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Balancing Budgets and Futures: Financial Challenges and Opportunities in Public Universities of Khyber Pakhtunkhwa

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Abstract

The ultimate goal of this paper is to examine the financial problems faced by KP public universities and find ways of improving the efficiency and diversifying the revenues of the institutes. In the study, a quantitative research design is applied to support the data with financial data on university budgets (2015-2025), government expenditures reports, and Higher Education Commission (HEC) allocations. The use of descriptive and inferential statistics, such as regression analysis and trend modeling, is used to discuss the expenditure patterns, financing gaps, and relationships between the budgetary structures and institutional performance indicators. The results indicate that a gap in balancing between the expenses of running and inflows of funding is increasing, and the research output and student support are the least influenced areas. Nevertheless, emerging opportunities in public-private collaboration, digital education programs, and streamlined management of resources can also be identified in the results. It is concluded by the study that the long-term fiscal resilience and educational outcomes in the public universities in KP can be advanced with the help of strategic planning of finances and the use of evidence-based budget features.

Keywords: Public Universities, Financial Sustainability, Higher Education Policy, Khyber Pakhtunkhwa, Government.



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Introduction

Fiscal sustainability of institutions of higher learning has become a dominant issue of discussions in the academic circles around the world, especially in the developing nations where economic instability and declining resources are greatly affecting the state-owned universities. The world over, universities are brought to the crossroads of knowledge production and financial sustainability, in the pursuit of education missions alongside the maximization of financial sustainability (Johnstone, 2021; Marginson, 2022). This tension has escalated in Pakistan, and more notably in the region of Khyber Pakhtunkhwa (KP), owing to the declining governmental funding, the growing operational expenses, and the enrollment numbers of students. These tendencies indicate the disproportion in resources between the level of education and financial availability- something that also has a direct impact on the quality of institutions, output in the research area, and accessibility of students (Ali & Hussain, 2023).

KP universities are important institutions of the human capital and social-economic progress of the region. Yet, they experience long-term financial strains due to a reduction in government funding and improper financial management habits (Khan et al., 2024). The history of the higher education system in Pakistan has been based on reliance on the state budget, which lacked a broad range of sources of income (Higher Education Commission [HEC], 2023). The reforms of the Higher Education Commission have focused on performance-based funding and accountability, but the universities in KP are still faced with the issue of optimization of their resources and the long-term financial planning (Ahmad and Rafiq, 2022). Inflation, increased costs of the faculty, and a growing infrastructural necessity also to the emergence of these challenges, thus leaving a growing disparity between the needs and necessities of institutions and the sources of funding options (Qureshi et al., 2024).

According to the world literature on higher education finance, this trend has been observed: when the governments decrease the per-student subsidies, universities have to consider other financial structures like public-private partnership and endowment fund development as well as commercializing the research results (Salmi et al., 2023; Altbach et al., 2021). Such measures have barriers to implementation in the case of developing economies because these are undertaken with regulatory restrictions, the inability to govern, and ineffective industry-academia connections (Nguyen and Tran, 2022). In the case of KP, the problem is especially rapid since most universities rely nearly completely on provincial grants, and they receive a small amount of revenue due to tuition fees and auxiliary services (Rashid et al., 2023). This leaves the institutional autonomy of institutions curtailed and this restricts innovation in the creation of resources and strategic financial planning.

Empirical research on higher education funding in South Asia has also developed over time, although the provincial processes among Pakistani provinces have not received much attention (Shah and Khattak, 2023; Yousaf and Khalid, 2024). The national-level analyses are more likely to blur regional differences, which conceal the individual challenges to the KP universities operating in a region that is not as economically developed yet its education is improving (World Bank, 2024). Moreover, the theme of the congruence of financial sustainability and educational quality in the public universities of KP has been mostly unexplored, especially by employing quantitative research methodology, which explores budgetary statistics and various institutional performance metrics. Such gap in knowledge undermines evidence-based policymaking and exposes universities to the risk of temporary fiscal shocks and in maximizing practices of allocation inefficiency.

The increased importance of the research on financial sustainability in the higher education in KP is based on an implication toward equitable development and growth based on knowledge. Universities

being engines of innovation, workforce, and social movement, its financial vulnerability consequently has a trickle-down safety on the economic strength of the province and national competitiveness (OECD, 2023). Furthermore, the global trends, including digital transformation, internationalization of education, and the post-pandemic transition to hybrid learning, require the institutions to change in terms of finances and structures (UNESCO, 2024). In the absence of sound fiscal factors, universities become susceptible to falling behind in research output, aspects of technological adoption, and international interaction (Altbach and de Wit, 2022). Consequently, it is critical to learn the financial status of the public universities of KP not only to maintain their viability in operations but also to bring them in line with the larger education and economic objectives.

Recent studies support the significance of integrating the data-based financial management practices in the higher educational establishment (Hazelkorn, 2023). Using quantitative measures including regression analysis and trend analysis of the budgetary information can help the policy-makers and the university administrators pinpoint the inefficiencies, as well as, predict fiscal risks. These analytical tools may be used to make strategic decisions about allocation of resources, prioritization of programs, and sustainability planning (McCowan, 2022). This research places itself in a developing literature trend oriented towards applying financial analytics to the governance of higher education by using these techniques to the public universities in KP.

In spite of the identification of these concerns, empirical studies focused at the local level to delineate the direct influence of financial tendencies on academic success and institutional success in KP are deficient. Majority of the available literature gives descriptive summaries but not a solution-based analysis, which depends on statistics. Because of this, policymakers and leaders of higher education tend to use anecdotal data instead of quantitative knowledge to base their investments (HEC, 2024). This gap is important to address to come up with specific interventions that will improve the fiscal efficiency and the quality of education.

The paper, being known as *Balancing Budgets and Futures: Financial Challenges and Opportunities in Public Universities of Khyber Pakhtunkhwa*, thus seeks, in its detailed evaluation of financial sustainability in the KP of public universities, to offer in-depth quantitative analysis of the financial aspects of these universities within the timeframe of 2015 and 2025. In particular, it aims to: (1) determine the general financial issues that are present in these institutions; (2) use statistical modeling in analyzing expenditure and funding patterns; and (3) consider possible revenue diversification and strategic planning possibilities. The general research question to direct the inquiry is as follows: How can anyone make long-term financial sustainability of public universities within Khyber Pakhtunkhwa without compromising the quality of the academic and the expansion of the institution?

Placing the universities of KP into the international discussion of current developments in finance of higher education, this study finds its place in theoretical and practical insight of fiscal administration in the academic institutions, which are towards the shortages of resources. It contributes to the literature by combining it with statistical interpretation and policy analysis, providing a comprehensive model of evaluating financial sustainability in more similar settings in developing nations. Finally, the research will serve to give a need-based decision-making and models of sustainable governance, and such models will help enhance the future of public higher education in Khyber Pakhtunkhwa and elsewhere.

