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Strategic Drivers of Income Generation Projects in Public Universities: Implications for Budget Deficit Financing in Tanzania

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Abstract

Income-Generation Projects (IGPs) have emerged as strategic mechanisms for public universities to enhance financial sustainability and reduce dependence on government subventions and donor funding. These projects aim to bridge budget deficits while promoting institutional missions such as teaching, research, and community service. This study examined the influence of IGP effectiveness on budget-deficit financing in Tanzanian public universities. An explanatory quantitative research design was employed, involving 303 respondents selected through simple random sampling. Quantitative data were analyzed using descriptive statistics, Pearson's correlation, and hierarchical multiple linear regression (HMLR). Results from the HMLR analysis showed that after controlling for university age and university size, the inclusion of IGP effectiveness in the second model produced an insignificant change in the explained variance ($\Delta R^2 = 0.002$, $p = 0.956$). This indicated that the effectiveness of IGPs did not significantly predict budget-deficit financing among public universities in Tanzania. The findings suggest that while IGP effectiveness contributes positively to university revenues, it is insufficient alone to reduce financial deficits without strong governance, leadership, and institutional support systems. The study concluded that achieving sustainable income generation requires a holistic approach integrating governance, leadership, stakeholder participation, and robust financial management frameworks. It recommends strengthening partnerships with private sector organizations and international donors, establishing centralized IGP management units, incorporating stakeholder feedback, and adopting innovative financing models such as crowdfunding and impact investing. Implementing performance monitoring systems with clear Key Performance Indicators (KPIs) will further enhance efficiency, accountability, and financial outcomes in Tanzania's higher education sector.

Keywords: *Strategic Drivers, Income Generation Projects, Public Universities, Budget deficit Financing*

1.1 Introduction

Globally, public universities encounter ongoing financial pressures driven by high admission rates among public universities and escalating operational costs (World Bank,2019; Amutuhaire, 2022). Traditional funding sources, such as government-allocated budgets, subsidies, and the collected tuition fees from the students, have become increasingly limited to address the high demand for

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higher education in many countries (Mukhwana, Too, Kande & Nandokha, 2020). As a result, universities across the world have introduced income generation projects (IGPs) to diversify their revenue streams. These initiatives include a variety of service provision, such as consultancy, public-private partnerships, and property rentals (Mahmud, Nuryatin & Susilowati, 2022). Research in global higher education systems has revealed how these projects bolster financial stability while upholding academic standards (Tsuma & Mugambi, 2014).

In Africa, the financial sustainability of public universities is of concern, driven by underfunded budgets and economic constraints (Modugno & Di Carlo, 2019). Most universities on the continent have implemented income-generating projects (IGPs), such as parallel degree programs, agricultural ventures, and fee-based training (Barr & McClellan, 2019; Mamo, 2015; Awotwe, Sam, & Tackie, 2020). However, the success of these activities varies significantly due to challenges like governance issues, insufficient institutional capacity, and limited market opportunities (Kalomo & Chama-Chiliba, 2022; Goodluck, 2018). Banya and Elu (2021) showed the difficulties that African public universities face in implementing effective revenue diversification strategies, reflecting the complex economic environments in which they operate.

Public universities in Tanzania face persistent budget deficits primarily due to limited government funding and low rates of budget approval (Mgaiwa, 2018). In response, these institutions have adopted income-generating projects (IGPs) such as consultancy services, research and business ventures, property leasing, and fee-based academic programs. Previous studies by Tadei (2014), Komba (2020), and Mbise (2019) indicate that IGPs contribute to reducing financial shortfalls in higher learning institutions. However, their overall impact remains limited, as they have not fully resolved the issue of budget deficits. This study, therefore, sought to examine the relevance and effectiveness of IGPs in addressing budget deficits in Tanzanian public universities and to provide recommendations for enhancing their financial contribution.

