Income Diversification and Financial Sustainability of Egyptian Financial Sector: Evidence From EGX

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Abstract:

In a world where global markets are becoming increasingly competitive, sustainability becomes crucial. Therefore, improving financial institutions' performance and strength requires establishing sustainable development. The main purpose of this research is to examine the potential impact of income diversification on the financial sustainability of financial institutions listed on the Egyptian Stock Exchange (EGX). The research uses eleven years of panel data from 2014 to 2024. Analyses were conducted using descriptive analysis, and three tests were applied: the Doornik–Hansen and Shapiro–Wilk tests to test the normal distribution of residuals and the Breusch–Pagan test to detect heteroskedasticity. Finally, panel data regression models are used to test hypotheses. The results concluded that income diversification is not limited to improving financial efficiency across assets but also extends to improving

returns to shareholders through increasing return on equity. This result is particularly important because it also indicates that companies that diversify their income sources become better able to face economic challenges, reducing the likelihood of bankruptcy. That is, diversification contributes to building greater financial strength and increasing a company's resilience to economic changes. Therefore, revenue diversification is a vital factor in companies' strategies, which contributes to strengthening the financial strength and stability of the company's overall financial position, consequently increasing profitability in the long term and enhancing financial sustainability. The findings have important practical implications for policymakers, regulators, and managers in financial institutions and will also be utilized as a basis for strategic decisions.

Keywords: Sustainability, Financial sustainability, Income diversification.

ملخص البحث:

لقد أصبحت الاستدامة أمرًا بالغ الأهمية في عالمٍ يشهد تنافسًا متزايدًا في الأسواق العالمية مما يتطلب إرساء التنمية المستدامة لتحسين أداء المؤسسات المالية ودعم قوتها، يهدف هذا البحث بشكل رئيسي إلى دراسة التأثير المحتمل لتنويع مصادر الدخل على الاستدامة المالية للمؤسسات المالية المدرجة في البورصة المصرية، لتحقيق هذا الهدف يستخدم البحث بياناتٍ على مدى إحدى عشرة عامًا من عام ٢٠١٤ إلى عام ٢٠٢٤، وقد أُجريت التحليلات باستخدام التحليل الوصفي كما طُبقت ثلاثة

اختبارات: اختبارا دورنيك-هانسن وشابيرو-ويلك لاختبار التوزيع الطبيعي، واختبار برويش-باغان للكشف عن مدى تجانس التباين. وأيضا" استُخدمت الدراسة نماذج انحدار بيانات التجميع لاختبار الفرضيات، هذا وقد خلصت النتائج إلى أن تنويع مصادر الدخل لا يقتصر على تحسين الكفاءة المالية للأصول فقط بل يمتد أيضًا إلى تحسين عوائد المساهمين من خلال زيادة العائد على حقوق الملكية، وجديربالذكر أن هذه النتيجة لها أهميةً خاصة لأنها تُشير أيضاً إلى أن الشركات التي تُنوّع مصادر دخلها تُصبح أكثر قدرةً على مواجهة التحديات الاقتصادية مما يُقلل من احتمال الإفلاس، أي أن تنويع مصادر الدخل من شأنه أن يُسهم في بناء قوة مالية أكبر وزيادة قدرة الشركة على الصمود في وجه التغيرات الاقتصادية، لذلك يُعدّ تنويع الإيرادات عاملاً حيوياً في استراتيجيات الشركات، إذ يُسهم في تعزيز القوة المالية واستقرار المركز المالي العام للشركة، وبالتالي زيادة الربحية على المدى الطويل وتعزيز الاستدامة المالية، ولهذه النتائج آثار عملية مهمة على صانعي السياسات والجهات التنظيمية والمديرين في المؤسسات المالية، كما ستُستخدم أيضاً كأساس لاتخاذ القرارات الاستراتيجية.

الكلمات المفتاحية: الاستدامة، الاستدامة المالية، تنويع مصادر الدخل.

1. Introduction:

Sustainability was first linked to economic development and placed a greater emphasis on the social, environmental, and economic aspects than others because of the substantial contributions made in this area and the adoption by the UN and its affiliated organizations (Alhabow, 2023). Recently, global interest in financial sustainability has increased as a result of limited resources and the economic crisis (Adelino *et al.*, 2022). Financial sustainability started to be utilized to describe future

issues and challenges that could be addressed by financial management because of the increasing financial loads that the next generation will have to pay, as well as the consequences of choices that weren't participated in or taken, but they might not have benefited from it initially (Alhabow, 2023). Better financial performance and increased efficiency can help a business to achieve financial sustainability, which is the ability to retain and sustain financial capacity for a long time (Sontag-Padilla *et al.*, 2012); hence, financial sustainability is the financial system's permanent component (Meyer, 2002). Financial sustainability is not only a necessary condition for achieving other components of sustainability but also is regarded as the main and unavoidable stage of significant sustainable banking practices (Uz-Zaman, *et al.*, 2023).

1.1 Research gap:

Numerous researches have demonstrated the beneficial correlation between revenue diversification and both financial conditions (Wicker & Breuer, 2014) and financial stability (Trussel 2002; Carroll & Stater 2009; Di Carlo *et al.*, 2019), but only a small number of studies have found that revenue diversification is a strategy that can improve an organization's sustainability and financial health (Jaafar, *et al.*, 2023). Therefore, it is important to explore this relationship in depth,

especially since there is a significant lack of thorough research exploring this relationship in the context of Egypt.

Furthermore, despite the recognition of the importance of income diversification, previous studies present contrasting views: some highlight a positive relationship between diversity of income and financial sustainability, while others either find a negative relationship or no discernible impact. Therefore, this research seeks to fill the literature gap by exploring the impact of income diversification on financial sustainability in financial institutions.

Additionally, this research covers the methodological gap by analyzing the impact from the standpoints of operating profitability, shareholder return, and financial stability, and then the three models present an integrated approach to financial sustainability.

1.2 Objective of the study:

In the situation indicated above, this study aims to fill the research gap in the literature by exploring the relationship between income diversification and financial sustainability of the Egyptian financial sector. To be specific, this research aims to investigate:

- The impact of income diversification on return on assets (ROA).

- The impact of income diversification on return on equity (ROE).
- The impact of income diversification on the likelihood of bankruptcy.

1.3 Significance of the study:

In recent years, financial sustainability has become a key objective across all industries (Çavmak, 2024). An organization's sustainability is crucial to its capacity to stay in the market (Naveed Aslam & Usman,2022). Because financial sustainability is considered one of the aspects of sustainability (McLaren & Struwig, 2019), then it's important to explore the factors that support financial sustainability.