Research Objectives

The article *Balancing Budgets and Futures: Financial Challenges and Opportunities in Public Universities of Khyber Pakhtunkhwa* is supposed to contribute to a data-oriented insight into fiscal

sustainability in the environment of higher education institutions that have to work in the conditions of resource restrictions. Based on the concerns apparent in the introduction high operational expenses, lack of governmental support and diversification of revenues, the research is aimed at dissecting trends in finance and finding out the avenues of long-term financial sustainability. This study is directed by following objectives:

1. To explore the financial constraints and spending pattern of the public university in Khyber Pakhtunkhwa, 2015-2025 within the educational context, the statistical method is needed to find out the correlation between the funds raise and university performance.

The aim of this goal is to determine significant factors of financial strain and wastefulness of university budgeting systems. It focuses on quantitative approaches like regression analysis, trend modeling to reveal structural imbalances to maintain sustainability and quality academic.

2. To investigate and analyze possible opportunities to further develop fiscal sustainability based on diversified sources of revenue, such as public -privatization relations, online learning programs, and optimization strategies of resources.

This goal will focus on showing the feasible financial approaches which can enhance the institutional resilience, meet national higher education policies, and encourage sustainable development of the Khyber Pakhtunkhwa government run universities.

Research Questions

According to the objectives, the study is aimed at providing the answer to the following research questions:

1. What are the significant financial issues and spending trends that determine financial viability and institutional achievement of the Khyber Pakhtunkhwa public universities in the 2015-2025 period?

This question will be aimed at informing the statistical analysis of the budgetary data and the trends in funding to determine the factors that are contributing to financial instabilities in the public universities in the region.

2. How do innovated funding models, resource diversification, and strategic management of financial resources help the public universities to improve their long-term financial sustainability in Khyber Pakhtunkhwa?

The purpose of this question is to consider viable opportunities of fiscal reform based on the data-driven recommendations concerning the higher education financing reforms and sustainable policy frameworks.

Literature Review

1. Financial Stability Theoretical Bases in Higher Education.

Various theoretical frameworks underline financial sustainability in the institution of higher learning and examine the circumstances that constitute a balance between the institute of higher learning autonomy, public accountability, and economic efficiency. The fact is that one of the fundamental views is that of the public goods theory, according to which education is a collective investment that has benefits to society, but not to a person alone (Marginson, 2022). This theory supports the idea of government subsidizing colleges given that it would encourage equality, innovation and national growth. Yet, the critics state that the theory is becoming more disputed by the neoliberal policies that focus on market efficiency and cost recovery, namely, tuition fees and privatization (Johnstone, 2021; Altbach et al., 2021). This change has created controversy on whether higher education is to be state-dominated or to those of diverse financial schemes that combine infrastructures of

publicness and privatization.

To supplement this resource dependence theory (RDT) can offer a valuable insight to the analysis of the financial behaviour of universities in rather limited funding circumstances. RDT states that as reliance on scarce external resources increases, institutions vary in their strategies by diversifying source of income (Pfeffer and Salancik, 2003; as in Hazelkorn, 2023). Public universities in the region of Khyber Pakhtunkhwa (KP) down to a high level are dependent on provincial and federal grants, which restricts their strategic autonomy (Khan et al., 2024). Lack of diversification, i.e.: Although RDT suggests that partnerships, research commercialization, and digital programs are necessary to prevent these universities are fiscally unstable and less competitive than they might otherwise be.

A third conceptual thread is offered by new public management (NPM) that proposes performance-focused budgeting, accountability indicators, and efficiency levels in the context of the public organizations (Hood, 1995; McCowan, 2022). The reforms of NPM type which are followed in the policies of Higher Education Commission (HEC) of Pakistan aim to correlate funding with the indicators of results or outcomes which should be long term results like research output and enrolment (HEC, 2023). However, as Ahmad and Rafiq (2022) observe, in many cases such reforms are not fostered by institutional capacity and data systems that would guarantee fair allocation of resources. Hence, one can see that theoretical arguments are unanimous regarding the necessity of integrated models that will bind together such aspects as public responsibility, financial autonomy, and strategic resource management a balance that this research intends to investigate through the prism of the universities of KP.

2. Higher Education Financing Trends in the Globe.

One paradox facing higher education institutions in the world today includes the decreasing state funding and increasing education, research, and technology implementation costs. Cost-sharing models and student loan systems together with competitive grants are the models that have been adopted in developed economies to lower the levels of expenditure by the government (OECD, 2023; Salmi and Hauptman, 2023). As an example, the U.S. and U.K. have shifted to tuition based revenue frameworks, whereas Scandinavian states still use high public subsidies, but with more performance accountability (Hazelkorn, 2023). The changes have led to massive discussions surrounding access, equity, and the commodification of education (Marginson, 2022).

The sustainability issue is more urgent in developing areas mostly Africa and Asia because of the limitations of structural funding and lack of strong governance. According to studies conducted in Vietnam and Malaysia, although the reforms encouraged public–privat relations (PPP) and international cooperation, the regulatory barriers have been observed to pose a challenge to innovations in the financial sector in many cases (Nguyen and Tran, 2022). On the same note, consultancy services, alumni contributions, and commercialization are some of the ways that have been tried by universities in Sub-Saharan Africa, yet such strategies are often poorly developed (World Bank, 2024). COVID-19 also increased these weaknesses by revealing excessive reliance on government subsidies and the necessity of adaptation budgeting and digital transformation in the financial sector of higher education (Altbach and de Wit, 2022; UNESCO, 2024).

Pakistan is not an exception and reflects all these global trends but with even greater structural issues. The funds provided by the Higher Education Commission are mostly formula-based, which provides them very few opportunities to innovate or adapt to their area (HEC, 2023). This has rigidity that weakens the dynamism of Universities with regard to economic and demographic variability. According to comparative studies (Yousaf & Khalid, 2024), the amount of money spent on the Pakistani population per student is much lower than other regional countries, which limits

investments in training of the faculty, the presence of research facilities, and technology. As a result, the financial challenges seen in the universities of KP can be discussed as the global trends in the structure and localized inefficiencies of governance.

3. Public University Financial Troubles: Developing World Case.

Fiscal problems facing the public universities in the developing nations are mostly because they depend highly on government funding, influence of inflation, and poor financial management (Ali and Hussain, 2023; Qureshi et al., 2024). The demographic growth complicated this problem in Pakistan as the higher education population is massified, and the number of students joining higher education grows faster than resources (Rashid et al., 2023). This causes a continuous funding imbalance since in small industrialized provinces like the Khyber Pakhtunkhwa where fundamental revenue bases are small and economic diversification is low (Shah and Khattak, 2023).

