.000	-4.096	6.096
	3	1.063	1.324	1.000	-2.959	5.084
Based on estimated marginal means						
a. Adjustment for multiple comparisons: Bonferroni.						

TABLE 6: HHI PAIRWISE COMPARISONS

4.3 PROFITABILITY

We tested the effect of COVID-19 on bank profitability in Zambia via the two hypotheses below:

H_0: $\mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

H_1: $\mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

An inspection of the RAROAA computations identified outliers in three banks that had negative RAROAA in at least one year. We generated histograms in SPSS that confirmed these RAROAA as outliers. As proposed by Tabachnick, Fidell and Ullman (2019, p.63) we removed these banks from the analysis before running the tests.

We tested the data for normality,and as shown in Table 7 below; results of the Kolmogorov-Smirnov statistic, which assesses the normality of the distribution of scores, gives non-significant scores (sig. value of more than 0.05), indicating normality.

TABLE 7: RAROAA TESTS OF NORMALITY

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
2018 RAROAA	.191	13	.200[*]	.867	13	.047
2019 RAROAA	.159	13	.200[*]	.846	13	.025
2020 RAROAA	.223	13	.075	.891	13	.099
2021 RAROAA	.109	13	.200[*]	.958	13	.722
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

With respect to the effect of the COVID-19 pandemic, our analysis indicates that all four multivariate tests (i.e., Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root) have a *p*-value less than 0.05 (i.e., sig. of 0.044) suggesting that there is a statistically significant difference in the profitability means of the banks as measured by the RAROAA during the years 2018 to 2021 (see Table 8 below). The Partial Eta Squared of 0.539indicates that 54% of the variability in the RAROAA means was caused by effects of the COVID-19 pandemic. We, therefore, conclude that the RAROAA means for 2018, 2019, 2020 and 2021 are different in the population from which we drew the data. Given that the most significant event/ intervention

during this time was the outbreak of COVID-19 in 2020 in the country, we suggest that the pandemic affected banks' profitability.

TABLE 8: RAROAA MULTIVARIATE TESTS

Multivariate Tests[a]							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
RAROAA	Pillai's Trace	.539	3.891 b	3.000	10.000	.044	.539
	Wilks' Lambda	.461	3.891 b	3.000	10.000	.044	.539
	Hotelling's Trace	1.167	3.891 b	3.000	10.000	.044	.539
	Roy's Largest Root	1.167	3.891 b	3.000	10.000	.044	.539
a. Design: Intercept Within Subjects Design: RAROAA							
b. Exact statistic							

The Mauchly's Test of Sphericity in Table 9 below shows that the test of sphericity at a significance level of 0.001is statistically significant. However, as recommended by Tabachnick, Fidell and Ullman (2019, p.269) we decided to rely on the Greenhouse-Geissertest (Sig. 0.028 as shown in Table 10), one of the significance tests that is adjusted for violation of the assumption to address the issue of sphericity.The Sphericity Assumed test in the Within-Subjects Effects Table, with a statistically significant result of 0.005 also gave us comfort regarding the data satisfying the sphericity assumption.

TABLE 9: RAROAA MAUCHLY'S TEST OF SPHERICITY

Mauchly's Test of Sphericity[a]							
Measure: Profitability							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
RAROAA	.144	20.796	5	.001	.486	.536	.333
Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.							
a. Design: Intercept Within Subjects Design: RAROAA							
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.							

The additional evidence from Table 10 below enables us to reject the null hypothesis, since the Greenhouse-Geisser, a more conservative test, which guards against a potential violation of sphericity, has a p-value of less than 0.05 (Sig. = 0.028).

TABLE 10: RAROAA TESTS OF WITHIN-SUBJECTS EFFECTS

Tests of Within-Subjects Effects

Measure: Profitability

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
RAROAA	Sphericity Assumed	39.240	3	13.080	4.985	.005	.294
	Greenhouse-Geisser	39.240	1.457	26.931	4.985	.028	.294
	Huynh-Feldt	39.240	1.607	24.419	4.985	.024	.294
	Lower-bound	39.240	1.000	39.240	4.985	.045	.294
Error (RAROAA)	Sphericity Assumed	94.452	36	2.624			
	Greenhouse-Geisser	94.452	17.485	5.402			
	Huynh-Feldt	94.452	19.283	4.898			
	Lower-bound	94.452	12.000	7.871			

To establish the stage at which the RAROAA means became statistically significantly different, we generated the pairwise comparisons (see Table 11 below) from SPSS. Post hoc analysis with a Bonferroni adjustment revealed that the means were statistically significant between 2020 and 2021 (sig. 0.015) at the 95% confidence level. This suggests that the outbreak of COVID-19 in 2020 in the country enhanced bank profitability in Zambia.