Setting financial sustainability as a goal is essential for maintaining operations in the financial sector, which plays a crucial role in the financial system and is considered an indicator of a strong economy. Due to the crucial role of financial institutions, the United Nations and associated regulatory agencies have recommended developing policies that diversify their revenue streams and ensure long-term sustainability (Cherian *et al.*, 2021).

This study is organized into five sections. The second section of this paper consists of two main parts: an extensive review of the theoretical background concerning financial sustainability and

income diversification, followed by a detailed exposition on the research development to outline the theoretical framework that underpins this study and conclude the research hypotheses. The third section clarifies the methodology. Section four describes the results and discusses the analyses. The last section presents the conclusion and explains the limitation of this study, besides providing future research and practical implications.

2- Literature Review:

2.1 Theoretical Background:

2.1.1 Financial Sustainability:

One of the concepts that is currently widely used is sustainability, which has grown and spread extensively (Alhabow, 2023). According to Marwa & Aziakpono (2015), sustainability is the capacity of an organization to achieve its long-term objectives. Afriyie (2015) refers to sustainability as the capacity of an organization to carry on with its operations permanently without worrying about running out of essential resources. Sustainability is not only the organization's continued existence but also its ability to carry out its mission for the good of society and conduct activities in a way that satisfies current demands without endangering the capacity of future generations to satisfy their own (McLaren & Struwig, 2019). It means that sustainability is the ability of an organization to generate, manage, and distribute financial affairs in a regular, continuous, and effective manner in

order to carry out programs and accomplish objectives that eventually benefit the communities in which they operate (McLaren & Struwig, 2019).

Focusing on sustainable growth is a long-term strategic issue for the business and, to some extent, represents the enterprise's growth potential and intrinsic capacity to expand with available financial resources (Luo & Dai, 2024); hence, an organization must be financially sustainable if it hopes to achieve its long-term objectives (Afriyie, 2015). Financial sustainability is frequently measured to quantify a firm's capacity to sustain future growth and is a consolidated indicator of the firm's ability to set strategic goals (Luo & Dai, 2024).

Financial sustainability is the ability of an organization to manage its financial resources both short- and long-term so that it can continue to operate as it does now and secure its financial resource needs for years to come while protecting the rights of future generations (Alhabow, 2023). Then, financial sustainability is providing ongoing financial success without endangering future financial success (Gleißner *et al.*, 2022). In other words, the capacity to settle financial and operational commitments, eliminate risks, generate long-term resources, and retain earnings in order to fund growth and expansion and reduce financial hardship is known as financial sustainability (Osazefua, 2020).

Because the financial health of a business is a combination of indicators of a company's capacity to sustain its operations, control obligations, and undertake strategic investments (Trinh *et al.*, 2025), financial sustainability includes four essential components: strategy, operating sustainably, investment, and risk management (McLaren & Struwig, 2019). Achieving financial sustainability is a step toward profitability, which occurs when businesses can reduce transaction costs, offer quality products and services that meet customer needs, make enough money, and have the ability to access new financing options (Uz-Zaman *et al.*, 2023).

2.1.2 Income Diversification:

According to resource dependency theory, organizations rely heavily on outside sources for essential materials (Pfeffer & Salancik, 2003), and when organizations can secure and preserve vital resources, they may be able to survive (Hodge & Piccolo, 2005). Besides, to be independent in the future, diversification is an essential strategy for organizations (Trinh *et al.*, 2025). This situation is because of the environment's uncertainty and the lack of essential resources (Jaafar *et al.*, 2023). On the other hand, the modern portfolio theory supports income diversification (Elton & Gruber, 1997) and emphasizes that businesses should think about the best combination of revenue sources while developing their diversification strategy (Mayer et al., 2014; Hung & Hager,

2019). For example, banks that have a diverse portfolio may perform better by increasing economies of scope and reducing the risk of bank failure (Markowitz & Todd, 2000).

Revenue diversification refers to the different sources of revenue that a company generates (Yan, 2011). However, the organization's operations would determine the degree of revenue diversification (Jaafar *et al.*, 2023). Organizations with various revenue streams appear to have had better financial circumstances; they were less susceptible, more stable, and had a lower risk of bankruptcy (Carroll & Stater, 2009; Wicker & Breuer, 2014; Despard *et al.*, 2017). Revenue diversification is a financial strategy for decreasing the degree of dependency (Jaafar *et al.*, 2023), reducing the volatility of their revenue portfolio (Kingma, 1993; Chang & Tuckman, 1994; Froelich, 1999), and increasing their financial stability (Di Carlo *et al.*, 2019).

Additionally, institutions should concentrate on their internal advantages while diversifying their revenue sources (Shariff & Kronenberg. 2018), so before choosing the diversification strategy, these organizations should examine their most reliable, steady, and sustainable sources of income; hence, these institutions would be able to diversify more successfully and stabilize their earnings (Carroll 2009). Particularly, the specifics of the income mix would determine how much revenue diversification could lessen financial vulnerability (Gronbjerg, 1993). Therefore, before choosing a particular diversification

strategy, institutions must conduct a SWOT analysis, which examines their strengths, weaknesses, opportunities, and threats (Jaafar *et al.*, 2023). Consequently, using diversification techniques would be a component of the businesses' strategy to minimize their financial challenges and maintain their financial stability (Jaafar *et al.*, 2023).

2.2 Research hypotheses development:

According to Stiroh (2004), revenue diversification does not increase financial institution profitability because non-interest income is frequently volatile. Similarly, Goddard *et al.* (2008) found evidence that, except for large firms, revenue diversification is not beneficial in the context of credit unions in the United States. Morever, Berger *et al.* (2010) concluded that income diversification had a negative impact on small banks' performance in the Chinese context and emphasized that a concentrated strategy yields larger profits and is considerably more cost-effective than a diversification strategy. This is consistent with the findings of the study by Mahali & Ansari (2023).

The main goal of the study by Mahali & Ansari (2023) was to examine how revenue diversification affected the top ten Indian MFIs' financial performance and sustainability during an eight-year span, from 2016 to 2023. The results showed that ROE, ROA, and FSS are not significantly impacted by income

diversification. This suggests that MFIs are not reaping the benefits of a diverse income approach and emphasizes the necessity of income diversification. The MFIs retain a larger percentage of interest income than non-interest income because of this and other factors. Therefore, MFIs should pursue a targeted profit plan instead of diversifying their revenue streams.