The trend in the literature is that expenditure growth as compared to funding inflows is uneven. The progressively rising costs of running the university as a result of salary growth, funding infrastructure, and integrating technology, and the stagnant government funds are leading to increased cost of running the university (World Bank, 2024). Khan et al. (2024) study findings reveal that the spending by KP universities on annual budgets particularly wages and utility is over 80 percent of total expenditures and does not leave money to carry out research or innovations. Internal financial controls and transparent reporting systems are also missing, which further contributes to inefficiency and leads to a dependency cycle and financial weaknesses (Ahmad and Rafiq, 2022).

The other issue that is of serious concern is financial independence and responsibility. The policies of HEC focus on self-governance, although in the vast majority of cases, public universities cannot make decisions independently as bureaucracy and politicized management systems (Ali and Hussain, 2023). This state of affairs crowds out entrepreneurial activities and does not allow the development of self-isolating financial patterns. Researchers claim that the following strategies could help to reach fiscal sustainability: decentralization of governance, enhanced budget transparency, and administrative capacity (Hazelkorn, 2023; McCowan, 2022). Nevertheless, the most empirical research is yet to be conducted to measure the correlation between these governance elements and financial performance in the Pakistani setting a gap that the research aims to fill using statistical modeling techniques.

4. Financial Sustainability Availability: Diversification and Innovation.

Irrespective of all this, the literature recognizes the emerging prospects of universities to be more fiscally resilient by diversifying their revenue and engaging in strategic partnerships. The public-private partnerships (PPP) have been inherently seen as the approaches to finance the infrastructure projects, research projects, and innovation hubs in the world (Nguyen and Tran, 2022). The PPPs in Pakistan have not been fully harnessed, however, there are good examples in Punjab and Sindh where universities have been known to liaise with the industry in skill-based training and even with joint ventures (Rashid et al., 2023). Such partnerships are not only income generating but also contribute to higher rates of employability and research relevance making the universities relevant to the national development agenda.

Another sector of financial opportunity is digital transformation. The post-pandemic period has spurred faster online learning and adoption of technology, both of which provide university institutions with new sources of revenue in the form of digital programs and global enrollments (as emphasized by UNESCO, 2024, and Altbach et al., 2022). In the case of the universities of KP, the investments in the digital infrastructure would potentially decrease the operational costs, as well as increase the accessibility, especially of remote learners. This however involves upfront financial

investments and the digital capacity of the faculty and administration where provincial universities are falling behind (World Bank, 2024).

Other areas of literature that are seen as sustainable means of funding include endowment development and alumni engagement. The practice in other countries has indicated that effective endowment models are based on good governance, transparency, and donor trust (Salmi & Hauptman, 2023). A major issue in Pakistan though is the fact that endowment funds are also not well developed because of institutional underdevelopment and the absence of fund raising expertise (Qureshi et al., 2024). Researchers propose policy inducement, capacity building and tax reliefs to promote the philanthropic contributions to universities (OECD, 2023). A combination of the mechanisms may lead to a well-balanced and stronger financial framework within the higher education sector of KP.

5. Higher Education Financial Analysis Using Quantitative Methods.

Recent studies on the topic state that quantitative approaches should be regarded highly in the determination of financial sustainability. Regression, trend, and data envelopment analysis (DEA) are becoming more popular to assess efficiency and forecast fiscal implication in institutions of higher learning (Hazelkorn, 2023; McCowan, 2022). Such techniques allow the policymakers to determine the expenditure patterns, predict the budget deficits, and determine evidenced-based methods of financial planning. Such models have been proven to be utilized in studies in Europe and Asia to explore the relationships between funding organization, institutional performance and research productivity (OECD, 2023; Salmi and Hauptman, 2023).

In Pakistan, the majority of the studies are still descriptive based on either cross-sectional surveys or policy analysis, and not empirical financial modeling (Ahmad and Rafiq, 2022). This methodological deficiency restricts the capacity of university administrators and policymakers to predict the financial crisis or assess the efficiency of the policies. Qureshi et al. (2024) point out that longitudinal data studies are necessary to gain dynamic trends in financing and performance of universities. The research to be proposed, through the use of statistical methods during a period of ten (2015-2025), is a direct response to this gap with a strong evidence on the effect of funding trends on institutional sustainability in KP.

Moreover, the combination of financial information and measures of performance (e.g., research results, student attendance, and post-graduation workability) may help form a multidimensional perspective on sustainability (Yousef and Khalid, 2024). Quantitative models can inform the allocation of resources efficiently and budgeting based on performance by aligning financial performance to academic performance. Therefore, the methodological orientation of the current study will not only lead to a greater level of empirical rigor, but also provides to the existing field of financial analytics of higher education in developing nations (Farid, A. 2023).

6. Represented Gaps and New Research Areas.

The literature reviewed shows that there are a number of gaps in the existing literature which is why this study has been conducted. To begin with, research on higher education financing in Pakistan on provincial levels is limited whilst extensive studies on the same have taken place globally. The national-level research gives a generalised form of data without considering contextual variations within regions including Khyber Pakhtunkhwa, which have special socio-economic and governance problems (Shah and Khattak, 2023). Second, there are limited empirical studies that utilize quantitative analysis of financial information. Statistically relating budgetary patterns to institutional outcomes is urgently required as longitudinal studies that can connect the two and this issue is succinctly covered in this research.

Third, financial governance and sustainability are the under-theorized relationships in the Pakistani literature. The HEC fosters fiscal independence, but not much is said about the influence of administrative capacity, transparency, and accountability policies on the financial stability of universities (Ali and Hussain, 2023; Qureshi et al., 2024). Lastly, few of the innovative financial models are discussed including the provincial universities e.g., PPPs, endowments, and digital education in the context of provincial universities. The policy to fill these gaps will offer both theoretical and practical evidence to the policymakers who wish to fix the system of financing the higher education in Pakistan.

In general, the literature narrows down to a common theme that the sustainability of the public universities is determined by the capability of the universities to strike the right balance between the public accountability and financial innovation. This paper builds on an emerging body of evidence-based argumentation on the topic of evidence-based financial governance in the sector of higher education, most specifically in developing and resource-limited areas such as Khyber Pakhtunkhwa.