TABLE 11: RAROAA PAIRWISE COMPARISONS

Pairwise Comparisons

Measure: Profitability

(I) RAROAA	(J) RAROAA	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b] Lower Bound	Upper Bound
1	2	-.166	.286	1.000	-1.067	.734
	3	-.090	.440	1.000	-1.477	1.297
	4	-2.087	.791	.130	-4.582	.408
2	1	.166	.286	1.000	-.734	1.067
	3	.076	.573	1.000	-1.731	1.883
	4	-1.921	.922	.355	-4.826	.985
3	1	.090	.440	1.000	-1.297	1.477
	2	-.076	.573	1.000	-1.883	1.731
	4	-1.997[*]	.585	.031	-3.842	-.152
4	1	2.087	.791	.130	-.408	4.582
	2	1.921	.922	.355	-.985	4.826
	3	1.997[*]	.585	.031	.152	3.842
Based on estimated marginal means						

*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

The findings in this studyregarding bank profitability seem unique. For example, in other jurisdictions, strategies implemented to counter the effects of the COVID-19 pandemic,such as diversification of revenue sourcesenhanced bank profitability (Li *et al.*, 2021; Kozak and Wierzbowska, 2022; Le *et al.*, 2022), but in the case of Zambia, banks did not diversify their revenue sources in a significant manner. In fact, statistics obtained from the Bank of Zambia showed that the aggregate non-interest income ratio dropped from 31% in 2017 to 27% in 2021 (Bank of Zambia, 2022b). Furthermore, all macroeconomic indicators such as GDP growth rate, interest rate, exchange rate, unemployment rate, and default rate became negativeduring the pandemic. For example, GDP growth rate dropped from to 4% in 2018 to -2.8% in 2020 before picking up to 3.6% in 2021, the rate of inflation escalated from 7.2% in 2018 to 22.1% in 2021, while the currency depreciated by 48% in the same period (Bank of Zambia, 2022). Bank returns would therefore be expected to decline.

However, Zambian banks employed other strategies to remain resilient during the pandemic. For example, the 2021 best performing bank in terms of marketleadership in profitability, deposits, and clientnumbersin the country claims to have delivered superior performance through rigorousinnovation in structuring deals, positive transaction trajectory and optimal management of costs (Zanaco, 2022). With respect to the banking sector overall, the Bank of Zambia (2022a) attributes the significant improvement in profitability to increasein net interest income (47% from 2020) and non-interest income (40% from 2020), and reduced provisions for impairments occasioned by upgrading of local currency debt by Fitch in April 2021 (Non-Performing Loan Ratio down to 5.8% in 2021 from 11.6% in 2020).

In line with Katusiime (2021)'s finding that bank profitability in developing countries was cushioned by the high yields on Government Securities such as treasury bills, Zambian banks' profitability benefited significantly from interest income earned on Government Securities. Due to reduced net Government spending, enhanced disbursements under the BoZ Targeted Medium-Term Refinancing Facility (TMTRF), and settlement of bonds, liquidity among banks remained high, with liquidity ratio and liquidassets ratios at 56.3% and 46.6%, respectively (Bank of Zambia, 2022a). This enabled banks to invest in Government Securities which accounted for 37% of all interest income (up by 40% from 2020). Therefore, despite the lull in economic activity and lack of income diversification, banks in Zambiaused their improved liquidity to earn more interest income from Government Securities, thereby enhancing their returns.

4.4 RISKNESS OF BANKS IN ZAMBIA

We tested the effect of COVID-19 on bank income volatility in Zambia via the two hypotheses below:

H_0: $\mu_{2018} = \mu_{2019} = \mu_{2020} = \mu_{2021}$

H_1: $\mu_{2018} \neq \mu_{2019} \neq \mu_{2020} \neq \mu_{2021}$

An inspection of the Z-Score computations identified outliers in three banks,one of which had negative scores. We generated histograms in SPSS that confirmed these Z-Scores as outliers. As proposed by Tabachnick, Fidell and Ullman (2019, p.63) we removed these banks from the analysis before running the tests.

We tested the data for normality, and as shown in Table 12 below, results of the Kolmogorov-Smirnov statistic, which assesses the normality of the distribution of scores, gives non-significant scores (sig. value of more than 0.05), indicating normality.We further assured ourselves that the Z-Score distribution was normal by comparing the respective "Means" against the "5% Trimmed Means" statistics which showed negligible differences.

TABLE 12: Z-SCORE TESTS OF NORMALITY

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
2018 Z-Score (based on ROAA)	.150	13	.200[*]	.935	13	.397
2019 Z-Score (based on ROAA)	.133	13	.200[*]	.936	13	.409
2020 Z-Score (based on ROAA)	.157	13	.200[*]	.960	13	.750
2021 Z-Score (based on ROAA)	.200	13	.159	.927	13	.313
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Our One-way repeated measures ANOVA indicates that all four multivariate tests (i.e., Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root) have a p-value less than 0.05 (i.e., sig. of 0.022). The Partial Eta Squared of 0.601 suggests that about 60% of the variability in the Z-Score means was caused by COVID-19, the major intervening event during the period under review. We therefore, reject the null hypothesis and conclude that there is a statistically significant difference in bank income volatility following the COVID-19 pandemic. In other words, there is evidence to suggest that banks in Zambia experienced statistically significant volatility in their income because ofthe COVID-19 pandemic.

TABLE 13: Z-SCORE MULTIVARIATE TESTS

Multivariate Tests[a]							
Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Z_Score	Pillai's Trace	.601	5.028 b	3.000	10.000	.022	.601
	Wilks' Lambda	.399	5.028 b	3.000	10.000	.022	.601
	Hotelling's Trace	1.508	5.028 b	3.000	10.000	.022	.601
	Roy's Largest Root	1.508	5.028 b	3.000	10.000	.022	.601
a. Design: Intercept Within Subjects Design: Z_Score							
b. Exact statistic							

Although the Mauchly's Test of Sphericity in Table 14 below shows that the test of sphericity at a significance level of 0.000 is statistically significant,we decided to rely on the Greenhouse-Geisser test (Sig. 0.004 as shown in Table 15), one of the significance tests that is adjusted for violation of the assumption to address the issue of sphericity. The Sphericity Assumed test in the Within-Subjects Effects Table, with a statistically significant result of 0.000 also gave us comfort regarding the data satisfying the sphericity assumption.

