



Opportunities and challenges of internal brain drain on national development: A focus on ICT lecturers on two selected higher institutions of learning in Zambia

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Abstract: *This study investigated the opportunities and challenges of internal brain drain among ICT lecturers at two selected Zambian higher education institutions. Zambia's higher education sector, critical for national development, faces the persistent challenge of brain drain, which significantly disturbs its capacity for research and knowledge generation. Grounded in Equity Theory and Herzberg's Two-Factor Theory, the research utilized an embedded correlational mixed-methods design to understand factors influencing lecturers' retention and evaluate the impact of brain drain on institutional research output. The quantitative component involved a survey of 44 ICT lecturers selected via simple and systematic random sampling, with the sample size determined using Yamane's formula. The qualitative component, employing snowball sampling, included interviews with 7 departed lecturers. Quantitative data were analyzed descriptively, while qualitative data were analyzed thematically. Results indicated that economic disparities, including inadequate salaries and limited research funding, are primary drivers of emigration. The study identified negative consequences such as diminished research productivity and a decline in qualified faculty. It recommends a comprehensive, multi-pronged strategy to address retention through improved compensation, enhanced resource allocation, and clearer career progression pathways. Ultimately, this research provides a data-driven basis for retaining academic talent and contributes to the realization of the African Union's Agenda 2063, particularly its aspirations for inclusive growth and people-driven development.*

Keywords: Internal brain drain, ICT lecturers, Zambia, National Development,

Introduction

The concept of brain drain originated in the early 1960s, coined by the Royal Society of London to describe the emigration of British scientists to North America (Köser-Akçapar, 2006). Broadly, it is defined as the migration of a fraction of the population that is relatively highly educated compared to the average (Beine, Docquier, & Rapoport, 2001), often involving professionals like physicians, engineers, and scientists (Gibson & McKenzie, 2011). This phenomenon represents a critical loss of intellectual capital for developing nations (Docquier & Rapoport, 2012). While existing empirical literature suggests that selective emigration can sometimes enhance human capital accumulation (the "brain gain" effect), this



benefit is highly uneven: it primarily accrues to wealthiest regions that are internationally connected and have better access to education, leaving highly vulnerable populations trapped in the least developed areas (Bocquier et al., 2014).

Recent global trends underscore that the challenge of skilled labor mobility is no longer confined to international borders; the problem of Internal Brain Drain (IBD) has emerged as a pervasive worldwide phenomenon. In developed economies, this strain is already evident in the form of acute faculty shortages in technical fields. For example, a 2022 survey by the Computing Research Association found that 21% of U.S. institutions seeking tenure-track computer science faculty failed to hire any candidates that year (Computing Research Association, 2022). This statistic illustrates the intense competitive pressure pulling high-skilled ICT personnel away from academia into lucrative industry roles.

The welfare consequences of such uneven labor allocation are often severe. In Scandinavia, for instance, a labor demand shock in Norway that attracted Swedish physicians led to a persistent rise in mortality in Sweden, concentrated in low-density regions, demonstrating the strain internal mobility places on public services (Dodini et al., 2025). Similarly, the United States has been described as experiencing a unique internal "brain drain" linked to broader socio-economic shifts (U.S. Congress, Joint Economic Committee, 2022).

In the African context, these distortions frequently manifest as intense competition for specialized skills within national borders. This is clearly observable in Mozambique, where Sherr et al. (2012) observed that 25.5% of physicians left the public sector, with the majority remaining in-country to work for the growing NGO and donor sectors. In other African contexts, including Uganda and Nigeria, low salary (a "Hygiene Factor") is frequently cited as the primary push factor for this attrition (Muhammad et al., 2025). Furthermore, Cloete and Bunting (2018) highlight that in South African universities, promotion pathways can be complex and opaque, varying significantly by faculty and rank. These regional examples demonstrate that IBD severely disrupts the public sector's capacity to deliver essential services by shifting talent toward the domestic private or non-governmental sectors.