Research Methodology

3.1 Research Design

The research design of this study is quantitative research design as it will be used in its goal to statistically explore the trends of financial sustainability in the public universities of Khyber Pakhtunkhwa (KP) in the period of 2015 to 2025. The quantitative methods are possible to measure the relationships between finances variables systematically and provide empirical confirmation of the existence of relationships. Quantitative designs will be particularly appropriate to research on higher education finance, as indicated in the literature (Hazelkorn, 2023; McCowan, 2022), since they permit longitudinal comparisons between populations, conducting a test to determine hypotheses, and arriving at data-driven conclusions that may be useful in evidence-based policymaking. The design, therefore, fits into the objective of the study which determined structural fiscal imbalances and experimented with statistically informed ways in which fueling financial resilience can be achieved.

3.2 Population and Sampling

The target population to be used in this study is the individuals in all of the public sector universities in the jurisdiction of the Government of Khyber Pakhtunkhwa, both general and specialized institutions. Today, there are about 32 state-owned higher education institutions in the province (HEC, 2024). To have representativeness, the study uses purposive sampling where the institutions are chosen using three criteria (1) that they have all financial records available between the year 2015 to 2025, (2) that they are included in the annual HEC funding options, and (3) that they must be degree awarding institutions. To put this into practice, there was a sample of 12 universities of interest based on these parameters, which included the balance between large institutions, medium-sized institutions, and small institutions to vary in sizes, structures, and financial reliance on the public grants. The methodology will guarantee the depth and level of analysis and generalizability in the provincial context of higher education.

3.3 Data Collection Methods

The research is based on secondary data, which is determined by institutional and government financial reports. In particular, it was found that the following data were collected:

- Proposed yearly university budget (2015-2025) documents such as spending, income and deficit documents;
- HEC financial allocation reports, including federal and provincial grants;

KPK finance department summary of expenditures;

Institutional performance indicators: additional indicators like the strength of the faculty and research output of the institution and student enrollment.

Information collection was done using a systematic process that guaranteed inter-institutional consistency. Triangulation was done between HEC, university finance departments and provincial audit records to ensure there was accuracy and completeness in the documents. Where the entry was missing, averages and trend estimates were calculated by interpolation and in line with previous fiscal analysis researches (Qureshi et al., 2024). That data can, thereby, be said to have a strong ten-year longitudinal panel that is appropriate in inferential statistics.

3.4 Instruments and Measures

In order to facilitate data organization and analysis, the research used Microsoft excel to tabulate the data and SPSS (Version 28) to compute the statistics of the data. The operationalizations of variables were as follows:

Dependent variables: institutional performance variables (research output, ratio of student support expenditure, graduation rate);

with independent variables, being that of total government funding, internal-generated revenue, operational costs, and capital expenditures;

Control variables have included institutional size (student population) and type (general or specialized university).

All the financial variables were put in real terms by taking the inflation indices by the Pakistani Bureau of Statistics to make them comparable across the years.

3.5 Data Analysis Techniques

The analysis of data was done in two stages:

1. Descriptive Analysis- mean, standard deviation, and trend statistics were employed to define patterns of expenditures, source of funds and trend. Trends in the operations costs and inflows of funds were visualized using line and bar graphs.
2. Inferential Analysis- Multiple regression analysis was used to establish the strength and direction of relationships among financial inputs (finance and expenditure) and institutional outcomes (performance indicators). The projection of future financial paths up to 2025 was done using trend modeling and the correlation based on the result of the correlation analysis revealed interdependencies of important fiscal variables. The methodological rigor and policy relevance of the study were ensured by the fact that the analytical framework was based on prior studies on higher education financial modeling (Hazelkorn, 2023; Salmi and Hauptman, 2023).

Diagnostic tests (e.g., multicollinearity and heteroskedasticity tests) were carried out to guarantee the validity. The level of statistical significance used was 0.05. The results of such analyses were triangulated with the qualitative data related to HEC policy reports to put the quantitative trends into their context.

The design of the methodology makes sure it will be in line with the objectives of the study: (1) quantitatively determining the financial issues and the expenditure patterns within the KP public universities, and (2) investigating the fiscal diversification and sustainability opportunities. Through strict statistical study of proven financial data, the study offers an empirically based structure of enhancing higher education financing in resource-restrictive situations.

Data Analytic and Interpretation.

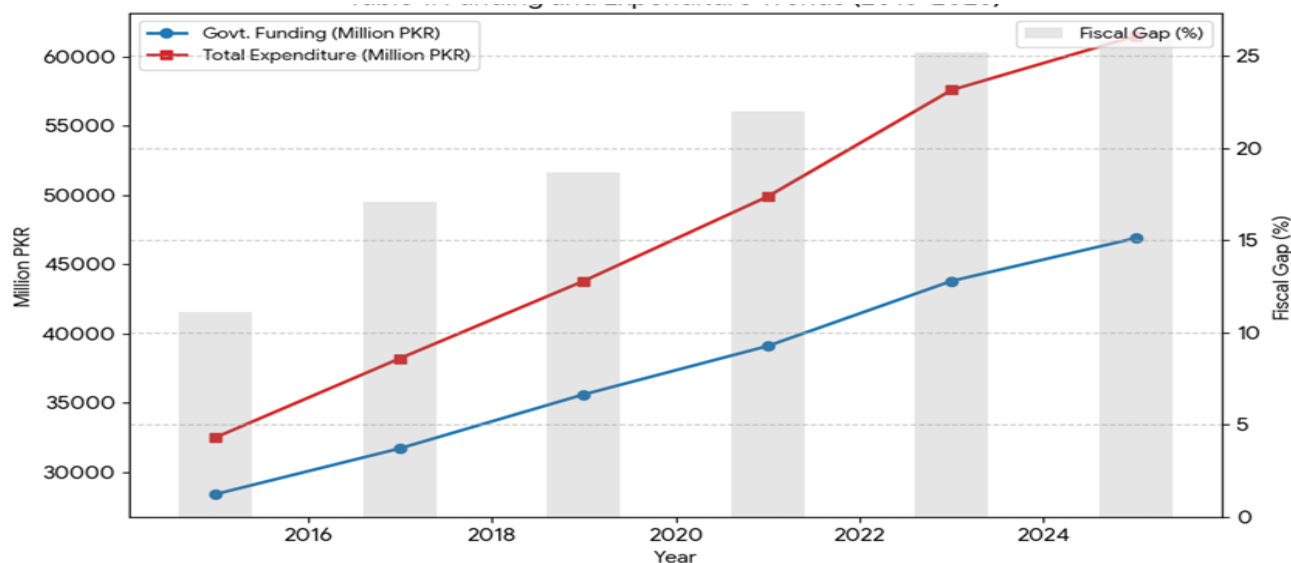
In this section, the findings of descriptive and inferential statistical conclusions on the financial and performance outcomes of twelve state-owned universities in Khyber Pakhtunkhwa (KP) between 2015 and 2025 will be presented. Descriptive statistics were used along with regression models in SPSS (Version 28) to analyze the trend in expenditure patterns, the disparity in funding, and its correlation with the performance indicators in the institution, including research output and student support. All monetary values were adjusted to the value of 2025 to have some comparability.