On the other hand, several studies concluded that diversification of income has a positive impact on financial sustainability. In their study, Osei-Kuffour & Peprah (2020) examined how institutional profile affected the relationship between private tertiary institutions' financial sustainability and income diversification in the Greater Accra Region of Ghana. According to the study, financial sustainability and income diversification have a moderately positive relationship, and the association between income diversification and financial sustainability was significantly enhanced by the moderating effect of institutional profile.

The purpose of the study by Cheuk (2021) is to examine the variables that may directly or indirectly affect the financial sustainability of charities, with a focus on financial management ability, accountability, revenue diversification, and income creation. The results indicate that, through revenue diversification and self-generation, there are positive and strong indirect correlations between financial management capacity and

responsibility and financial sustainability. In other words, financial sustainability and financial management ability are related, although the relationship is indirect and mediated by revenue diversification and self-generated income, and through revenue diversification, accountability also has a strong and favorable indirect relationship with financial sustainability.

In his study, Githaiga (2021) aimed to investigate the connection between revenue diversification and the financial sustainability of microfinance institutions. Using a sample of 444 MFIs from 2013 to 2018 across 108 countries. According to the findings, MFIs' financial sustainability has been significantly and positively affected by revenue diversification. Consequently, compared to MFIs that are primarily focused on lending, those with a well-diversified income stream are anticipated to have greater financial sustainability.

Likewise, by using the quantile regression technique on data from ASEAN banks from 2008 to 2019, the study by Najam *et al.* (2022) investigated the effect of revenue diversification on financial sustainability as measured by return on assets (ROA). Furthermore, as control variables, market capitalization, interest and non-interest incomes, bank size, and liquidity risk are examined. Although sizes can vary between nations and quantiles, the empirical results show that income diversification has a favorable influence on return on assets at the lower,

medium, and upper quantiles for all countries. Additionally, the performance of banks is positively impacted by market capitalization, non-interest revenue, and bank size. On the other hand, interest revenues and liquidity risk have a negative correlation with bank performance across all nations at every quantile.

By concentrating on seven growing economies in Asia, the study by Xie *et al.* (2022) looked at how revenue diversification affects bank efficiency between 2008 and 2019. Non-performing loans, capitalization, gross domestic product, and non-interest income are considered control variables in this context. The empirical results show that whereas non-performing loans have a strong negative link with bank efficiency, market capitalization, revenue diversification, non-interest income, and gross domestic product have a considerable positive impact on bank efficiency.

Uz-Zaman *et al.* (2023) conducted a study to examine the effectiveness and performance of Bangladesh's banking industry in order to determine how financial sustainability may be guaranteed. This paper also examines the significance of financial sustainability for all-encompassing sustainable banking practices. It has been discovered that the management efficiency of banks is enhanced by the improvement of liquidity and discretionary credit, profit-generating capacity, and banking experience.

Similarly, Talel *et al.* (2024) investigated the relationship between Kenyan microfinance institutions' financial sustainability and income diversification. Panel data collected from 32 MFIs between 2010 and 2019 was used in the study. The findings show that income diversification significantly and favorably impacted the financial sustainability of Kenyan MFIs, and the results also indicate that expanding into non-lending ventures could enhance the financial sustainability of MFIs.

Estimating the level of financial sustainability in Vietnamese universities is the aim of the study by Trinh *et al.* (2025) conducted to evaluate the financial sustainability of 134 Vietnamese universities from 2013 to 2020. The study's findings showed that practically all of the universities were unsustainable because of their lack of financial diversity. Higher education institutions' degree of financial diversification may be impacted by factors such as age, ownership type, the ratio of lecturers with PhD degrees, location, and land size. According to this research, public colleges are more financially stable than private ones, and rural universities are more financially diversified than their urban counterparts.

In conclusion, the literature review reveals differing viewpoints: several studies indicate a positive impact of income diversification on financial sustainability (Osei-Kuffour & Peprah, 2020; Cheuk, 2021; Githaiga, 2021; Najam *et al.*, 2022;

Xie *et al.*, 2022; Uz-Zaman *et al.*, 2023; Talel *et al.*, 2024; Trinh et al., 2025), while others suggest a negative impact (Berger *et al.*, 2010) or no significant impact (Stiroh, 2004; Mahali & Ansari, 2023). Then, exploring the relationship between income diversification and financial sustainability remains critical. Furthermore, each one of the previous studies concentrated on one perspective; hence, investigating this relationship from an integrated framework that includes the three perspectives, ROA, ROE, and Z-score, provides more contribution to the literature.

Predicated on what is discussed in previous studies, the following hypotheses are formulated:

H1: There is a significant impact of income diversification on the return on assets (ROA) of financial companies listed on the Egyptian Stock Exchange.

H2: There is a significant impact of income diversification on the return on equity (ROE) of financial companies listed on the Egyptian Stock Exchange.

H3: There is a significant impact of income diversification on the likelihood of bankruptcy of the financial companies listed on the Egyptian Stock Exchange.

3- Research Methodology:

This study was based on a sample of 39 companies operating in the financial sector and listed on the Egyptian Stock Exchange

(EGX). These companies include commercial banks, financial investment companies, insurance companies, financial leasing companies, and financial brokerage companies. This sample was purposefully selected to represent the financial sector comprehensively while ensuring diversity of financial activities to account for the analysis of the impact of income diversification on financial sustainability.

The independent variable is income diversification, whereas the dependent variable is financial sustainability. Some control factors are also included in the study, including financial leverage, size, net income growth, and long-term investments as a percentage of total assets.

The data covered a period extending from 2014 to 2024 to track the financial and strategic performance of companies over a decade that encompasses significant economic and regulatory transformations in the Egyptian market, including the implementation of International Financial Reporting Standards (IFRS) and changes in monetary and fiscal policies, besides circumstances derived from the coronavirus pandemic. The data was extracted from the financial statements published on the Egyptian Stock Exchange website and the companies' websites.