TABLE 14: Z-SCORE MAUCHLY'S TEST OF SPHERICITY

Mauchly's Test of Sphericity[a]							
Measure: Income_Volatility							
Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Z_Score	.125	22.280	5	.000	.511	.572	.333
Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.							
a. Design: Intercept Within Subjects Design: Z_Score							
b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.							

To establish the stage at which Z-Score means became statistically significantly different, we generated the pairwise comparisons (see Table 16 below) from SPSS. Post hoc analysis with a Bonferroni adjustment revealed that the means were statistically significant between 2019 and 2021 (sig. 0.017), at the 95% confidence level. This suggests that the outbreak of COVID-19 in 2020 in the country influenced bank income volatility.

The study revealed an increase in income volatility attributable to the COVID-19 pandemic. This could be attributed to several factors which include an increase in credit impairments, high operating expenses, and a significant increase in non-performing loans (NPLs) in 2020 (Absa Bank Zambia PLC, 2021; Bank of Zambia, 2021). In addition, the lock-downs due to the pandemic caused reduced activity levels across different economic sectors. Consequently, banks recorded a high level of liquidity. This led to loss of income in that funds were either invested on a short-term basis or not at all.

TABLE 15: Z-SCORE TESTS OF WITHIN-SUBJECTS EFFECTS

Tests of Within-Subjects Effects							
Measure: Income_Volatility							
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Z_Score	Sphericity Assumed	316.594	3	105.531	8.733	.000	.421
	Greenhouse-Geisser	316.594	1.534	206.323	8.733	.004	.421

	Huynh-Feldt	316.594	1.715	184.608	8.733	.003	.421
	Lower-bound	316.594	1.000	316.594	8.733	.012	.421
Error (Z_Score)	Sphericity Assumed	435.051	36	12.085			
	Greenhouse-Geisser	435.051	18.413	23.627			
	Huynh-Feldt	435.051	20.579	21.140			
	Lower-bound	435.051	12.000	36.254			

In 2021, some of the factors cited above reversed, resulting in higher earnings. For example, while the NPL ratio increased from 8.9% in 2019 to 11.6% in 2020, the ratio dropped to 5.8% in 2021 (Bank of Zambia, 2021, 2022a). At the same time, the level of economic activity increased resulting in real GDP rising to 3.6% in 2021 after contracting by 2.8% in 2020. Consequently, Return of Assets (ROA) dropped from 3.3% in 2019 to 2.1% in 2020, but increased to 5.2% in 2021, while the movement in Return on Equity (ROE) was 16.5% in 2019, 12.9% in 2020 and 35.1% in 2021.

Our conclusion that banks' income volatility increased significantly is consistent with the findings of Tran *et al.* (2022) who noted that interventions to address the COVID-19 pandemic drastically affected bank revenues and expenses. The Bank of Zambia, for example, observed that the change in the work environment increased operating expenses of various local banks, which subsequently raised the cost to income ratio (Bank of Zambia, 2022a).

TABLE 16: Z-SCORE PAIRWISE COMPARISONS

Pairwise Comparisons						
Measure: Income_Volatility						
(I) Z_Score	(J) Z_Score	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	.235	.489	1.000	-1.308	1.778
	3	-3.772	1.655	.250	-8.988	1.445
	4	-5.537[*]	1.400	.011	-9.951	-1.123
2	1	-.235	.489	1.000	-1.778	1.308
	3	-4.006	1.676	.205	-9.291	1.278
	4	-5.772[*]	1.548	.017	-10.651	-.892
3	1	3.772	1.655	.250	-1.445	8.988
	2	4.006	1.676	.205	-1.278	9.291
	4	-1.765	1.007	.630	-4.939	1.408
4	1	5.537[*]	1.400	.011	1.123	9.951
	2	5.772[*]	1.548	.017	.892	10.651
	3	1.765	1.007	.630	-1.408	4.939
Based on estimated marginal means						

| *. The mean difference is significant at the .05 level. |
| b. Adjustment for multiple comparisons: Bonferroni. |

5. CONCLUSION AND POLICY IMPLICATIONS

5.1 CONCLUDING REMARKS

The aim of this study was to evaluate the effect of the COVID-19 pandemic on revenue diversification and performance of banks in Zambia. In particular, the study sought to establish the effect of COVID-19 pandemic on bank non-interest income diversification as measured by the HHI, profitability as measured by RAROAA, and income volatility as measured by the Z-Score. Based on our findings, we conclude that there was no statistically significant difference in bank revenue diversification following the COVID-19 pandemic in Zambia. In other words, banks in Zambia did not significantly diversify their income sources in response to the COVID-19 pandemic. With respect to bank performance, our study found that there was a statistically significant increase in bank profitability as measured by RAROAA in the aftermath of the pandemic. Similarly, our study found that there was a statistically significant increase in bank income volatility following the COVID-19 pandemic.