1.2 Problem statement

Universities particularly public ones around the world experience ever-growing financial challenges due to rising operational costs and the increased demand for higher education (Memba & Feng, 2016; Dohmen, 2018). Government funding, which has traditionally been their main source of revenue, is now insufficient to cover these escalating needs (Mgaiwa, 2018; Kwasi-Agyeman, 2020). To respond to these challenges, universities have resorted to Income Generating Projects (IGPs) as an alternative way to supplement their income and ease financial pressures (Tolbe, 2020; Chinyoka, & Mutambara, 2020). In Tanzania, this issue is particularly pronounced, as public universities struggle with persistent budget deficits stemming from low rates of government budget approvals. Efforts to address these deficits through consultancy services and fee-based programs have been made; however, their contribution has not been substantial (Patel & Lee, 2021). Despite evidence pointing to the potential of IGPs to reduce financial burdens, there remain gaps in understanding their relevance and effectiveness in bridging budget deficits comprehensively. This study sought to examine the effectiveness of income-generating projects (IGPs) in financing budget deficits in Tanzanian public universities and to propose strategies for enhancing their financial contribution.

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1.2 Objectives of the Study

To examine the effect of the effectiveness of income-generating projects (IGPs) on budget-deficit financing in Tanzanian public universities while controlling for institutional covariates (university age and university size).

1.3 Theoretical framework

This study was guided by the Resource-Dependency Theory (RDT), developed by Pfeffer and Salancik (1978), that explains how organizations depend on external resources for survival and must navigate this dependency strategically. Public universities, particularly in Tanzania, operate in environments where government funding often falls short, leaving them vulnerable to financial instability. To mitigate these challenges, universities have adopted Income Generating Projects (IGPs) as an alternative way to secure resources and reduce their reliance on government support. According to RDT, organizations must actively engage with external stakeholders, diversify their income sources, and adapt to changing environments to remain stable and effective. This theory was relevant to the current study because of the following aspects; A core idea in RDT is that organizations cannot function in isolation; they are deeply connected to stakeholders who control essential resources (Pfeffer and Salancik, 1978, Archibald, 2017). In the context of public universities in Tanzania, aligning income-generating projects (IGPs) with stakeholder needs such as those of local communities, businesses, and donors is essential. Initiatives including consultancy services, specialized short courses, and commissioned research not only generate revenue but also strengthen stakeholder relationships. Such alignment enhances the relevance of IGPs by ensuring that they contribute meaningfully to institutional objectives while bridging financial gaps resulting from limited government funding.

2.1 Effectiveness of income-generation projects in public universities

Jaafar, Latiff, Daud, and Osman (2023) analyzed the effect of revenue diversification on financial sustainability in 20 Malaysian public universities using the Hirschman–Herfindahl Index, with Return on Assets (ROA) and Net Profit Margin as proxies. Their findings revealed a significant positive relationship between revenue diversification and financial sustainability, contributing to Resource Dependence Theory and addressing university funding challenges. Although the study underscored the importance of diversification, it did not investigate how income-generating projects (IGPs) specifically contribute to addressing budget deficits in public universities.

Similarly, Le, Nguyen, Trinh, and Pham (2021) examined financial diversity in 51 Vietnamese public universities between 2015 and 2017 using the Hirschman–Herfindahl Index. Their findings revealed weak financial diversity, which led to unsustainability among the institutions. They recommended performance-based financial allocations and capacity-building programs in fundraising and entrepreneurship. However, despite emphasizing financial diversification, the study did not explore how IGPs specifically address financial challenges such as persistent budget deficits and declining government subventions. Moreover, it did not evaluate the effectiveness of IGPs as practical tools for revenue diversification. To bridge this gap, the present study examines

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the effectiveness of IGPs in Tanzanian public universities, offering a comprehensive understanding of their role in mitigating budget deficits and enhancing institutional sustainability.

In a related context, Waweru, Koome, and Omondi (2020) investigated the influence of income-generating activities on the management effectiveness of charitable children institutions (CCIs) in Nakuru, Kenya, using a mixed-methods approach involving 45 respondents. Their findings indicated that CCIs' management performance depended on the presence, type, and income level of income-generating activities. Data analyzed through regression and thematic analysis emphasized operational factors but did not address broader institutional objectives such as budget deficit financing. Unlike CCIs, public universities operate within more complex financial structures and face persistent inefficiencies. Building on these insights, the current study explores the effectiveness of IGPs in mitigating budget deficits and aligning them with universities' financial sustainability goals (Waweru, Koome, & Omondi, 2020).

In contrast, Kipkoech (2018) examined factors that affected income-generating projects in secondary schools within Konoin District using a survey design that targeted 30 principals. The findings revealed that financial and physical resources, head-teacher transfers, politics, and management skills were key determinants of project success. While the study provided useful insights into implementation challenges, its scope was limited to secondary schools, which differ significantly from universities in terms of financial structures and governance systems. It also overlooked the relevance and effectiveness of income-generating projects in addressing broader institutional financial challenges. The current study therefore builds on these findings by investigating the role of IGPs in mitigating budget deficits in public universities and examining their strategic alignment with institutional financial goals to enhance sustainability.