Table (1) Study variables and Measurement

variables	Measurement	Explanation/Purpose
Dependent variable: Financial sustainability.		
ROA (Return on Assets)	Net Income / Total Assets	To measure the efficiency of using assets to generate profits
ROE (Return on Equity)	Net Income / Total Equity	To measure a company's profitability for its shareholders
Z-Score	Altman Z-Score Adjusted for the Financial Sector: $Z = X1+X2+X3+X4$ X1: Working Capital / Total Assets X2: Retained Earnings / Total Assets X3: Earnings Before Interest and Taxes / Total Assets X4: Market Value of Equity / Total Liabilities	To measure the likelihood of financial insolvency
Independent variable: Income diversification.		
Non-traditional income to total income ratio (NTIR)	Non-interest Income / Total Income	To measure the extent of income diversification through non-traditional revenue
Operating Income vs. Gross Profit (OIGP)	Operating Income / Gross Profit	To compare operational efficiency against overall performance (indicating the impact of operating expenses)
Control variables:		
FL (Financial Leverage)	Total Debt / Total Equity	To measure the extent to which a company relies on debt for financing
Size	log(Total Assets)	To reflect the overall size of the company
Net Income Growth (NIG)	$(\text{Net Income}_t - \text{Net Income}_{t-1}) / \text{Net Income}_{t-1}$	To measure net profit growth over time
Long-term Investments / Total Assets (LITA)	Long-term Investments / Total Assets	To measure the long-term investment composition of the asset structure

Three multivariate regression models were proposed to measure the impact of income diversification on various dimensions of financial sustainability, including a set of control variables to adjust for the influence of other factors. These models were used to analyze the relationship at the firm level over time, allowing for testing the hypotheses of the study within the context of the Egyptian financial sector. This study adopted the models proposed by Stiroh (2004); Altman & Hotchkiss (2006); Nguyen & Roca (2017); and Ahmed & Saleh (2019).

Model One: The Impact of Income Diversification on Return on Assets (ROA):

$$ROA_{it} = \beta_0 + \beta_1 NTIR_{it} + \beta_2 OIGP_{it} + \beta_3 FL_{it} + \beta_4 Size_{it.} + \beta_5 NIG_{it.} + \beta_6 LITA_{it.} + e_{it}$$

This model aims to test whether diversifying revenue sources—represented by the NTIR and OIGP variables—contributes to improving the efficiency of asset utilization to achieve profitability.

ROA is a pivotal indicator in measuring operational financial sustainability, as it reflects a company's effectiveness in generating profits from its existing assets. This model suggests that increasing non-traditional income may lead to improved financial performance unless it is accompanied by high operational risks.

Model Two: The Impact of Income Diversification on Return on Equity (ROE):

$$ROE_{it} = \beta_0 + \beta_1 NTIR_{it} + \beta_2 OIGP_{it} + \beta_3 FL_{it} + \beta_4 Size_{it.} + \beta_5 NIG_{it.} + \beta_6 LITA_{it.} + e_{it}$$

This model focuses on performance from the shareholders' perspective, examining the impact of diversity of income on the return achieved on the capital invested by shareholders. The model considers that shareholders are concerned with returns after covering liabilities. Therefore, the impact of income diversification may be stronger or weaker depending on the degree of risk and leverage, which are included as a control variable.

Model Three: The Impact of Income Diversification on the Z-Score:

$$Z\text{-}score_{it} = \beta_0 + \beta_1 NTIR_{it} + \beta_2 OIGP_{it} + \beta_3 FL_{it} + \beta_4 Size_{it.} + \beta_5 NIG_{it.} + \beta_6 LITA_{it.} + e_{it}$$

This model represents the protective dimension of financial sustainability, measuring whether diversification of income sources reduces the likelihood of bankruptcy.

The Z-score is an integrative measure that considers profitability, indebtedness, and liquidity and is widely used as a warning indicator of financial distress. The model aims to verify the hypothesis that companies that rely on diversified income

sources are more resilient and less vulnerable to financial risk in a volatile economic environment.

In summary, the three models reflect an integrated perspective on financial sustainability, examining the impact from the perspectives of operating profitability, shareholder return, and financial stability. These models are integrated with the hypotheses of the study. The results of the models are expected to provide quantitative insights that support administrative policies in the Egyptian financial sector toward improving diversification and reducing risk.

4-Results and Discussion:

4.1 The descriptive analysis:

Table 2 shows the results of the descriptive analysis of the study variables, which included 429 observations. Financial sustainability was measured through three primary indicators: return on assets (ROA), return on equity (ROE), and the Z-score index, which measures the probability of bankruptcy. The average ROA was relatively low, 0.013, reflecting the weak ability of financial institutions listed on the Egyptian Stock Exchange to generate returns from their assets. The negative values reached a minimum of -0.509, indicating the presence of companies suffering from operating losses. The average ROE was 8.325, but the large standard deviation of 23.001 reflects a marked variation in companies' performance, with some

companies recording severe losses of up to -167.45. The Z-score averaged 28.237, a positive indicator reflecting a high degree of security. However, extreme values of 3109.625 and a high standard deviation of 198.219 may indicate anomalous data that requires revision.

For income diversification variables, the non-traditional income-to-total income (NTIR) and operating income-to-gross profit (OIGP) ratios were used. The NTIR recorded a negative average of -0.548, which is unusual and indicates that some companies may experience fluctuations or losses in non-traditional income sources. Large negative values indicate severe variation among companies. The average OIGP was 0.269, indicating that operating profit represents approximately 27% of total profit on average. However, a minimum of -147.185 demonstrates that some companies suffer from severe operational inefficiency.

Table (2) result of descriptive analysis

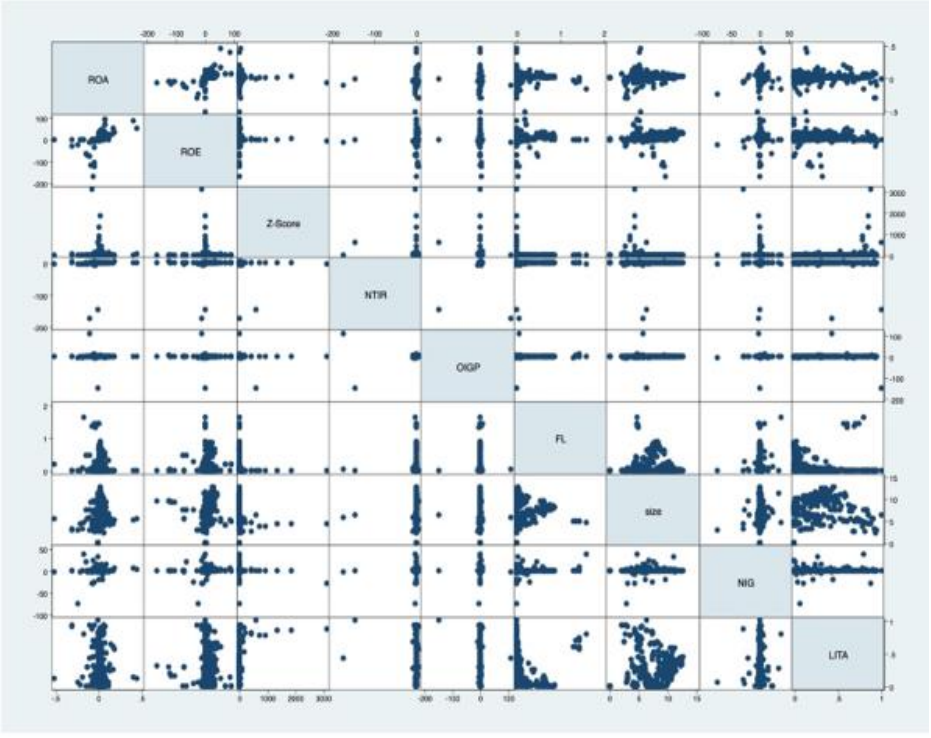
Variable	Obs	Mean	Std.Dev.	Min	Max
ROA	429	0.013	0.062	-0.509	0.450
ROE	429	8.325	23.001	-167.453	92.081
Z-Score	429	28.237	198.219	-0.756	3109.625
NTIR	429	-0.548	11.024	-174.171	5.804
OIGP	429	0.269	8.997	-147.185	111.583
FL	429	0.132	0.278	0.000	1.608
size	429	6.720	3.434	0.000	12.749
NIG	429	0.029	5.643	-74.246	36.871
LITA	429	0.264	0.263	0.000	0.998