5.2 POLICY IMPLICATIONS

This study has revealed that banks in Zambia did not diversify their revenue sources in response to the COVID-19 pandemic. In fact, the banks were on a path of income concentration prior to the pandemic (Kayombo, 2021). This is despite the evidence in the literature which suggests that banks which had diversified their revenue sources withstood the pandemic betterthan their specialised peers (Ochenge, 2022; Simoens and Vennet, 2022; Taylor, 2022), and that banks that diversified their revenue sources in response to the pandemic performed better than those that did not (Kozak, 2021; Li *et al*., 2021; Le *et al*., 2022).

Although bank profitability increased in the pandemic era, income volatility also increased thereby, exposing banks in the country to insolvency risk. Therefore, the Bank of Zambia should encourage banks to diversify their non-interest income sources to enhance their capacity to withstand major disruptions caused by natural and man-made disasters. This could be done by setting minimum non-interest income ratios for the sector.

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WAYS TO STRENGTHEN FINANCIAL AND REAL SECTOR INTEGRATION

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ABSTRACT

Improving the efficiency of the economy, ensuring sustainable economic growth on an innovative basis requires a more detailed analysis of economic relations and relationships that have developed between the financial and real sectors of the economy at the present stage. The relationship between the financial and real sectors of the economy is expressed through economic relations occurring at different levels of management. The role of financial institutions in the formation of investment resources of institutions of the real sector of the economy is significant.

A variety of theoretical approaches to studying the interaction between the financial and real sectors of the economy has given rise to heated discussions and there is still no consensus on many fundamental issues. On the one hand, the barriers to the generation and diffusion of innovations, the spread of innovations in the economy are the lack of a balanced interaction between the financial and real sectors of the economy, primarily the insufficient level of development and quality of financial institutions. On the other hand, institutions of the real sector of the economy, having free funds, instead of investing them in new technologies and equipment, themselves rushed into the financial sector for speculative purposes in order to obtain high profits. From these positions, the need to study the problem of interaction between the financial and real sectors of the economy seems to be relevant now.

KEYWORDS: *Real Sector,Innovation, Financial-Industrial Groups,Investment, Shareholder.*

1. INTRODUCTION

According to the world experience, the strong integration of the banking and financial system and industrial sectors will contribute to increasing the stability of the national economy and increasing innovation activity in its sectors.

Today, by strengthening the integration of financial and industrial capital in the world economy, high results are being achieved in the development of innovations and their widespread introduction into the sectors of the economy. In particular, in countries with rapidly developing economies, the activities of corporate structures based on the integration of financial and industrial capital play an important role in increasing innovation activity in various sectors of the economy. Also, ensuring the integration of finance and industrial capital will not only create favorable conditions for the activities of financial institutions, but also strengthen the process of implementation of targeted projects by industrial enterprises and the achievement of high efficiency.

The experience of countries around the world shows that high-level companies operating as main and subsidiaries fully or partially consolidate their tangible and intangible assets through economic integration to create new jobs, increase production efficiency, expand markets for goods and services and implement competitiveness projects. integrated corporate structures are common. Financial-industrial groups are a common form of these integrated corporate structures. The establishment of financial-industrial groups plays an important role in enhancing the stability of the national economy, along with strengthening the integration of financial and industrial capital.

The world experience of formation and development of financial-industrial groups shows that they serve as an effective tool for strengthening integration between financial institutions and industrial enterprises, sustainable development of high-capacity industries and increasing the country's innovative potential.

The necessity and expediency of integration processes in the economy is determined by the degree to which the mechanisms of distribution of the effect resulting from the merger among the participants are coordinated. This is because the mismatch in the involvement of individual participants in the group and in taking into account their interests has a negative impact on the process of formation of financial-industrial groups in the economy. This situation will also be a serious obstacle to the sustainable development of financial and industrial groups in the future.

2. Literature Rewiev

The formation of integrated corporate structures by ensuring the integration of the banking and financial system and industries has been studied by many foreign economists as a specialized research, and these studies have important scientific approaches. In particular, M. Bendikov(2006) argued that integrated structures have a high potential for innovative development of science-intensive industries.

E.Rudtskaya and E.Khrustalev(2010) spoke about the creation of an effective mechanism for increasing the innovative potential of the economy through the formation of financial and industrial groups, the creation of innovations and their application to innovation, as well as the capitalization of innovations and their introduction into the manufacturing sector.

O.Khrustalev (2011) argued that these issues can be positively addressed through the formation of financial-industrial groups by conducting research on financial methods of financing the

innovative activities of enterprises and coordination of economic interests of participants in investment projects. He also developed models for the formation of integrated corporate structures in a science-intensive production complex.

S. Larin (2011), on the other hand, conducted research on the role of financial and tax policy instruments in the formation of the target infrastructure of innovation systems and the promotion of its activities, and developed their structural structure.

V. Dementev (1998) argued that the formation and implementation of a single scientific, technical and investment policy within the financial and industrial groups will increase the innovation potential, and the diversification of enterprises will constantly stimulate the creation and implementation of innovations.

3. Research Methodology

It is advisable to use model analysis of financial-industrial groups to ensure equality of interests between the participants of financial-industrial groups. The main issue should be to meet the needs of partners in the group for new products, as well as to study the innovative aspects of financial-industrial groups, which determine the strategic competitive advantages associated with the financing of innovative activities of financial-industrial groups by financial institutions.

The Bank's participation in the capital of a new product manufacturer increases its interest in financing the production and improvement of the company's products.