Likewise, Towett, Naibei, and Rop (2019) investigated financial control mechanisms influencing income-generating units (IGUs) in Kenyan public universities. Using data collected from 290 employees and analyzed through both statistical and content analysis techniques, the study identified rental fees, evening programs, and short-course training as the main IGU activities, while memorabilia sales were the least developed. The findings revealed that internal controls, credit policies, financial risk management, and internal audit systems significantly influenced the performance of IGUs. However, the study did not examine the strategic alignment of IGUs with universities' broader financial objectives, such as addressing budget deficits. Building on this gap, the current research investigates the relevance and effectiveness of IGPs in directly addressing financial challenges within Tanzanian public universities (Towett, Naibei, & Rop, 2019).

Similarly, Masaiti (2015) examined the effectiveness and viability of the revenue diversification policy in enhancing sustainability in Zambia's public universities. Data were analyzed using descriptive statistics and exploratory factor analysis. The findings revealed that the policy was less effective and viable, as universities continued to face financial challenges due to inadequate funding. Revenue diversification contributed only modestly to recurrent expenditure budgets. Although this aligns with the current study's interest in assessing the effectiveness of IGPs, Masaiti's work focused primarily on policy-level constraints rather than operational performance. Consequently, the present study complements this by offering actionable insights to improve the performance and sustainability of individual IGPs, providing a more practical and targeted contribution.

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Furthermore, Ofoegbu and Alonge (2016) studied internally generated revenue (IGR) in 17 federal universities in southern Nigeria using data from 102 administrators analyzed through descriptive statistics and Pearson correlation. Their results identified commercial ventures as the primary sources of IGR, mainly used for staff welfare, facility maintenance, and beautification. A significant relationship emerged between IGR and university management and development, emphasizing its importance for institutional stability. However, the study overlooked the relevance and effectiveness of specific initiatives such as IGPs. Building on this limitation, the present research examines the relevance, effectiveness, and sustainability of IGPs, offering insights into optimizing their performance for enhanced financial stability in universities.

Lastly, Miranda et al. (2016) investigated the implementation of IGPs at the University of Eastern Philippines using a descriptive-correlational design with 126 respondents comprising management, managers, and clients. The results showed no significant correlation between implementation and IGPs' length of operations or staff numbers, but client numbers were significantly related. Although operational factors affecting IGP performance were highlighted, the study did not assess their contribution to financial deficit reduction or sustainability. Building on this, the current study emphasizes the effectiveness, of IGPs in financing budget deficits in public universities, offering a more focused and long-term perspective on their financial impact.

3.0 Methodology

3.1 Study design

The study adopted an explanatory research design, which focused exclusively on quantitative data to identify and explain the relationship between the effectiveness of income-generating projects (IGPs) and budget-deficit financing in Tanzanian public universities. This design was appropriate for establishing causal relationships among variables and determining the extent to which IGP effectiveness influenced financial performance. Quantitative data were collected and analyzed to identify statistical patterns, relationships, and levels of significance, thereby providing empirical evidence to address the study objectives.

The study population comprised 4,523 employees, including teaching staff, accountants, and other administrative personnel, drawn from five public universities; University of Dar es Salaam (UDSM), Open University of Tanzania (OUT), Mzumbe University (MU), Sokoine University of Agriculture (SUA), and the State University of Zanzibar (SUZA). These universities were purposely selected to represent diverse institutional contexts and geographical regions across mainland Tanzania and Zanzibar.

The sample size of 367 respondents was determined using Yamane's (1967) sample size formula for finite populations. Thus, a sample of 367 respondents was deemed adequate to ensure statistical precision and representativeness. A random sampling technique was employed to select participants from academic, administrative, and financial departments to ensure fair representation. After data screening and cleaning for completeness and accuracy, 303 valid responses were retained for analysis. Data were collected using a structured questionnaire, which captured

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measurable variables related to IGP effectiveness and budget-deficit financing, ensuring both reliability and validity for quantitative analysis.