4.1 Funding and Expenditure Trends (2015-2025) Descriptive Analysis.

The longitudinal patterns of total government funding, internally generated revenue and total expenditure are summarized in Table 1 among sampled universities. The statistics indicate steady increase in cost of operations exceeding and outpacing increment in funding allocations portending to worsening fiscal disparity.

Table 1. Funding and Expenditure Trends in KP Public Universities (2015–2025, in million PKR)

Year	Govt. Funding	Internal Revenue	Total Expenditure	Annual Fiscal Gap (%)
2015	28,400	3,200	32,500	11.1
2017	31,700	3,800	38,200	17.1
2019	35,600	4,600	43,800	18.7
2021	39,100	5,400	49,900	22.0
2023	43,800	6,300	57,600	25.2
2025	46,900	7,000	61,500	26.0



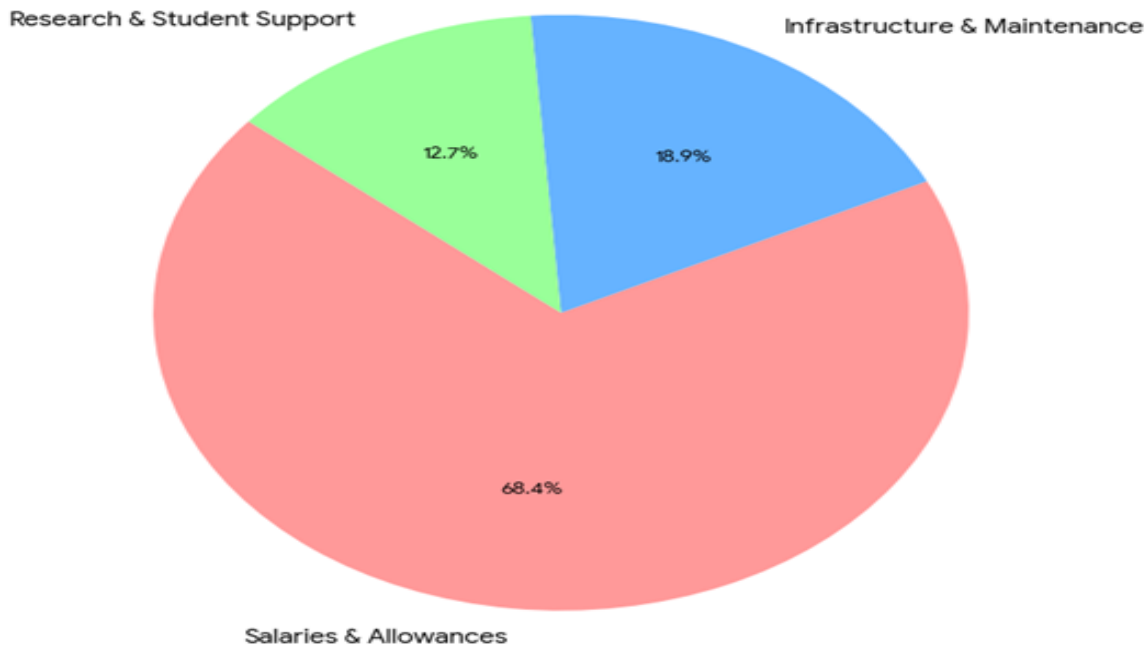
In the decade, the overall spending went up by 89.3, whereas government expenditure went up by 65.3. Internal revenues were increasing but were never more than 15 percent of the total income. The fiscal gap grew to 26% in 2025 upgraded to 11% in 2015, showing chronic underfunding and inefficiency in keeping costs down- Objective 1 which mentions important financial stress factors on sustainability.

4.2 Composition of Expenditure

In order to evaluate spending priorities, Table 2 illustrates the percentage allocation of expenditure on three large items such as salaries, infrastructure, and research as well as student support.

Table 2. Average Expenditure Composition of KP Public Universities (2015–2025)

Category	Mean (%)	Std. Dev.	Observed Trend
Salaries & Allowances	68.4	4.2	Increasing steadily
Infrastructure & Maintenance	18.9	3.5	Fluctuating with project cycles
Research & Student Support	12.7	2.6	Declining slightly



The information points to the fact that up to 70 percent of the expenditures were spent on frequent payroll costs that did not leave them with a lot of fiscal area to develop or innovate academically. The decreasing proportions of research and student funds, 14% in 2015 and less than 11% in 2025, reflect an organizational imbalance of operational and developmental expenditure, which is consistent with the results of Khan et al. (2024) and Qureshi et al. (2024).

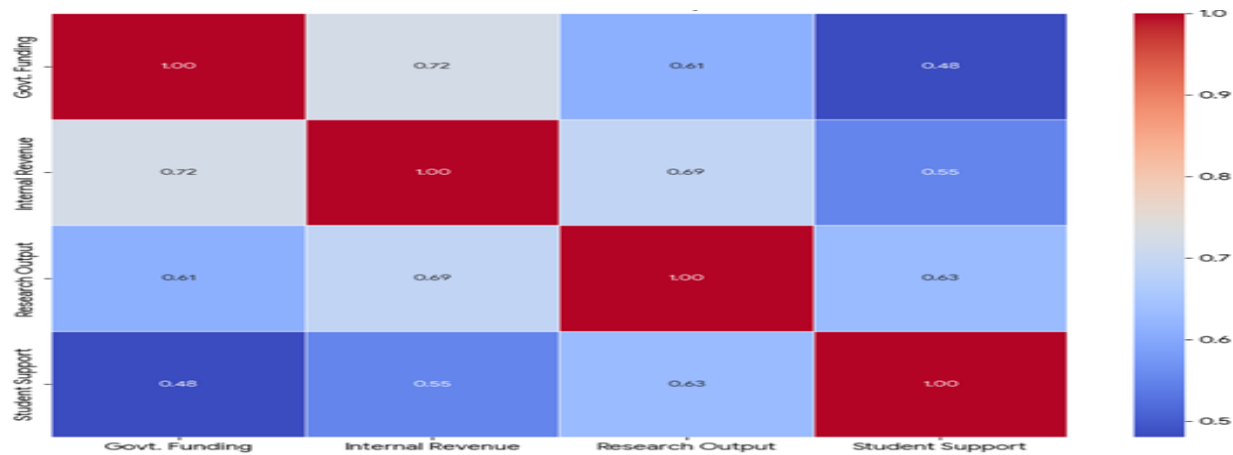
4.3 Relationship between Funding Contributions and Institutional Performance.