Capital relations between the participants of the financial-industrial groups affect the increase of the integration potential, as the increase of the integration effect is an acceptable situation for all participants. Quantitative analysis is necessary to determine the extent of the bank's participation in the capital of industrial enterprises, a reasonable mechanism for lending and the conditions for effective financing of new production. In this case, the issue of modeling the innovative effect of banking and industrial capital integration is important. Conditionally, three types of models can be distinguished: representative, regression, and conceptual.

The first will be aimed at involving a wide range of relationships in the model, fully covering the external and controllable parameters, various factors in the model. However, the more connections are included in the modeling, the more the validity of the model depends on the level of previous connections.

Regression models, on the other hand, represent statistically significant relationships.

Conceptual models help to illuminate the nature of economic phenomena and to determine the characteristics of their relationship based on the separation of important aspects of the occurrence of economic phenomena (Rudtskaya, Khrustalev, 2008).

According to foreign experience, the perfect development and solution of management tasks in many economic systems is one of the important issues, the experience of modeling such systems provides a favorable basis for the development of representative models of financial-industrial groups. In the case of improper organization of mutual corporate relations, the relevant calculations can have a significant effect in terms of saving working capital, optimizing tax liability. In complex conditions, this type of economy often has a positive effect on the stabilization of the activities of grouped enterprises.

The following are the most important areas of model analysis of financial-industrial groups:

- Coordination of investment decisions within financial and industrial groups and distribution of profits from the implementation of relevant investment projects;

- Coordination of joint-stock, credit and cooperation relations along the technological chain;

- Innovative advantages of financial and industrial groups;

- Financial-industrial groups as a mechanism of mutual insurance of group members;

- The nature of the relationship between the participants of the financial and industrial groups and the coordination of interests within the group;

- Increased productivity of existing production resources in financial and industrial groups.

In practice, many results have been achieved in modeling the integration effect associated with resource turnover in the implementation of production and investment programs of financial-industrial groups. Within the framework of financial-industrial groups, the economy of working capital is assessed in cooperation with enterprises.

From the point of view of realization of strategic advantages of financial-industrial groups, it is important to express dependencies in these structures, which characterize investment and innovation processes in particular. Modeling of such processes plays an important role in solving strategic issues in the activities of financial and industrial groups.

4. Analysis and Results

In the organization of high-capacity production in financial-industrial groups, it is important to effectively organize its financial aspects. According to modern research, it has been confirmed that the innovative type of economic growth plays a key role in technological relations in a number of advanced foreign countries and in the world economy as a whole. It is based on a system of creating scientific innovations and their application to innovation, as well as mechanisms for capitalizing innovations and expanded reproduction. The effectiveness of these mechanisms determines the innovative potential of the economy and the ability to create and implement innovations in the economic system. In the activities of financial-industrial groups there are favorable conditions for the positive solution of the above issues (Bendikov, Khrustalev, 2006, Frolov,2007, Khrustalev, 2010).

The world experience of formation and development of financial-industrial groups shows that they serve as an effective tool for strengthening integration between financial institutions and industrial enterprises, sustainable development of high-capacity industries and increasing the country's innovative potential.

Studies show that the following models of development of financial-industrial groups are widespread in the world economy: Anglo-American, German, Latin and Japanese.

The Anglo-American model applies in the United Kingdom, the United States, Australia, and Canada. The basis of industrialization in these countries is the mechanism of capital accumulation on the basis of entrepreneurship. Capital is formed at the expense of institutional shareholders (banks, insurance companies and pension funds) and operates through a separate and independent shareholder mechanism.

The German model applies in Germany and Austria, where the financial basis of large and medium-sized corporations is the banking system, in which the role of individual shareholders is

insignificant. The banking mechanism of the German model focuses on long-term investment relations between the financial and industrial sectors in the structure of corporate relations. In this model, banks are the suppliers of debt capital to companies in need of external sources of financing.

An important feature of the German tradition is determined by the interdependence of industry with the bank. Stable horizontal financial-industrial associations occur in the intersectoral integration of industrial enterprises with financial institutions on the basis of financial, joint-stock, as well as business relations. In addition, the banks pay special attention to the allocation of large financial resources for promising investment projects, new research and innovation in the activities of enterprises belonging to the group.

The Latin model is used in France, Belgium and Italy. In this model, individual and family corporations emerged in the form of free corporate networks as a result of mergers by investment companies and holdings of investment banks.

The Japanese model is characterized by long-term investment in the industry, close ties between the financial and industrial sectors. Japanese banks not only provide loans, but also organize financing and cooperation meetings of financial-industrial groups. The bank also provides financial support for projects aimed at the production of high-capacity products and innovations in industrial enterprises.

The main advantages of innovative development in the national economy through the establishment of financial and industrial groups are:

- In the framework of the integration of financial and industrial structures, it is planned to implement projects aimed at achieving high economic efficiency, which will support the large-scale introduction of innovations in practice;

- As a result of the merger of finance and industrial capital, the turnover of financial resources will accelerate, and as a result, enterprises will have a high opportunity to finance innovative activities. This is because the issue of introducing new research and innovations in the activities of enterprises operating in the real sector of the economy today is directly related to the provision of financial resources. The formation of financial-industrial groups creates a favorable basis for a positive solution to the above problem.