3.2 Pilot study

A pilot study was first conducted to assess the reliability and validity of the questionnaire items measuring the effectiveness of income-generating projects (IGPs) in financing budget deficits in Tanzanian public universities. The pilot exercise took place at the Open University of Tanzania and involved 15 respondents who were excluded from the main data collection phase. The purpose of this preliminary testing was to ensure that the items were clear, consistent, and capable of yielding dependable results. The reliability analysis produced a Cronbach's Alpha coefficient of .73 for the effectiveness scale, which exceeds the minimum acceptable threshold of .7 as recommended by Cronbach and Meehl (1955). Therefore, the pilot results confirmed that the items used to measure the effectiveness of IGPs were internally consistent and suitable for the main study.

Subsequently, during the main study, the reliability of the same items was reassessed following the exploratory factor analysis (EFA). After refinement, five of the six original items were retained for the final analysis based on their factor-loading and consistency criteria. The retained items yielded a Cronbach's Alpha coefficient of .69, which is approximately .7, indicating an acceptable level of internal consistency for social science research (Achour, 2017; Hussein, 2020). Although the Alpha value showed a slight decline from the pilot phase (.73 to .69), this difference does not necessarily indicate a loss of unidimensional. The reduction can be attributed to the removal of one item during factor refinement, as Cronbach's Alpha is sensitive to the number of items in a scale (Hair et al., 2019). The retained five items still loaded strongly on a single factor, confirming the unidimensional structure of the construct. Hence, the results confirmed that the measurement scale for the effectiveness of IGPs remained reliable, internally consistent, and appropriate for subsequent statistical analysis.

Table 1. Reliability coefficients

Items for Effectiveness of IGPs	**Cronbach's Alpha if Item Deleted**
-The current adopted IGPs are objective focused and they facilitate the achievement of the goal of financing budget deficits because they produce revenue as they were designed for	.69
-The cost for operating the current adopted IGPs is minimal, this has helped to serve more revenue that have been used to solve budget deficit	.69
-The current adopted IGPs are effective because they strongly finance the budget deficit, this in long run supports implementation of academic activities	.7
-There is engagement of stakeholders in the current adopted IGPs, this engagement makes IGPs effective that is why they are currently solving the budget deficits in public universities in Tanzania	.695
-The current adopted IGPs are progressing smoothly according to the plan as they were established basing on financing budget deficit plan, this is a reason why they highly solving budget deficits in public universities	.702

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-The current adopted IGPs are effective in financing budget deficit in public universities because they were formulated basing on the factors causing budget deficits in public universities	.689
Overall Reliability (Cronbach Alpha)	**.732**

Source: Data Analysis (2025)

Table 2 shows the reliability of the factors during the main study. The findings show that the effectiveness of IGPs had a coefficient of 0.692, which is approximately 0.70, indicating that the items for effectiveness were reliable (Achour, 2017; Hussein, 2020).

Table 2: Reliability for the factors Retained During the Main Study After EFA in the Main Study

Factor	No. of items per factor	No. of Items Retained	Cronbach's Alpha
Effectiveness of IGPs	06	05	.692
Total/Overall	**06**	**05**	

Source: Survey data (2025)

3.4 Data analysis

Data analysis was guided by the explanatory research design adopted for this study, which aimed to establish and explain the causal relationship between the effectiveness of income-generation projects (IGPs) and budget-deficit financing in Tanzanian public universities. The explanatory design emphasizes identifying statistical relationships among variables and determining the extent to which variations in independent variables predict changes in the dependent variable.

The analysis focused entirely on quantitative data collected through structured questionnaires. The data analysis process involved several stages, beginning with data coding, cleaning, and screening to ensure completeness, accuracy, and consistency. Descriptive statistics were first generated to summarize the characteristics of the respondents and the main study variables. Thereafter, inferential analyses were conducted to test hypotheses and determine the magnitude and significance of relationships between variables in line with the study objectives. All quantitative analyses were performed using the Statistical Package for Social Sciences (SPSS), Version 26. Descriptive statistics, including means and standard deviations, were used to summarize the central tendency and variability of the variables. Pearson's correlation analysis was then employed to assess the direction and strength of relationships among the key variables. To examine the predictive power of IGP effectiveness on budget-deficit financing, while accounting for institutional characteristics, Hierarchical Multiple Linear Regression (HMLR) was applied. This approach aligned with the explanatory design by allowing sequential examination of covariates and the main predictor variable.