In Zambia, the primary concern has critically shifted toward IBD, involving the localized movement of skilled professionals from resource-strained public institutions to better-resourced competitors within the national borders (Mulenga, 2020; Shumba & Mawere, 2012; Zulu, 2024). This internal mobility is driven by the same calculus of push factors (inadequate home conditions) and pull factors (superior prospects) that characterizes international migration.

While low salary remains a baseline dissatisfier, literature suggest that for highly specialized ICT staff in Zambia, the critical failing is often the institution's inability to provide intrinsic professional fulfillment ("Motivators"). Historical research at the University of Zambia (UNZA) supports this, consistently identifying unfavorable conditions of service including low remuneration, poor compensation systems, and inadequate research funding as the root causes of general lecturer retention issues (Mulenga, 2020; Mulenga & Msango, 2016; Akinwale et al., 2023).

The impact of this internal capital flight is magnified in high-demand fields like Information and Communication Technology (ICT) via two distinct channels (Mulenga, 2020):

1. Inter-Industry Mobility (IIM): Academics depart for the significantly higher-paying private sector. This results in a permanent depletion of the HE sector's capacity to train future professionals.
2. Inter-University Mobility (IUM): Academics migrate between local HEIs. This functions as an institutional "zero-sum game" that merely reallocates existing talent without addressing the aggregate national shortage.

Given the strong demand for skilled IT professionals in today's high-technology-driven global markets (Metin & Ertan, 2022), the loss of these specialists via IBD directly compromises Zambia's national digital development

The drivers for ICT lecturers are intensified. While low remuneration and poor working conditions are primary push factors (Mulenga, 2020; Zulu, 2024), ICT specialists face a severe wage disparity as their skills are benchmarked against competitive international technology sector salaries (Shumba & Mawere, 2012). Beyond financial aspects, high-skilled professionals often quit due to a lack of non-financial characteristics, such as the lack of opportunities to further develop knowledge and skills, autonomy, managerial support, and feeling valued (Sukumaran, 2021; Todericiu et al., 2022; Vinas-Bardolet et al., 2020). Key institutional push factors identified in African HEIs include: inadequate research infrastructure, limited bandwidth, and lack of modern technology and software licenses (Muthanna & Guoyuan, 2018; Teferra, 2025); and poor career management, such as ineffective application of sabbatical leave and failure to equalize returning teachers' salaries (Muthanna & Guoyuan, 2018).

The consequence is a direct erosion of research productivity and institutional capacity, leading to the disruption of programmes, loss of continuity, and the stagnation of technology adoption (Mulenga, 2020; Ikpi, 2023). Specifically, loss of experienced

lecturers diminishes the HEI's capacity to teach modern curricula and engage in technology-driven research (Naseri & Venkataiah, 2024). This phenomenon is quite disturbing for the stability of universities and national economic development (Akporehe, 2022).

Despite the overwhelming negative impacts, an emerging perspective suggests the potential for brain gain and brain circulation to yield long-term benefits (Docquier & Rapoport, 2012). This is especially true for the technology sector, where engaging the diaspora can facilitate rapid knowledge and technology transfer and the creation of valuable global tech networks. The motivation for emigrant ICT academics to return and contribute to the digital transformation of their home country is strong (Ter & Ochi, 2024). Zambia has shown positive developments toward leveraging its diaspora, with the government supporting grants for professionals to relocate and planning to devise a diaspora engagement policy expected to provide a springboard for economic growth and increase remittances and FDI (Noyoo, 2017). Mitigating IBD therefore requires HEIs to align with these national efforts by implementing robust rewards systems (Zulu, 2024) and securing dedicated funding for ICT resource modernization (Mulenga, 2020). By investigating the perceptions of lecturers, including ICT specialists, this study aims to contribute localized insights on how Zambian HEIs can tailor their retention and attraction strategies to mitigate the specific challenges of internal brain drain and effectively leverage the global opportunities for national digital development.