Source: Based on Stata v14 output.

For control variables, the average financial leverage (FL) ratio was 0.132, with peak values reaching 1.608, reflecting varying degrees of reliance on debt financing. The size variable, expressed using the natural logarithm of total assets, averaged 6.720, indicating the presence of small, medium, and large companies within the sample. The average net income growth (NIG) was slightly positive at 0.029, but the sharp negative values up to -74.246 and high standard deviation indicate significant volatility in annual profitability performance. Finally, the long-term investments to total assets (LITA) variable showed an average ratio of 0.264, reflecting a moderate reliance on long-

term investment assets within companies' financial structures. The results generally indicate a significant variance in the sample characteristics in terms of financial performance, diversification, and financing structure, which supports the need to use one of the data transformation methods to follow a normal distribution. The following figure illustrates the results of the relationships between the variables represented graphically to illustrate the dispersion in the data.

Figure (1) Result of Scatter Matrix between Variables



Source: From Stata v14 output.

The figure above displays a scatter matrix, which illustrates the binary relationships between the dependent, independent, and control variables in the study. The bivariate graphs reveal clear abnormal distributions and outliers, particularly in variables related to financial sustainability, such as ROE and Z-score. This is consistent with the large standard deviations reported in the descriptive analysis table.

The matrix also shows that many variables, particularly NTIR and OIGP, tend to be clustered around a limited number of values, with some outliers scattered, indicating an asymmetric distribution (skewness). These graphical patterns indicate that the data requires processing outliers before proceeding with standard analysis. This is to ensure the validity of the results and avoid bias resulting from extreme or non-normal data distribution. Therefore, the ln function was introduced for the study variables to ensure the data followed a normal distribution. After examining the distribution, it was found that the data followed a normal distribution, supporting the use of multiple regression to demonstrate the impact between different variables.

4.2 Validity and reliability:

To verify the validity of the models used and test their compliance with the basic statistical assumptions, three main tests were conducted: the Doornik–Hansen and Shapiro–Wilk

tests to test for normal distribution of residuals and the Breusch–Pagan test to detect heteroskedasticity.

Table (3) Diagnostic tests for models

Model	Doornik-Hansen		Shapiro-Wilk W test for normal data		Breusch-Pagan	
	chi2(2)	Prob>chi2	z	Prob>z	chi2(1)	Prob>chi2
model 1	3.672	0.2653	4.661	0.2913125	2.467	0.190
model 2	3.871	0.225	5.08049	0.31753063	2.319	0.178
model 3	2.503	0.2199	4.10168	0.256355	2.368	0.182

Source: Based on Stata v14 output.

The results of the Doornik–Hansen test showed that all three models (Models 1, 2, and 3) had probability values (Prob > chi^2) above the accepted level of 0.05, reaching 0.2653, 0.225, and 0.2199, respectively. This indicates that the null hypothesis (H_0) that the residuals follow a normal distribution was not rejected, supporting the model's validity in terms of statistical consistency.

The results of the Shapiro–Wilk test also supported these conclusions, as all probability values (Prob > z) exceeded 0.25, reinforcing the assumption of a normal distribution of residuals in all models. This is a positive indication that the estimated models meet one of the basic conditions for linear regression.

Regarding the Breusch–Pagan test, which measures homogeneity of variance, the results showed that the probability values for the three models (0.190, 0.178, and 0.182) were all above the 0.05 significance level. This means that there is no problem with heteroscedasticity in the residuals, and therefore the regression estimates are reliable in terms of homoscedasticity. Based on these results, it can be concluded that the three models meet the basic diagnostic conditions to an acceptable degree and are considered suitable for analyzing the relationship between income diversification and financial sustainability indicators in the Egyptian financial sector. Before beginning the regression analysis, the following table presents the results of the variance inflation coefficient.

Table (4) Variance inflation factor

	VIF	1/VIF
LITA	1.084	.923
size	1.049	.953
FL	1.048	.954
NIG	1.023	.977
NTIR	1.016	.984
OIGP	1.008	.992
Mean VIF	1.038	.

Source: Based on Stata v14 output.

To verify the absence of multicollinearity among the independent variables in the three models, the Variance Inflation Factor (VIF)

test was used, as shown in Table 4. The results showed that all VIF values were well below the acceptable threshold of 10, and all values were less than 1.1, which are strong indications of the absence of substantial multicollinearity among the variables. These results indicate that none of the variables included in the models suffer from strong correlations that might distort the estimates or inflate the standard error, enhancing the reliability of the statistical results of the estimated models. Therefore, the three models are statistically valid in terms of the independence of the explanatory variables, which supports the accurate conclusion of the relationship between diversity of income and financial sustainability.

4.3 Hypotheses Testing:

Table (5) presents the results of standard models that aim to measure the impact of income diversification on financial sustainability indicators, using three dependent variables: return on assets (ROA), return on equity (ROE), and the Z-score. The statistical values demonstrated strong significance for the models, as confirmed by F-tests ($p < 0.01$) and high R-squared values 0.754 for the first model, 0.782 for the second model, and 0.730 for the third model), indicating the models' explanatory power in explaining changes in financial sustainability.