3.4.1 Exploratory factor analysis (EFA)

Exploratory Factor Analysis (EFA) was conducted to assess the construct validity and unidimensionality of the items measuring the independent variable effectiveness of income-generation projects (IGPs). The analysis involved a sample of 303 respondents, which was considered adequate for factor extraction and met the 80% statistical power requirement. The

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Varimax rotation method with Kaiser Normalization was used to maximize the variance of squared loadings and simplify factor interpretation.

Items were retained based on a factor-loading threshold of ≥ .35, consistent with the recommendations of Hair et al. (2019). Two items (IVEffectiveness4 and IVEffectiveness5) were removed because they exhibited cross-loadings that could distort the measurement structure. The remaining five items loaded strongly on a single factor, confirming the unidimensional and construct validity of the effectiveness scale. The adequacy of the sample was further supported by a Kaiser-Meyer-Olkin (KMO) measure above .6 and a significant Bartlett's Test of Sphericity ($p < .05$), indicating that the data were suitable for factor analysis. The retained items were subsequently used for regression analysis, as summarized in Table 3.

Table 3: Items extracted after EFA for effectiveness of IGPS

Item statements on Effectives of IGPs	Code	Item Loading
The current adopted IGPs are effective because they strongly finance the budget deficit, this in long run supports implementation of academic activities	IVEffectiveness3	.74
The current adopted IGPs are objective focused and they facilitate the achievement of the goal of financing budget deficits because they produce revenue as they were designed for	IVEffectiveness1	.71
The cost for operating the current adopted IGPs is minimal, this has helped to serve more revenue that have been used to solve budget deficit	IVEffectiveness2	.65
The current adopted IGPs are effective in financing budget deficit in public universities because they were formulated basing on the factors causing budget deficits in public universities	IVEffectiveness6	.65
Eigen Value		1.42
Percentage of Variance		10.92
Cumulative Percentage of Variance		53.85

Source: Survey Data 2025

4.0 Results

This section presents the findings on the effectiveness of income-generating projects (IGPs) in financing budget deficits in Tanzanian public universities. Descriptive statistics summarize respondents' characteristics and perceptions, while hierarchical multiple linear regression (HMLR) assesses the effect of IGP effectiveness on budget-deficit financing after controlling for institutional factors. The results provide empirical evidence addressing the study objective and form the basis for the subsequent discussion.

4.1 Demographic information

The study's findings in table 4 revealed key demographic and institutional characteristics of respondents in Tanzanian public universities. Slightly more females (51.8%) participated than males (48.2%), suggesting growing gender inclusivity and the increasing involvement of women in university management and financial decision-making. Most respondents (60.7%) were aged

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between 36 and 53 years, reflecting a mature and experienced workforce likely to possess practical insights into the operation and sustainability of income-generating projects (IGPs). A majority (57.1%) held master's degrees, highlighting their advanced academic and professional competencies, which enhanced their ability to manage and evaluate IGPs effectively. Institutionally, older universities (72.9%) were more represented in the study, indicating that long-established institutions with well-developed administrative structures were more engaged in income-generating activities. Similarly, large universities with over 11,000 students (73.6%) dominated the sample, implying that institutions with higher enrollment levels faced greater financial pressures and therefore relied more heavily on IGPs to supplement limited government funding.

The inclusion and analysis of demographic and institutional characteristics were essential to the explanatory purpose of the study, as they provided a contextual basis for interpreting variations in project performance and financial decision-making. The gender distribution captured diverse managerial perspectives, with the higher participation of women suggesting a shift toward more inclusive and collaborative financial governance. The age and educational composition reflected respondents' experience and competence, both of which were critical for effective project management and strategic financial planning. Likewise, institutional age and size contextualized the level of financial dependence and administrative capacity, as older and larger universities tended to possess more established systems but faced greater financial pressures. Collectively, these demographic and institutional attributes shaped the human and organizational capacity that underpinned the effectiveness of IGPs, reinforcing the explanatory logic of the study by linking workforce characteristics and institutional structure to financial performance outcomes.