- The formation and implementation of a single scientific, technical and investment policy within the structure will have a positive impact on the growth of innovation potential;

- Encourage the production of high-capacity products in financial and industrial groups, conduct in-depth marketing research and activities to expand markets, encourage the introduction of innovations in production;

- The advantage of the financial and industrial structure in the vertical integration of manufacturing enterprises is the improvement of their activities and financial stability as a result of the merger of technologically close production units. It also plays an important role in achieving significant positive results in the field of innovation.

- The diversification of activities of the enterprises of the group encourages them to constantly conduct research and strengthen activities aimed at creating and implementing innovations.
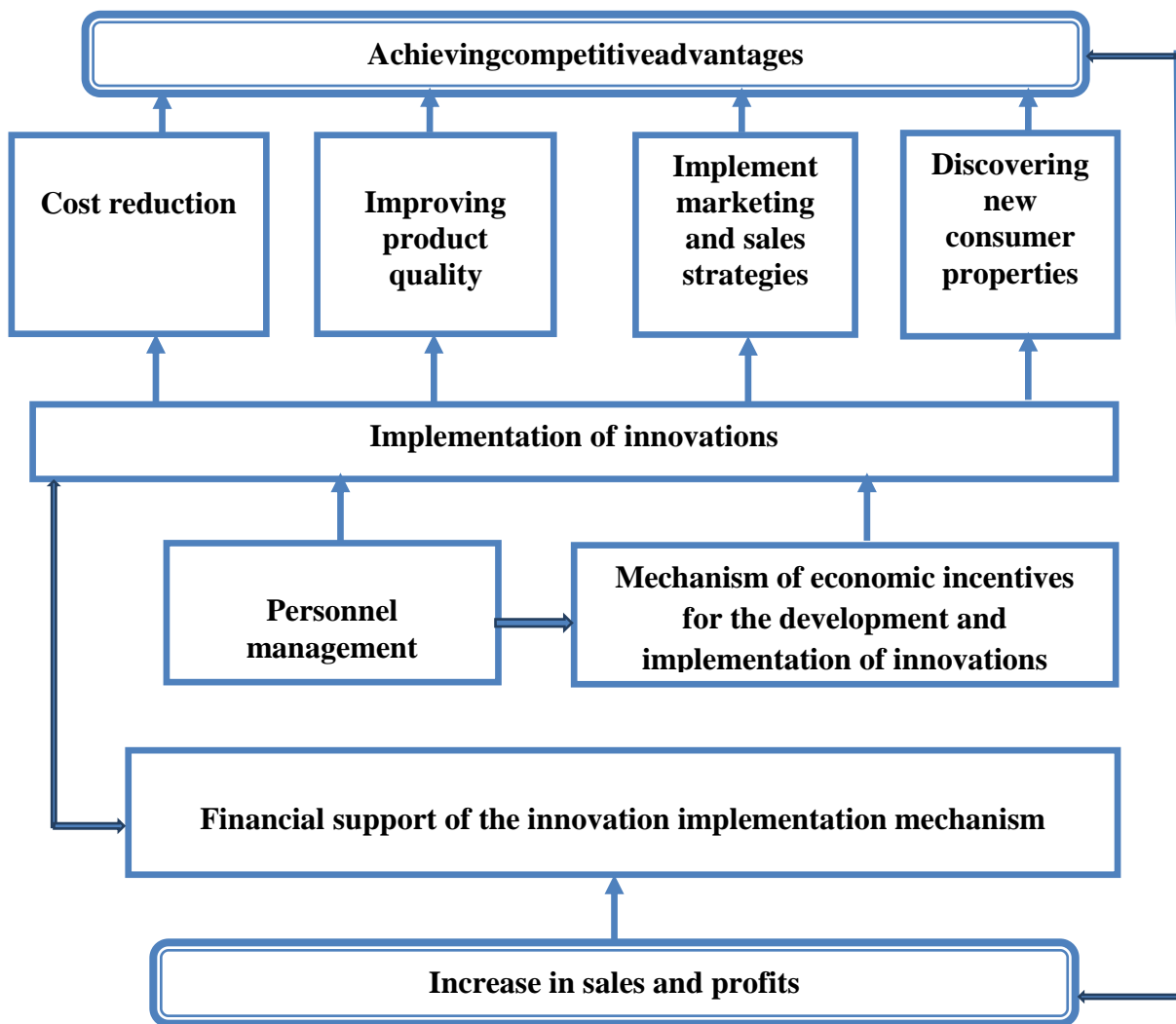
Figure 1.The interaction of competitive advantages over profit margins in financial-industrial groups and vice versa

One of the urgent issues in the Republic of Uzbekistan is to increase the stability of the national economy through the introduction of advanced scientific and technological achievements and innovations in various sectors of the economy. At the same time, the issue of accelerating economic growth on an innovative basis should be addressed by combining the actions of two main areas of economic development:

- Creation of an effective market, including the development of its innovation segment, which provides a wide range of innovations;

- Implementation of structural modernization of the economy on the basis of technical and technological modernization of production, creation of favorable conditions for the spread of modern technologies.

Consistent introduction of innovative developments in this direction in the activities of industrial enterprises will serve to increase the quality and competitiveness of products in the future.