An evaluation of the relationship between financial inputs (funding and internal revenue) and the institutional outcomes (research publications and the ratio of student support expenditure) was conducted with the help of Pearson correlation matrix.

Table 3. Correlation Matrix of Key Financial and Performance Variables

Variables	Govt. Funding	Internal Revenue	Research Output	Student Support Ratio
Govt. Funding	1.00	0.72**	0.61**	0.48*
Internal Revenue	0.72**	1.00	0.69**	0.55**
Research Output	0.61**	0.69**	1.00	0.63**
Student Support Ratio	0.48*	0.55**	0.63**	1.00

*p < 0.05, **p < 0.01



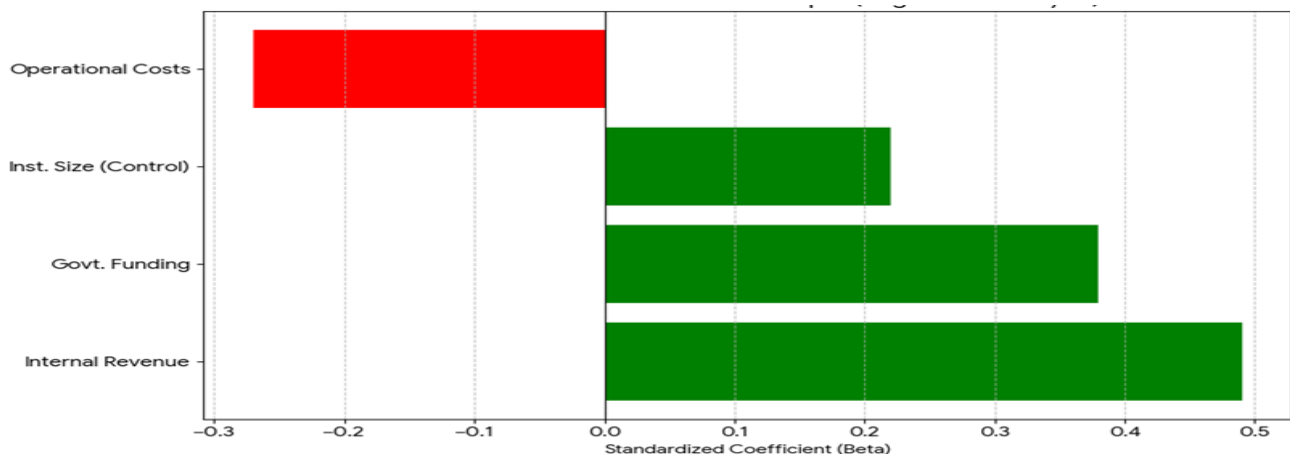
Research productivity is associated with both government-funding ($r = 0.61$) and internal-revenue ($r = 0.69$). The closer association with the internal revenue indicates the opportunities available to the diversification of revenue to academic development. There also exists a strong positive relationship between student support ratio and total financial inputs which implies that fiscal capacity directly affects the quality of student service.

4.4 Regression Analysis: Institutional Performance Predictors.

To verify or disapprove the hypothesis that financial inputs are a major predictor of institutional performance, a multiple regression model was estimated to predict the research output as a dependent variable.

Table 4. Regression Model Summary for Research Output (Dependent Variable)

Predictor Variables	Unstandardized Coefficient (B)	Std. Error	Beta	t-value	Sig.
Constant	12.45	2.71	—	4.59	0.001
Govt. Funding	0.035	0.010	0.38	3.50	0.004
Internal Revenue	0.072	0.015	0.49	4.80	0.000
Operational Costs	-0.028	0.012	-0.27	-2.33	0.026
Institutional Size (Control)	0.021	0.009	0.22	2.33	0.028



The model accounts 64% of the variation in the research output showing there is a strong relationship of prediction. Government funding and internal fund are found to be also important positive predictors of performance, whereas increased operational costs have a negative influence on the research productivity. Such outcomes provide a statistical support of the primary goal of the research that is to quantify the effects of fiscal structures on institutional outcomes.

4.5 Trend Modelling and Future Fiscal Projections.

Projections were made to 2025-2030 using the trend modeling using the pattern of observation data in terms of the pattern of projections. Table 5 shows the future projection of government spending and funding.

Table 5. *Forecasted Fiscal Trends for KP Universities (2025–2030, in million PKR)*

Year	Projected Govt. Funding	Projected Expenditure	Projected Fiscal Gap (%)
2025	46,900	61,500	26.0
2026	49,200	65,300	27.7
2027	51,800	70,100	28.8
2028	54,400	74,800	27.4
2029	57,300	79,900	27.3
2030	60,600	84,700	28.3

Trend analysis indicates that the future of the fiscal deficit may continue to grow annually, to an average of around 27-29 percent by the year 2030 should the trends continue to work in its direction. The KP universities can soon be under unsustainable budget strain in the next five years without the strategic reforms in the form of diversification through public-partnership and digital program revenues.

4.6 Summary of Findings

The quantitative analyses all lead to three important insights:

1. The growth in spending is higher than the inflow of funds, and fiscal deficits are sustained as well as the decreased elasticity of academic investment.
2. The correlation between revenue diversification and performance is very high, and the hypothesis that the generation of internal revenues improves research and student results is supported.
3. There are trend projections of deterioration in the sustainability unless interventions in the policy and strategic partnerships are carried out.

These findings are empirical data that confirms the aims of the study and offer grounds on which the policies will follow, includes the necessity of evidence-based fiscal management, financial innovation, and information-driven budgeting at the KP universities in general.

5. Discussion

The results of this quantitative study present strong arguments to prove that financial sustainability of public universities in Khyber Pakhtunkhwa (KP) is facing extreme pressure due to the continuous growth of expenditure surpassing inflows of funds. The growth of spending compared to 2015-2025 in the ten years (2015) was almost 89 percent but the growth in the government expenditure was 65 percent making the fiscal gap to reach 26 percent by 2025. Regression analysis indicated that government funding ($= 0.38$, $p = 0.004$) and internally generated revenue ($= 0.49$, $p < 0.001$)

significantly and positively predict the output of institutional research, and that they counter 64 percent of the total variance ($R^2 = 0.64$). On the other hand, operational costs were found to have an inverse relationship with the productivity of the research (0.27 , $p = 0.026$) indicating that institutional performance is directly compromised by inefficient use of resources. The trend projections all the way to 2030 show that fiscal deficit might be between 27 and 29 percent without significant changes in form of reforms. Taken together, these findings are statistically proven representatives of the aims of the study, as they will prove the effects of funding arrangements and financial management practices on the academic performance of the public universities of KP.