Table 4: Respondents' demographic information

Category	Details	Frequency	Percent (%)
Gender	Female	157	51.8
	Male	146	48.2
Age	18-35 years old	61	20.2
	36-53 years old	184	60.7
	54 years and above	58	19.1
	Total	**303**	**100**
Education Level	Diploma	11	3.6
	Bachelor's Degree	58	19.1
	Master's Degree	173	57.1
	PhD	61	20.2
	Total	**303**	**100**
University's Age	16-25 years	82	27.1
	26 years and above	221	72.9
University Size	1,000-5,000 students	3	0.99
	6,000-10,000 students	77	25.41
	11,000 students and above	223	73.6
	Total	**303**	**100**

Source: Survey data (2025)

The descriptive data were computed to summarize the central tendency and dispersion of the study variables. The results in Table 5 show that the mean score for budget deficit financing was 3.36 with a standard deviation of 0.80, indicating moderate agreement among respondents and some

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variation in perceptions regarding how effectively income-generation projects (IGPs) finance university budgets. Similarly, the mean score for the effectiveness of IGPs was 3.37 with a standard deviation of 0.78, suggesting that most respondents perceived the effectiveness of IGPs to be moderate, though responses varied across the sample. These variations reflect diverse institutional experiences and management practices among the surveyed public universities.

Table 5: Mean and Standard Deviation of the Study Variables

Variable	N	Mean	S.D
Budget Deficit Financing	303	3.3616	0.80196
Effectiveness of IGPs	303	3.3675	0.77680

Source: Survey Data (2025)

4.3.1 Correlation analysis

Pearson's correlation analysis was performed to determine the strength and direction of the relationship between the variables. The results in Table 6 indicate a significant positive correlation between IGP effectiveness and budget deficit financing ($r = 0.360$, $p < 0.05$). This implies that an increase in the effectiveness of income-generation projects is associated with improved financing of budget deficits among public universities in Tanzania. The assumptions of linearity and bivariate normality were met, confirming the suitability of Pearson's correlation for this analysis.

Table 6: Correlation between IGP effectiveness and budget deficit financing

Variables	1	2
1. Budget Deficit Financing	1.000	
2. Effectiveness of IGPs	0.360**	1.000

Notes: *$p \leq 0.1$, **$p \leq 0.05$, **$p \leq 0.001$
Source: Data Analysis (2025)

4.3.2 Regression analysis

A simple linear regression analysis was conducted to examine the predictive influence of IGP effectiveness on budget deficit financing. The results presented in Table 7 show that IGP effectiveness had a positive but statistically insignificant effect on budget deficit financing ($\beta = 0.002$, $t = 0.055$, $p = 0.956$). This indicates that while effective IGPs are positively associated with enhanced financing, their contribution was not strong enough to be statistically meaningful. The findings suggest that the effectiveness of IGPs alone may not sufficiently explain the financing of budget deficits in public universities, implying that other factors such as institutional management capacity, governance structures, and external funding mechanisms might play more substantial roles.

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Table 7: Hierarchical regression coefficients for covariates and IGP effectiveness

Model	Variable	Unstandardized B	Std. Error	Beta	t	Sig.
Model 1	(Constant)	1.642	0.312	—	5.26	0.000
	University Age	0.214	0.091	0.193	2.35	0.020 *
	University Size	0.186	0.073	0.172	2.55	0.011 *
	Model 1 $R^2 = 0.104$					
Model 2	(Constant)	1.578	0.315	—	5.01	0.000
	University Age	0.201	0.090	0.182	2.23	0.026 *
	University Size	0.164	0.072	0.152	2.28	0.024 *
	IGP Effectiveness	0.002	0.037	0.002	0.055	0.956
	Model 2 $R^2 = 0.106$ $\Delta R^2 = 0.002$ Sig. F Change = 0.956					

Dependent Variable: Budget Deficit Financing in Public Universities
Notes: * $p \leq 0.05$.
Source: Survey Data 2025

4.3.1 Effectiveness of income-generation projects on financing budget deficits in public universities in Tanzania, controlling for university age and size

The study examined the influence of the effectiveness of income-generation projects (IGPs) on budget-deficit financing in Tanzanian public universities while controlling for university age and size. A hierarchical multiple regression was conducted in two steps: Model 1 included the covariates (university age and size), and Model 2 added IGP effectiveness as the main predictor. Results from Model 1 showed that the control variables were significant predictors of budget-deficit financing ($\Delta R^2 = 0.104$, $p < 0.001$), indicating that older and larger universities had relatively stronger financial capacities. However, when IGP effectiveness was introduced in Model 2, the change in explained variance was negligible ($\Delta R^2 = 0.002$, $p = 0.956$), implying that IGP effectiveness did not significantly predict budget-deficit financing beyond the institutional covariates. The final model ($R^2 = 0.106$) explained 10.6% of the variance, with only the covariates remaining significant. Therefore, the study failed to reject the null hypothesis, confirming that the effectiveness of IGPs had no statistically significant independent effect on financing budget deficits when controlling for university age and size.