Today, the market in industrialized and scientifically advanced countries can be represented as a stable complex of companies, banks and financial intermediaries. This complex is characterized by the interrelationships and complex relationships between its elements as the basis of financial and industrial cooperation and in the form of competition. The general form of direct and indirect relations in the process of updating products and technologies within the financial-industrial
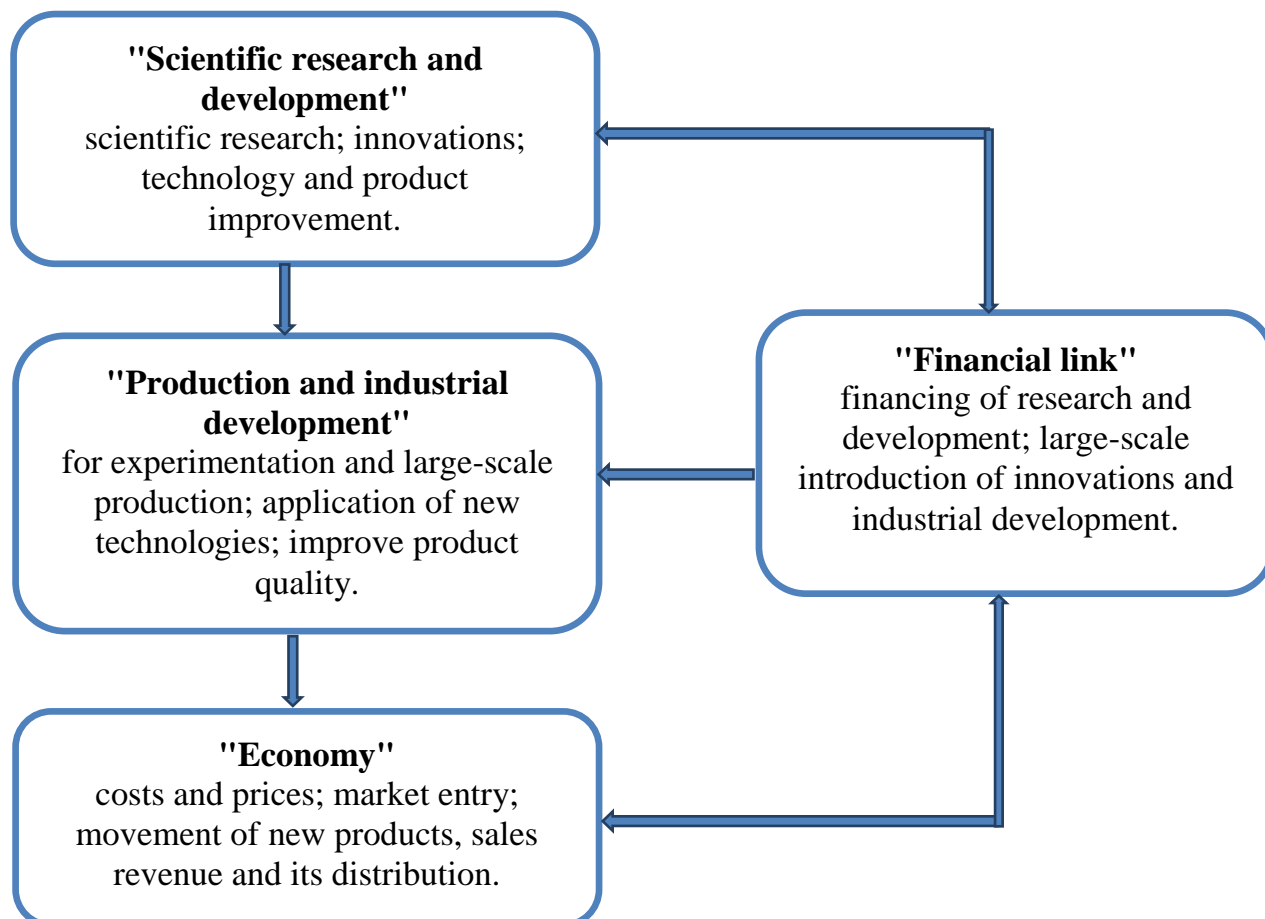
corporate structures can be described as follows. (See Figure 2).

Figure 2. The structure of direct and inverse feedback in the mechanism of technology and product innovation

Supporting the high efficiency of market activity in the process of long-term economic reforms is aimed at ensuring the rapid technological processes in the economy. This goal will be achieved, first of all, through the unification of market and centralized systems of regulation of economic activity in the field of creation and distribution of innovations.

Effective and sustainable enterprises must pay special attention to addressing interrelated management issues in order to achieve strategic planning goals. The main ones are: marketing research in the market and adaptation to its current and future requirements; investment support of production at the expense of cash and rational organization of mutual payments; development of scientific, experimental and production capacity aimed at the organization and use of

investment, scientific, technical and technological opportunities, increasing the level of technological re-equipment in ensuring the competitive advantages of products; improving the pricing system; professional development of staff, etc.

Measures to form the target infrastructure of innovation systems and stimulate the activities of its constituent elements should be complemented by financial and tax policy instruments that have a positive impact on initiative (Larin, Khrustalev, 2011).

An important part of the set of tools used to support innovative development is the formation of the necessary infrastructure and the activation of investment in the introduction of innovations in the activities of enterprises under the direct encouragement of the state. Direct measures are particularly effective if they are focused on the needs of the private sector and have an incentive nature for enterprises. They will be less effective if a structure that responds quickly to changing conditions and a strategy to achieve specific goals is not developed. Positive results are obtained when using a set of measures that do not require high flexibility.