Table (5) Income Diversification and Financial Sustainability Test Results

variables	Model 1: ROA			Model 2: ROE			Model 3: Z-score		
	Coef.	t-value	p-value	Coef.	t-value	p-value	Coef.	t-value	p-value
NTIR	0.011	2.040	0.042**	0.087	4.870	0.00***	0.094	3.160	0.00***
OIGP	0.016	4.910	0.00***	0.056	4.460	0.00***	0.080	3.345	0.03**
FL	-0.021	-1.950	0.051*	0.247	2.060	0.051**	-0.098	-4.360	0.00***
size	0.002	2.300	0.022**	1.387	4.260	0.00***	0.203	2.710	0.007**
NIG	0.002	3.200	0.001**	0.238	2.220	0.025**	0.101	4.440	0.00***
LITA	0.013	3.140	0.00***	0.549	4.130	0.00***	0.711	6.260	0.00***
Constant	0.006	4.920	0.00***	-0.829	-3.320	0.0048**	0.955	3.810	0.021**
	R-squared		0.754	R-squared		0.782	R-squared		0.730
	F-test		4.037	F-test		3.747	F-test		11.908
	Prob > F		0.001	Prob > F		0.001	Prob > F		0.000
*** p<.01, ** p<.05, * p<.1									

Source: Based on Stata v14 output.

In the first model, which uses return on assets (ROA) as an indicator of financial sustainability, the results showed that both NTIR (the ratio of income diversification from non-traditional resources) and OIGP (operating income optimization) had a positive and significant impact on ROA. Positive β values were obtained for these two variables (β = 0.011 for NTIR and β = 0.016 for OIGP), indicating that increasing income diversification, whether through non-traditional resources or improving operating income, contributes to enhancing asset utilization efficiency and, consequently, increasing returns.

The high statistical significance (p = 0.042) indicates that income diversification through non-traditional sources (NTIR) has a significant impact on improving ROA. This means that

companies that rely on non-traditional sources of income can improve asset efficiency and increase returns. As for improving operating income (OIGP), the results showed that it had a stronger and greater impact on improving ROA ($p < 0.001$). This indicates that companies that focus on improving operational performance (such as increasing revenues from core activities and reducing costs) experience significant increases in financial efficiency through improved returns on assets.

Based on the findings, the first hypothesis (H1) is accepted, which states that diversity of income has a significant impact on return on assets. This reflects the positive relationship between income diversification and improved financial performance of companies, leading to increased profitability and efficient use of assets.

In the second model, which uses the return on equity (ROE) ratio as an indicator of financial sustainability, the results confirmed that both the ratio of income diversification from non-traditional resources (NTIR) ($\beta = 0.087$, $p < 0.001$) and operating income optimization (OIGP) ($\beta = 0.056$, $p < 0.001$) had a positive and significant impact on the return on equity.

The results showed that income diversification, whether through non-traditional resources or operating income optimization, enhances companies' ability to increase returns on equity. This reflects companies' ability to employ diverse income sources to

improve shareholder profitability and thus maximize returns received by investors. This result is important because it suggests that income diversification can be an effective mechanism for improving a company's profitability and increasing shareholder value over the long term.

Based on these results, the second hypothesis (H2) is accepted, which states that diversity of income has a significant impact on the return on equity. This reinforces the idea that companies that diversify their sources of income can maximize returns to shareholders and increase their market value, which reflects a significant positive impact on the sustainability of returns in the long term.

In the third model, which uses the standardized Z-score as an indicator of financial sustainability, the results showed that both the NTIR coefficient ($\beta = 0.094$, $p < 0.001$) and the OIGP index ($\beta = 0.080$, $p = 0.03$) had a significant positive impact. These results indicate that diversifying income sources, whether through reliance on non-traditional sources or by improving operating income, contributes significantly to reducing the likelihood of bankruptcy and consequently enhancing companies' financial sustainability. Then, companies should pursue income diversification as a key tool for reducing the risks associated with bankruptcy to improve their financial sustainability.

Based on these results, the third hypothesis (H3) is accepted, which states that diversification of income sources has a significant impact on the benchmark score. This reflects the important role of diversified income in reducing the likelihood of bankruptcy and improving companies' financial sustainability, which underscores the importance of income diversification strategies in enhancing financial security for institutions.

The control variables also showed strong statistical significance in most models. For financial leverage, in model 1 (ROA), the leverage coefficient is -0.021, with a p-value of 0.051, indicating a significant negative impact of financial leverage on ROA. This means that increased reliance on debt may negatively impact the efficiency of asset utilization to generate earnings. In model 2 (ROE), the leverage coefficient is 0.247, with a p-value of 0.051, which is close to the 10% significance level. Therefore, it can be argued that financial leverage has a weak positive impact on ROE, but the impact is not strong enough. In model 3 (Z-score), the coefficient is -0.098, with a p-value of 0.00, which is significant. This suggests that increased financial leverage increases the likelihood of financial insolvency, suggesting that highly leveraged firms may face financial sustainability challenges.

For firm size, in model 1 (ROA), the coefficient is 0.002, with a p-value of 0.022, indicating a significant positive impact of firm

size on asset utilization efficiency. That is, larger firms tend to achieve a higher return on assets. In model 2 (ROE), the coefficient is 1.387, with a p-value of 0.00, indicating a strong positive relationship between firm size and ROE. In model 3 (Z-score), the coefficient is 0.203, with a p-value of 0.007, indicating that larger firms are less likely to go bankrupt, reflecting greater financial stability.

For net income growth (NIG), in model 1 (ROA), the coefficient is 0.002, with a p-value of 0.001, indicating a significant positive impact of net income growth on ROA. That is, companies that achieve net income growth tend to improve their asset utilization efficiency. In model 2 (ROE), the coefficient is 0.238, with a p-value of 0.025, indicating a significant positive impact of net income growth on ROE. In model 3 (Z-score), the coefficient is 0.101, with a p-value of 0.00, indicating that net income growth enhances financial stability and reduces the likelihood of bankruptcy.

For long-term investments (LITA), in model 1 (ROA), the coefficient is 0.013, with a p-value of 0.00, indicating a significant positive impact of long-term investments on ROA. In model 2 (ROE), the coefficient is 0.549, with a p-value of 0.00, indicating a positive impact of long-term investments on ROE. In model 3 (Z-score), the coefficient is 0.711, with a p-value of

0.00, indicating that institutions with a higher proportion of long-term investments are less likely to go bankrupt.