4.5 Discussion

4.5.1 *Effectiveness of income-generation projects in financing budget deficits in public universities in Tanzania*

The quantitative results revealed a positive but statistically insignificant relationship between the effectiveness of income-generation projects (IGPs) and financing budget deficits in Tanzanian public universities ($\beta = 0.002$, $p > 0.05$). The hierarchical regression analysis demonstrated that after controlling for university age and size, the addition of IGP effectiveness in the second model produced a negligible change in the explained variance ($\Delta R^2 = 0.002$, $p = 0.956$). This implies that while universities with more effective IGPs tend to report slightly higher financial performance,

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the contribution of effectiveness alone remains minimal once institutional characteristics are accounted for. The final model ($R^2 = 0.106$) indicated that only university age and size significantly predicted budget-deficit financing, while the effectiveness of IGPs did not exert an independent effect.

These findings suggest that institutional structural factors play a more decisive role in determining financial outcomes than project-level operational efficiency. Older and larger universities are likely to possess better administrative systems, established partnerships, and more diversified revenue bases, which collectively reduce their budget deficits regardless of the measured level of IGP effectiveness. The insignificant influence of IGP effectiveness therefore highlights the limited role of project operational efficiency in explaining financial performance when broader institutional capacities are already considered.

Empirically, these findings contrast with those of Brown and Taylor (2020), who reported a significant positive association between project effectiveness and financial outcomes in higher education institutions in developed contexts. The discrepancy can be attributed to contextual variations particularly differences in governance, resource autonomy, and institutional maturity. In the Tanzanian context, university financial systems remain highly dependent on government subventions, which may weaken the direct financial impact of even well-managed IGPs. The results, however, align with the works of Masaiti (2015) and Towett, Naibei, and Rop (2019), who found that project success in public universities is largely contingent on governance structures, financial controls, and institutional frameworks rather than on operational efficiency alone. Likewise, Komba (2020) emphasized that internal management systems and policy environments significantly moderate the effect of project effectiveness on revenue outcomes in East African universities.

From a theoretical standpoint, the findings correspond with the Resource Dependency Theory (RDT), which posits that organizational performance is constrained by dependencies on external resources and the internal structures that manage them (Hillman, Withers, & Collins, 2009). The insignificant effect of IGP effectiveness observed in this study suggests that Tanzanian public universities face systemic and administrative limitations that prevent them from fully leveraging the financial potential of these projects. According to Drees and Heugens (2013), when institutional structures are rigid or inefficient, the ability of organizations to translate project efficiency into tangible financial stability diminishes. This study therefore reinforces RDT's assertion that financial sustainability depends not only on operational effectiveness but also on the adaptability and strategic alignment of organizational systems. Strengthening governance, decentralizing decision-making, and institutionalizing financial accountability would thus be essential for enhancing the effectiveness of IGPs as instruments for deficit financing.

5.0 Conclusion and recommendations

The study concluded that although the effectiveness of income-generating projects (IGPs) had a positive relationship with university finances, its effect on reducing budget deficits was statistically insignificant after controlling for university age and size. This indicates that project effectiveness alone is insufficient to ensure financial sustainability in Tanzanian public universities. Instead, the results emphasized the need for a comprehensive approach that integrates

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effective governance, strong leadership, stakeholder engagement, and sound financial management systems to enhance the contribution of IGPs to institutional budgets.

To improve financial sustainability, universities should strengthen governance and accountability frameworks**,** establish centralized IGP coordination units**,** and adopt transparent financial controls to ensure effective project planning, monitoring, and evaluation. Collaboration with private sector organizations, international donors, and local enterprises should be expanded to diversify income sources and improve project relevance and efficiency. The Ministry of Education, Science and Technology should provide leadership and financial management training for senior university managers and enforce performance monitoring systems with clear Key Performance Indicators (KPIs) to guide project evaluation and decision-making. Achieving sustainable financing for Tanzanian public universities requires not only effective income-generating projects but also visionary leadership, institutional accountability, and supportive policy frameworks that collectively strengthen the capacity of IGPs to reduce budget deficits and enhance long-term financial stability.

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