The core problem is the lack of a contemporary, specialized understanding of academic brain drain in Zambian Higher Education Institutions (HEIs) necessary to safeguard national development priorities. This issue is critically intensified by the general exodus of lecturers, driven by documented push factors like poor remuneration and inadequate institutional support (Mulenga, 2020; Zulu, Masaiti & Mundende 2024). Specifically, the problem is magnified among Information and Communication Technology (ICT) lecturers, whose highly marketable and specialized skills lead to a severe brain drain, as they frequently exit academia for other industries where they face significant wage disparity (Shumba & Mawere, 2012). This persistent loss of specialized human capital directly jeopardizes the successful attainment of Zambia's Vision 2030 goals for Human Capital Development and Digital Transformation by diminishing HEIs' capacity to educate a technologically skilled workforce and conduct R&D. Crucially, the absence of current empirical data evaluating both the potential opportunities (brain gain) and the precise impact on research productivity prevents the formulation of effective, evidence-based national retention strategies aligned with the Vision 2030 agenda.

This study therefore sought to address the following objectives:

1. To investigate the perceptions of lecturers at two selected Zambian higher education institutions concerning the factors influencing their decisions regarding institutional retention or departure.
2. To analyze the potential opportunities arising from brain drain for national development, specifically within the context of lecturers at two selected Zambian higher education institutions.
3. To evaluate the impact of brain, drain on research productivity and scholarly contributions at two selected Zambian higher education institutions

The study's structure is visually and logically clarified through a conceptual framework that explicitly connects the theoretical concepts to the empirical variables leading to internal brain drain. This model serves as the analytic roadmap. The framework establishes that Institutional Conditions (Hygiene Deficiencies) and the status of Intrinsic Motivators directly influence the level of Perceived Inequity (the key calculation driving domestic mobility). The ultimate manifestation of these combined dynamics is the Internal Brain Drain Outcome (measured intent to leave the public HEI for a domestic alternative).

The theoretical relationships described on page six are visually presented in a Conceptual framework diagram as shown figure 1. As depicted in the framework, the combined effects of institutional conditions and intrinsic motivators directly feed into the Perceived Inequity calculation, which represents the comparison of the input-to-outcome ratio with domestic private sector benchmarks. Perceived Inequity subsequently functions as the mediating mechanism (the key psychological driver justifying the decision for domestic mobility) thereby leading to the Internal Brain Drain Outcome.

The theoretical foundation of this study is critically developed by contextualizing Equity Theory (Adams, 1965) and Herzberg's Two-Factor Theory (Herzberg et al., 1959) specifically to the phenomenon of internal brain drain. This approach validates the two motivational theories' relevance and demonstrates how they are transformed by the specific environmental challenges, thereby enhancing the analytical depth and rigor of the study.

Inequitable funding and structural inequalities in African higher-education systems constrain universities' capacity to provide quality education and to attract and retain talent in critical areas such as ICT, highlighting broader challenges in achieving

access, inclusion, and institutional effectiveness (Motala, Oketch, Wangenge-Ouma, & Masutha, 2023).