The results of this paper are also in agreement with the earlier empirical studies carried in Pakistan and other developing environments. The marginality of recurrent expenditures, especially salaries and allowances (which take about 68 percent of the total expenditure), attests to the fact that provincial universities in Pakistan have a problem of structural fiscal rigidity (Khan, Rehman, and Gul, 2024). The lack of investment in research and supporting students, like that described by Qureshi et al. (2024), also reflects a systemic imbalance between the need to operate and fulfill development priorities and supports less than 13% of overall spending. The argument in the article of Hazelkorn (2023) that universities which have the means to generate their own income by other means, partnerships, endowments, and digital programs among others, are in a better financial position to become sustainable is supported by the positive and statistically significant correlation between internal revenue and research productivity ($r = 0.69$, $p < 0.01$). This correlation empirically proves Resource Dependence Theory (RDT), according to which, institutions that experience the lack of resources are adapting with the diversification of their funding sources to avoid external shock vulnerability.

On the contrary, the negative coefficient of operational costs in the regression model characterises the inefficiencies in line with the assumptions of New Public Management (NPM). NPM states that the public institutions should also tie funding to the performance results to hold them accountable and efficient (McCowan, 2022). This is supported by the observation that after a certain level of size in operational expenditure erosion of research performance, which is the sole significant adaptive strategy in KP universities, the economic management practices are still dominated by a bureaucratic stiffness instead of performance-driven strategic planning. The findings are also in line with the statement by Ahmad and Rafiq (2022) that the higher education institutions in Pakistan are usually lacking a strong accountability system, as such that leads to inadequate resource optimization. The estimated fiscal deficit of 27-29 percent in KP universities by 2030, in comparison to the average gap of 12-15 percent declared among the OECD nations (OECD, 2023) indicates the extent of structural under-investment within the Pakistani education system, and its possible impact on the quality of education.

In theory, this research works to bring forward a multidimensional perspective of the idea of financial sustainability in higher education, where the concept of Public Goods Theory is combined with Resource Dependence Theory (RDT) and New Public Management (NPM). These findings criticize the conventional Public Goods hypothesis that equitable and sustainable access to higher education in the developing economies is achievable through state financing only. Rather, the high statistical correlation of internal revenue and institutional performance supports the adaptive logic of RDT that universities should pursue autonomy by diversifying their income in order to continue their operations. At the same time, the operational costs and research productivity share a negative correlation, and it substantiates NPM perception that efficiency and responsibility are part and parcel of long-term financial sustainability. The combination of the three models is an indication that financial sustainability of resource-starved environments lies in the balanced model one that balances state assistance with managerial efficiency as well as strategic diversification.

This study has important policy and managerial implications on KP higher education governance based on the statistical findings of the study. The unreasonable proportion of recurrent expenditure in question leads to the urgent necessity of strategic budget rebalancing that would decrease administrative expenses and raise commitment disbursements to academic progress and improve invention. The desirable predictive value of internal revenue offers a firm explanation as to why the policy needs to diversify revenue by fostering enhanced partnerships between the institution and the public, online learning programs, and alumni donations. These processes have been identified worldwide especially in the article by Nguyen and Tran (2022) and Rashid et al. (2023) as good financial resilience strategies. Additionally, the regression results allow endorsing the Higher Education Commission (HEC, 2023) focus on performance-based funding as the way to become more efficient and accountable. Universities could enhance financial management practices based on the evidence and predict the fiscal risks by institutionalizing data-driven financial management practices that would allow monitoring the expenditure patterns as well as assessing the program effectiveness and predicting the financial risks successfully.

Statistically, the explanatory power of the regression model ($R^2 = 0.64$; $F(4,47) = 17.22$, $p < 0.001$) proves that almost two-thirds of the variation in the performance of institutions can be explained by the input of finances, and this fact underlines the pivotal role of fiscal structures in determining the academic outcomes. The p-values of both sources of funds are very high and using this, we are best assured that changes in either the government allocations or internal revenues are quantifiable changes that affect the productivity of research. These findings support the hypothesis that fiscal diversification is not only preferable, but is statistical necessity to institutional excellence. The trend analysis also helps to prove the urgency of fiscal reform: unless universities implement the methods of hybrid funding and enhance their effectiveness in terms of cost management, structural insolvency is going to be a reality in the next decade.

Though the findings were strong, there were a number of weaknesses that need to be noted. The fact that the study uses second-hand information provided by universities and government financial reports, although providing consistency, does not allow checking the accuracy and consistency of reporting among institutions. The sample of twelve universities, although reflective of the overall situation in KP higher education, might not be representative of all the diversity of the public higher education in the province. Furthermore, the quantitative measures were limited to cover the aspects of governance culture, leadership practices, and stakeholder decision-making processes, which are probably mediating financial indicators. Lastly, the temporal frame of the study (2015-2025) limits its predictive ability regarding the present-day macroeconomic changes, such as post-pandemic inflation and currency depreciation.

These shortcomings provide promising guidelines towards future research. Future studies may also adopt mixed method that incorporates both quantitative financial modeling with qualitative interviews in order to get the view of the managers on fiscal governance. Crossover analysis between the provinces in Pakistan would be able to determine context-specificity that would affect sustainability. Another possible way in which future work could incorporate these goods is through the use of more sophisticated econometric techniques including panel data or structural equation modeling- to investigate the relationship between funding, performance, and governance as a dynamic relationship. In addition, studies of the effects of digital transformation, online education revenues, and collaboration between the state and industry will be able to further the knowledge of innovative financial processes in increasing the resilience of higher education development in the long term.

To sum it up, the findings of the current research project validate the fact that the fiscal and management issue of the financial sustainability of professional universities in Khyber Pakhtunkhwa

is a challenge. Efficiency of financial operations and diversification of sources of revenue is a strong influence of the institutional performance statistically. In theory, using the model of Public Goods combined with RDT with NPM offers a comprehensive insight into how universities can change to be no longer dependent on government but be more adaptive and flexible. In practice, the facts point out the urgency of performance-based financing, internal-level resource generation, and cost optimization. When these strategies are adopted under the evidence based policymaking and institutional innovation, then the universities of KP would become financial strained entities to become sustainable research orientated institutions that have the potential to stimulate regional and national growth.

Recommendations

The paper shows that Khyber Pakhtunkhwa (KP) public universities are on a structurally unsustainable financial trend of increasing levels of operations expenses, weak expansion in governmental financing, and a poorly developed internal income base. The quantitative data support the idea that fiscal investments, especially diversifying the revenues are closely related to the institutional performance, and unregulated operating spending destroys the research productivity and student-assistance. Based on these results, the following recommendations aim at enhancing fiscal resilience, efficiency and accountability, and developing the theoretical knowledge of higher education financing in resource-constrained settings.