5-Conclusion:

This study adopts a quantitative analytical approach to examine the impact of diversity of income on the financial sustainability of financial companies listed on the Egyptian Stock Exchange during the period from 2014 to 2024. The data used represent cross-sectional data (panel data), covering 39 companies over 11 years, which allows for the analysis of changes within companies over time, as well as between different companies. A multiple linear regression model was used within a panel data framework to test the relationship between the variables of the study.

For the Egyptian financial institutions, the descriptive analysis demonstrated that these institutions have a weak ability to generate returns from their assets, and some of them suffer from operating losses. Moreover, some institutions may experience fluctuations or losses in non-traditional income sources. On the other hand, a high level of security because of reducing the likelihood of bankruptcy is indicated by a positive Z-score.

The findings concluded that income diversification, whether through non-traditional sources or through improving operating income, contributes to increased asset utilization efficiency and enables companies to maximize shareholder returns and reduce

the likelihood of bankruptcy, hence enhancing financial sustainability. Additionally, the results of the models indicate that control variables such as financial leverage, net income growth, firm size, and long-term investments significantly affect the financial performance and sustainability of firms. Although the impact may vary across variables and models, all control variables have a significant impact on improving financial returns and reducing the likelihood of bankruptcy.

In conclusion, there is a significant impact of income diversification on the financial sustainability of the financial companies listed on the Egyptian Stock Exchange. So, companies that are seeking to improve their financial sustainability should focus on income diversification strategies, whether through investing in non-traditional sources or improving operational performance. This not only enhances their ability to improve asset efficiency and, consequently, increase returns but also increases returns on equity and higher share values. Moreover, diversifying income sources can improve financial sustainability by reducing financial risks and improving a company's ability to cope with financial crises.

Limitation and future research:

Notwithstanding the findings' uniqueness, the study included a few limitations. First, the research uses a sample of Egyptian financial institutions; future research may use samples from

different countries with different social and economic circumstances. Second, this research focuses on the financial industry; hence, further research can explore the relationship in other industries. Third, the research considers revenue diversification as one factor that affects financial sustainability; future studies should explore internal and external factors that lead to financial sustainability in business. Notably, further research could also examine the ideal level of diversification for various types of businesses. Additionally, surveys or in-depth interviews with managers or senior officers should be a part of future research to explore this relationship.

Practical Implications:

The results indicate the importance of revenue diversification as a key strategy contributing to improved financial sustainability indicators, especially return on assets and return on equity. Besides, income diversification is a key tool for reducing the risks associated with bankruptcy and improving financial sustainability. Therefore, companies should consider adopting income diversification and operational efficiency strategies as part of their strategic plans to achieve greater financial sustainability.

These findings would have important practical implications. For managers at financial institutions in Egypt, a clearer understanding of how income diversification impacts their

financial sustainability can directly inform strategic planning, guiding their efforts to identify and pursue optimal revenue streams. Managers also need to focus on increasing revenues from multiple sources, whether traditional or non-traditional, and on improving the efficiency of their operating activities. Consequently, that leads to creating long-term competitive advantages and effective financial and operating systems. For regulatory bodies and policymakers, the insights could be instrumental in designing frameworks that support the sustainable growth and resilience of this sector, thereby fostering broader economic stability and social development.

References:

- Adelino, M., Lewellen, K., & McCartney, W. B. (2022). Hospital financial health and clinical choices: evidence from the financial crisis. *Management Science*, *68*(3), 2098-2119.
- AFRIYIE AOA. (2015). Financial sustainability factors of higher education institutions: a predictive model. *International Journal of Education Learning and Development* 2(3): 17-38.
- Ahmed, R., & Saleh, A. (2019). Income Diversification and Financial Performance in Emerging Markets: Evidence from the Financial Sector. *Journal of Emerging Market Finance*, 18(2), 225-230.
- Alhabow, A. H. (2023). Internal audit and its role in achieving financial sustainability in self-financing units/case study. *Revenue Journal: Management and Entrepreneurship*, 1 (1), 01–10

- Altman, E. I., & Hotchkiss, E. (2006). Corporate Financial Distress and Bankruptcy: Predict and Avoid Bankruptcy, *Analyze and Invest in Distressed Debt.* Pp 92-100.
- Berger, A. N., Hasan, I., & Zhou, M. (2010). The effects of focus versus diversification on bank performance: Evidence from Chinese banks. *Journal of Banking & Finance*, *34*(7), 1417-1435.
- Carroll, D. A. (2009). Diversifying municipal government revenue structures: Fiscal illusion or instability?. *Public Budgeting & Finance*, *29*(1), 27-48.
- Carroll, D.A. and Stater, K.J. (2009) Revenue Diversification in Non-profit Organizations: Does it Lead to Financial Stability? *Journal of Public Administration Research and Theory* 19(4), 947–966. https://doi.org/10.1093/jopart/mun025
- Çavmak, D. (2024). A Study on The Internal Determinants of Financial Sustainability Performance in Private Hospitals. *Selçuk Üniversitesi Sosyal Bilimler Meslek Yüksekokulu Dergisi*, *27*(1), 321-331.
- Chang, C. F., & Tuckman, H. P. (1994). Revenue diversification among non-profits. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *5*(3), 273-290.
- Cherian, J., Gaikar, V., Paul, R., & Pech, R. (2021). Corporate culture and its impact on employees' attitude, performance, productivity, and behavior: An investigative analysis from selected organizations of the United Arab Emirates (UAE). *Journal of Open Innovation: Technology, Market, and Complexity*, *7*(1), 45.
- Cheuk, S. (2021). Financial management capacity, accountability, own income generation, revenue diversification and financial sustainability in charities of Malaysia. *Studies of Applied Economics*, *39*(1).

- Despard, M. R., Nafziger-Mayegun, R. N., Adjabeng, B. K., & Ansong, D. (2017). Does revenue diversification predict financial vulnerability among non-governmental organizations in sub-Saharan Africa?. *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, *28*, 2124-2144.
- Di Carlo, F., Modugno, G., Agasisti, T., & Catalano, G. (2019). Changing the accounting system to foster universities' financial sustainability: first evidence from Italy. *Sustainability*, *11*(21), 6151.
- Elton, E. J., & Gruber, M. J. (1997). Modern portfolio theory, 1950 to date. *Journal of banking & finance*, *21*(11-12), 1743-1759.
- Froelich, K. A. (1999). Diversification of revenue strategies: Evolving resource dependence in nonprofit organizations. *Nonprofit and voluntary sector quarterly*, *28*(3), 246-268.
- Githaiga, P. N. (2021). Revenue diversification and financial sustainability of microfinance institutions. *Asian Journal of Accounting Research*, *7*(1), 31-43.
- Gleißner, W., Günther, T., & Walkshäusl, C. (2022). Financial sustainability: measurement and empirical evidence. *Journal of Business Economics*, *92*(3), 467-516.
- Goddard, J., McKillop, D., & Wilson, J. O. (2008). The diversification and financial performance of US credit unions. *Journal of banking & finance*, *32*(9), 1836-1849.
- Gronbjerg, K. A. (1993). Understanding nonprofit funding: Managing revenues in social services and community development organizations, San Francisco: Jossey-Bass.