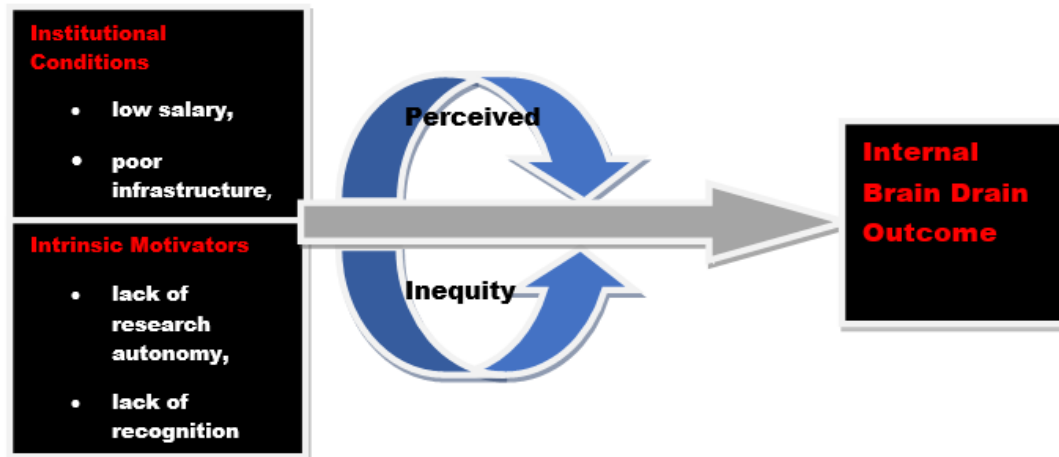


Figure 1. Conceptual framework

Source: Researcher 2025

Equity Theory (Adams, 1965) is fundamental to explaining the psychological catalyst for internal brain drain—the decision to move domestically. The theory asserts that employees evaluate the fairness of their work environment by comparing their ratio of inputs (e.g., specialized ICT knowledge, research output, advanced degrees) to outcomes (e.g., non-competitive salary, heavy teaching load, insufficient resources) against a perceived reference group. For specialized ICT staff, this comparison is amplified by a pervasive dual reference group problem that directly drives internal mobility: Firstly, the staff's expertise is immediately valued on the domestic private sector ICT market, where the outcomes are significantly higher. The vast disparity between the staff's HEI-based outcomes and the readily available private sector outcomes constitutes a severe distributive injustice, providing the rational explanation for their choice to leave the HEI for a domestic opportunity (Adams & Freedman, 1976; Walster et al., 1978). Evidence from Nigerian universities suggests that adequate research infrastructure and supportive management practices significantly enhance academic staff performance, underscoring the importance of institutional support in higher-education settings (Surakat, 2023). This deficit in the essential tools required for high-level academic productivity generates a perception of procedural injustice regarding how their professional role is managed, pushing them toward environments, often domestically, that offer better operational integrity. The theory is thus

transformed into a powerful predictor of voluntary domestic mobility driven by the pursuit of equitable rewards.

On the other hand, Herzberg's Two-Factor Theory (Herzberg et al., 1959) offers the necessary framework for diagnosing the structural factors that create an HEI environment susceptible to internal brain drain. Its power lies in distinguishing factors that merely prevent unhappiness from those that actively foster commitment. Hygiene Factors (Herzberg, 1968) such as low pay, poor working conditions, and excessive workload (Mulenga, 2020) which are critically deficient in African HEIs. In this context, these systemic deficiencies generate intense dissatisfaction and operate as the primary push factors, making the domestic private sector a highly attractive alternative destination. Crucially, merely correcting these deficiencies only addresses the *Hygiene* issue; it is insufficient for long-term retention (Herzberg et al., 1959). To retain specialized ICT staff and mitigate internal brain drain, the focus must shift to identifying and strengthening Motivator Factors (Alshmemri et al., 2017). These intrinsic elements achievement, recognition, responsibility, and advancement (Herzberg, 1968)—such as enhanced research funding and clear meritocratic promotion pathways, are the unique components that foster the professional fulfillment and commitment necessary to bind staff to the HEI, even when competitive external (domestic) salaries are available. The integrated application of these two theories allows the study to achieve a dual objective: diagnosing the psychological drivers of movement (Equity) while identifying the specific institutional adjustments required for staff commitment (Herzberg) to successfully combat internal brain drain.

Method

This study is underpinned by the pragmatic paradigm, which provides the necessary intellectual foundation for employing a mixed-methods design. Pragmatism, unlike strict positivism or interpretivism, focuses on the consequences of action and utility, asserting that the most appropriate methods are those that best address the specific research question (Creswell & Plano Clark, 2018). This stance justifies the use of an embedded correlational mixed-methods design (Creswell & Plano Clark, 2018), where the quantitative survey component (correlational analysis) is prioritized to quantify factors influencing Internal Brain Drain (IBD), while the qualitative component (in-depth interviews) is embedded to provide rich, explanatory narratives for the statistical results.