The process of direct state support includes the following measures:

- Support the activities of research institutions in conducting research and development work focused on industrial needs;

- Strengthening the skills of scientific, engineering and technical staff working in the field of innovation;

- Targeted support for research in the private sector. At the same time, the focus should be on supporting research projects aimed at creating new types of products and carried out jointly by different enterprises, as well as the activities of real sector enterprises;

- Redistribution of research resources to increase innovation activity through the integration of science and industry. This situation should be directed to the formation of leasing and consulting centers, science and technology parks, business incubators, to support the allocation of production space to enterprises on the territory of universities and research institutes;

- Mediation activities aimed at testing the developed innovations and other ancillary activities, providing consulting services, support for the creation of a database of innovative activities. This activity should be carried out in the interests of small and medium-sized enterprises, which have a strong need for ancillary services due to lack of financial resources;

- Systematic measures for the development of mutually coordinated tools used to overcome complex structural shortcomings of innovative systems. These should be aimed at improving the performance of innovative cluster entities, such as a network of companies, scientific institutions that support producers and consumers, interconnected in a single chain, for mutual benefit.

In recent years, trends aimed at strengthening liberal principles in the regulation of economic development in developed market economies have created favorable conditions for a significant expansion of the use of indirect methods of financial support in the form of tax benefits. Features of the development of the structure of the national economy in Uzbekistan, including differences in the tax system, as well as corporate legislation, require the development of various forms of tax benefits and their effective use in innovative industries. One of their acceptable manifestations is special tax benefits for capital investments in research and development, as well as benefits for depreciation.

It should be noted that innovation is one of the important strategic resources of the state. Successful solution of socio-economic problems, introduction of new industrial and financial technologies, development of innovation and investment infrastructure, preservation and increase of intellectual potential, production of import-substituting export-oriented products, accumulation of foreign exchange reserves are to some extent associated with innovation. The formation of integrated corporate structures by ensuring the integration of financial and industrial capital is an urgent issue in promoting the development of innovative developments and modernization of production, the introduction of technical and technological renewal processes. This is because financial institutions play an important role in financing the process of implementing innovations in industrial enterprises. Therefore, in world practice, the innovative potential of financial and industrial groups is highly valued.

It is expedient to establish large innovative marketing centers in our country to ensure the free movement of products on the basis of national enterprises with international experience in operating in the markets of high-tech products. These centers, together with organizations regulating foreign economic activity, should develop mechanisms to ensure the participation of national products based on high technology in world markets.

The main activity of national enterprises should be aimed not only at expanding the domestic market, but also to take a strong position in the markets of the world and increase their share in these markets through the production of competitive products.

The government should support targeted participation in the process of establishing global networks of leading innovation activities, such as the Innovation Relay Centers (IRC) and the European Business Network (EBN).

The emergence of a new field of innovative entrepreneurship and its development on the basis of market relations requires effective integration of financial and industrial structures, as well as specialists-managers who meet the requirements of the new system. They should not only have a high scientific and practical potential and be able to apply national and foreign experience in creating innovations, but also be able to anticipate the need for innovation and be able to use modern marketing methods in a competitive environment. The main thing is that they should be able to substantiate the commercial effectiveness of the innovative project, its technical and technological implementation, as well as a reasonable assessment of the production and financial and economic conditions of the consumer of innovations. The research conducted confirmed the importance of the economic effect achieved as a result of the activities of integrated enterprises and its place in the stability of the national economy.

5. Conclusions and Suggestions

Based on the scientific results obtained on the basis of research, the following can be concluded:

- Integration of manufacturing enterprises and commercial banks in the national economy not only strengthens the overall marketing position in the market, but also the distribution of responsibilities, adherence to corporate procedures, management systems based on the interests of each enterprise and the unity of strategic goals. means a combination of technological, financial and intellectual potential.

- Based on international experience, we believe that the following models can be used to organize the activities of financial and industrial groups in the Republic of Uzbekistan:

- Japanese model;

- German model.

The peculiarity of these two models is that the task of coordinating the activities of financial-industrial groups is mainly performed by banks. In these models, banks also play an important role in the implementation of targeted projects aimed at the production of high-capacity and competitive products and the development of innovative activities within groups.

- Ensuring the integration of financial and industrial capital in Uzbekistan will increase the potential of enterprises to introduce large-scale innovations in the future. This is because the process of introducing innovations in enterprises in the real sector of the economy is directly based on the need for financial resources. This issue will be addressed positively by ensuring the integration of financial and industrial capital.

- Formation of highly integrated corporate structures engaged in the production of high value-added finished products, sellers of goods, services on the basis of integration of enterprises and financial institutions in the manufacturing industry and implementation of targeted projects aimed at producing high quality and competitive products and developing innovative activities should.

- It is necessary to form corporate structures in the form of holdings through the vertical integration of industrial and service enterprises, whose technological period of production is interconnected, and to direct banks' investments in promising projects. Particular attention should be paid to the involvement of technologically and cooperative-related enterprises producing competitive products in domestic and foreign markets, and the introduction of projects aimed at covering all stages of reproduction and increasing the financial and production capacity of enterprises.

- In order to ensure the widespread introduction of innovations in the economy of the country and to achieve high efficiency in the future, it is expedient to establish a state body to monitor the process of development and implementation of innovations.

In conclusion, the formation of an innovative market in Uzbekistan should be supported by qualified scientific, technical, technological and financial management, which is one of the key elements in the mechanism of development of intensive sectors of the economy, ensuring sustainable economic growth.

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