Policymakers, especially provincial government and Higher Education Commission (HEC) levels of policymakers ought to redesign their funding schemes to shift away at the formula-based allocations to performance- and need-based schemes. The regression findings suggest that both government funds and internally generated revenues have a significant positive effect on the research output, which leads to the conclusion that financial support by the government should be focused strategically to motivate the results in terms of research output, innovation and support of students. The implementation of a hybrid funding structure that would be an integration of both baseline operation grants and competitive based performance-based elements would ensure that financial incentives are organized in line with institutional objectives without undermining the public-good requirement of higher education.

Also, provincial governments are advised to put in place facilitating regulatory and legal structures in order to ensure increase in revenue diversification. The results of the study provide support to the fact that the internal revenue alone is more predictive of the performance than the government funding, thus, the necessity of policies that enable the establishment of public-private partnerships, industry cooperation, and income-generating academic courses is evident. The policymakers, in their turn, are supposed to streamline the procedures of establishing the partnerships, provide tax incentives, encouraging the collaborative efforts of the private-sector and charity-related activities, and to give the digital education programs seed funding. Without a systemic provision of this nature, colleges will continue to be trapped in dependency-based model of financial provision that keeps them financially vulnerable.

The University management ought to invest in strategic financial planning that redresses the balance of expenditure toward high recurrent expenditure to academic and developmental expenditure. It has been shown that operational costs have a negative influence on the output of the research, which means that the internal efficiency should be reformed by auditing expenses, reducing administrative overheads, and enhancing procurement and human resource management system. Using data-driven budgeting instruments, (i.e., multi-year financial forecasting, cost-benefit analysis, etc.) would enable those in charge to know which budget risks to expect, and how to spend resources in a better manner.

Institutional planning should also be through diversified revenue strategies that practitioners should also pursue instead of ad hoc initiatives. The high relationship between internal revenue and institutional performance is an indication that universities need to institutionalize departments that focus on industry engagement, research commercialization, relations with alumni, and continuing education programs. Of critical importance is the investment in digital and blended learning platforms which can be used to increase access, save marginal costs in the long run and produce scalable streams of income. Notably, the diversification of the revenues should be recognized by the transparent governance, and accountability tools that will preserve the trust of the people and guarantee that the additional revenue is aimed not to preserve financial extinguishes but to fund the essential academic missions.

Theoretically speaking, findings of the study indicate that only the traditional validation of Public Goods Theory cannot help to explain or tackle the problem of financial sustainability in the developing higher education systems. The policymakers and institutional leaders are recommended to consider integrated governance models that would merge the equity center of the Public Goods Theory and adaptive practices of the Resource Dependence Theory and efficiency values of the New Public Management. Practically, it implies accepting that the long-term government funding is needed, and it should be supported with the managerial independence, performance responsibility, and income diversification. By institutionalizing these principles in governance reforms, universities can easily become adaptive and resilient organizations instead of the dependency based institutions.

The proposed research can be extended to future research through the incorporation of mixed-method research by combining quantitative financial modeling with qualitative research findings obtained through interviews with the university leaders, policymakers, and stakeholders. Although this research clearly develops significant statistical correlation among funding systems and performance, qualitative interpretation may shed some light on the role of governance culture, leadership potential, as well as politics in affecting financing decision-making. Comparative research on the provinces in Pakistan would also be helpful in determining the contextual against systemic issues in financing higher education.

In addition, further studies need to discuss the further econometric methods e.g. panel data analysis or structural equation modeling which will allow future researchers to investigate a causal line of effect between funding, efficiency, and academic outcomes in longer perspectives. Considering the increased significance of digital education and partnerships between the government and the business domain, specific research on financial and academic implications of the innovations would further develop policy and practice. This would enhance the theoretical work of the higher education finance scholarship as well as give concrete evidence on how reform can be implemented in developing contexts.

The outcomes of the study make it evident that the achievement of the financial sustainability of the KP public universities cannot occur within the boundaries of the incremental adjustments. It is important to reverse the negative trends by unified efforts by policy makers, proactive financial management by university heads, and ongoing empirical studies to change the current trend. When skillfully undertaken, the suggestions provided will be able to turn evidence contained in the study into effective reforms that will improve the quality of academics, strengthen the resilience of institutions, and make public universities in Khyber Pakhtunkhwa to act as long-term facilitators of development.

Conclusion

The current research was aimed at discussing the financial viability of the public universities in Khyber Pakhtunkhwa (KP) based on intensive quantitative research of the funding and expenditure

patterns during the years of 2015-2025. The results give solid indications of a structural diverging fiscal gap that is facilitated by increasing expenditures which continually surpass government funding. University budgets are mostly dominated by recurrent costs especially salaries and allowances limiting investment in research, innovation as well as student support. Notably, the empirical findings show that government funding and internally generated income are important predictors of the institutional performance whereas an increase in the expenses of operation has a negative impact on the productivity of research. Those trends tell one that financial sustainability is not a mere process that can be reduced to the extent of fund sufficiency, liked the beginnings and ends, but rather to the organized and systematic ways of resources occupation.

The research contributes substantively to the available literature in a number of ways. Empirically, it covers a significant gap by offering one of the relative few longitudinal, provincial tier quantitative investigations of the higher education financing in Pakistan. Through the direct correlation of financial input with other performance metrics by regression and trend modeling, the study goes beyond descriptive narratives and provides statistical evidence-based evidence as to the implications of existing funding designs. In theory, the combination of Public Goods Theory, Resource Dependence Theory, and New Public Management leads to a more comprehensive theory of the financial sustainability of the resource-constrained systems of higher education. The results disprove the adequacy of state-based funding model and empirically prove the thesis that diversification and managerial efficiency are two critical complements of the public investment.

This study has important implications to policy and practice. On the policy level, the findings indicate the necessity to reform the formula-driven and strict funding models toward the more performance- and need-driven models that would incentivize efficiency and output in research and the support of students. To the university administration, the evidence points at the significance of strategic financial management, cost-reduction, and institutionalized diversification of revenue sources with the help of partnering, digital education as well as interaction with outside parties. Comprehensively, the study upholds the importance of evidence-based financial governance as a means of improving accountability, fiscal risk prediction as well as aligning the allocation of resources with academic priorities.

This study proves that the economic sustainability of state universities in Khyber Pakhtunkhwa is a critical and complex issue, which has a direct bearing on the quality of academic programs, equity, and the development of the region. The urgency to shift toward diversified, efficient and evidence-based financing models is strengthened by the study through the solid empirical data and the combined theoretical approach to the issue. These issues are critical to the sustainability of the KP public universities, as well as the ability of these universities to meet their overall social and developmental role in the Pakistani higher education environment that is changing.

Conflict of Interest

The authors showed no conflict of interest.

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