- Hodge, M. M., & Piccolo, R. F. (2005). Funding source, board involvement techniques, and financial vulnerability in nonprofit organizations: A test of resource dependence. *Nonprofit management and leadership*, *16*(2), 171-190.

  https://doi.org/10.1108/JPBAFM-24-01-2012-B003

- Hung, C., & Hager, M. A. (2019). The impact of revenue diversification on nonprofit financial health: A meta-analysis. *Nonprofit and voluntary sector quarterly*, *48*(1), 5-27.

- Jaafar, J. A., Latiff, A. R. A., Daud, Z. M., & Osman, M. N. H. (2023). Does revenue diversification strategy affect the financial sustainability of Malaysian public universities? A panel data analysis. *Higher Education Policy*, *36*(1), 116-143.

- Kingma, B. R. (1993). Portfolio theory and nonprofit financial stability. *Nonprofit and Voluntary Sector Quarterly*, *22*(2), 105-119.

- Luo, L., & Dai, Z. (2024) Does the Carbon Market Inhibit the Financial Sustainability of Thermal Power Generation Enterprises? Evidence from a Quasi-Natural Experiment in China.

- Mahali, M., & Ansari, M. N. (2023). Income diversification and financial sustainability of Indian microfinance institutions (MFIs): An empirical study. *Mahali, M., & Ansari, MN (2024). Income Diversification and Financial Sustainability of Indian Microfinance Institutions (MFIs): An Empirical Study. International Journal of Banking, Risk & Insurance*, *12*(1).

- Markowitz, H. M., & Todd, G. P. (2000). *Mean-variance analysis in portfolio choice and capital markets*. John Wiley & Sons.

- MARWA N & AZIAKPONO M. (2015). Financial sustainability of Tanzanian saving and credit cooperatives. *International Journal of Social Economics* 42(10):870-887.
- Mayer, W. J., Wang, H. C., Egginton, J. F., & Flint, H. S. (2014). The impact of revenue diversification on expected revenue and volatility for nonprofit organizations. *Nonprofit and Voluntary Sector Quarterly*, *43*(2), 374-392.
- McLaren, J. I., & Struwig, F. W. (2019). Financial ratios as indicators of financial sustainability at a South African university. *Journal of Contemporary Management*, *16*(2), 68-93.
- Meyer, R. L. (2002). The demand for flexible microfinance products: lessons from Bangladesh. *Journal of international development*, *14*(3), 351-368.
- Najam, H., Abbas, J., Alvarez-Otero, S., Dogan, E., & Sial, M. S. (2022). Towards green recovery: Can banks achieve financial sustainability through income diversification in ASEAN countries?. *Economic Analysis and Policy*, *76*, 522-533.
- Naveed Aslam, M., & Usman, A. K. (2022). Evaluation of financial sustainability of Islamic microfinance institutions in Pakistan. *Journal of Islamic & Religious Studies*, *6*(1), 98-120.
- Nguyen, H., & Roca, E. (2017). The Role of Financial Sustainability in Bank Performance. *Financial Management,* 46(3), 743-767.
- Osazefua Imhanzenobe, J. (2020). Managers' financial practices and financial sustainability of Nigerian manufacturing companies: Which ratios matter most?. *Cogent Economics & Finance*, *8*(1), 1724241.

- Osei-Kuffour, F., & Peprah, W. K. (2020). Correlate of income diversification and financial sustainability of private tertiary institutions as moderated by institutional profile. *International Journal of Academic Research in Accounting, Finance and Management Services*, *10*.
- Pferrer, J., & Salancik, G. R. (2003). *The external control of organizations: A resource dependence perspective*. Stanford, CA: Stanford Business Books.
- Shariff, K., & Kronenberg, J. (2018). Revenue diversification strategy for higher education in the GCC. *Retrieved April*, *21*, 2019.
- Sontag-Padilla, L., Staplefoote, B. L., & Gonzalez Morganti, K. (2012). Financial sustainability for nonprofit organizations: A review of the literature. RAND Corporation. Research reports. United States.
- Stiroh, K. J. (2004). Diversification in banking: Is noninterest income the answer?. *Journal of money, Credit and Banking*,36(5), 853-882.
- Talel, L. C., Asienga, I., & Githaiga, P. N. (2024). Income Diversification and Financial Sustainability of Microfinance Institutions in Kenya. *The Journal of Financial, Accounting, and Economics*, *1*(1), 33-44.
- Trinh, T. M., Nguyen, T. T. H., Pham, O., & Pham, H. H. (2025). The financial sustainability of Vietnamese higher education institutions: unveiling the hidden factors. *Asian Education and Development Studies*, *14*(2), 267-282.
- Trussel, J. M. (2002). Revisiting the prediction of financial vulnerability. *Nonprofit Management and Leadership*, *13*(1), 17-31.
- Uz-Zaman, A., Hossain, M. S., & Abedin, M. T. (2023). Route to Financial Sustainability: Implications in a Mixed Method

Framework. *Ashik-Uz-Zaman, Hossain, MS, & Abedin, MT (2023). Route to financial sustainability: Implications in a mixed method framework [Special issue]. Corporate Ownership & Control*, *20*(3), 386-407.

- Wicker, P., & Breuer, C. (2014). Examining the financial condition of sport governing bodies: The effects of revenue diversification and organizational success factors. *VOLUNTAS: International Journal of Voluntary and Nonprofit Organizations*, *25*, 929-948.
- Xie, Z., Liu, X., Najam, H., Fu, Q., Abbas, J., Comite, U., ... & Miculescu, A. (2022). Achieving financial sustainability through revenue diversification: A green pathway for financial institutions in Asia. *Sustainability*, *14*(6), 3512.
- Yan, W. (2011) The interactive effect of revenue diversification and economic base on US local government revenue stability. *Journal of Public Budgeting, Accounting and Financial Management* 31(6), 419–426.