The study was conducted across two selected public HEIs in Zambia: Charles Lwanga College of Education and Zambia University College of Technology. The target population consisted of all current ICT lecturers (N = 49) within these two institutions.

For the quantitative component, the sample size was determined to be n = 44, representing a near-census of the accessible population, selected through simple random sampling to maximize statistical power. The sample size of n=44 is appropriate for the subsequent descriptive, correlational, and ANOVA analyses (Hutcheson & Sofroniou, 1999). The qualitative component utilized snowball sampling to recruit seven (7) recently departed lecturers, continuing until thematic saturation was reached. This non-probability technique was necessary given the sensitive and inaccessible nature of the departed population.

The instrument was a structured questionnaire that underwent rigorous review. It was subjected to expert review by senior academics and department heads to ensure content validity and alignment with the theoretical framework (Equity Theory and Herzberg's Two-Factor Theory). Following revisions, it was pilot tested on a small external group to refine clarity. The internal consistency of the multi-item scales was assessed using Cronbach's alpha confirming reliability (α values were above 0.70).

The questionnaire was composed of four sections: Section A (Demographic Information), Section B (Perceptions of Retention/Departure Factors), Section C (Potential Opportunities Arising from Brain Drain), and Section D (The Impact of Brain Drain). Questionnaire Items (Likert Scale: 1=Strongly Disagree to 5=Strongly Agree)

The following items in Table 1 formed the core scales for Sections B, C, and D. Data were analyzed using SPSS (Statistical Package for the Social Sciences). The quantitative analysis included Descriptive Statistics, and ANOVA. The qualitative data were analyzed using thematic analysis (Braun & Clarke, 2006). To enhance credibility, two independent coders were utilized, and Cohen's Kappa (Cohen, 1960) was used to assess inter-rater reliability, ensuring the identified themes accurately reflected participant experiences.

Table 1: Survey Items on Lecturer Retention and Brain Drain Effects

Section	S/N	Statement
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Section B	1	Lecturers' decisions regarding institutional departure/retention are influenced by working conditions.
	2	The current salary offered at this institution adequately reflects my qualifications and experience.
	3	Unclearly defined pathways for career progression within your current institution reduces retention rates among lecturers.
	4	Lack of resources for professional development at your institution reduces retention rates among lecturers.
	5	Some lecturers leave because their contributions to the institution are not adequately recognized and rewarded.
	6	Potential political interference in the higher education sector have influenced negatively on job retention among lecturers.
Section C	1	The emigration of lecturers (brain drain) presents potential opportunities for national development.
	2	Absence creates leadership opportunities for juniors.
	3	Returning academics bring valuable skills.
	4	International collaborations initiated by the migration lecturers can lead to increased funding opportunities for Zambian institutions.
	5	Diaspora network of Zambian academics could lead to valuable research collaborations.
Section D	1	Brain drain has an impact on research productivity and scholarly contributions at higher education institutions.
	2	Due to brain drain, research publications decline.
	3	Lecturer's departure harm graduate education quality.
	4	Mentorship opportunities for junior faculty is affected by the departure of senior lecturers.
	5	Loss of experienced lecturers hinder institution's capacity to engage in international research collaborations.
	6	Due to brain drain of lecturers there is always a decrease in the number of students pursuing advanced degrees at your institution.

Source: Researcher 2025

Ethical considerations were rigorously maintained, including securing formal research permission, obtaining informed consent, and ensuring participant anonymity and confidentiality.

The methodological rigor of this study is acknowledged alongside several inherent limitations, primarily related to sampling and sample size. The study's scope is restricted by its small sample size (n=44) for the quantitative survey and its focus on only two higher education institutions in Zambia, which limits the generalizability of the

statistical findings to the broader national HE system. There were also limitations arising from reliance on self-reported perceptions and issues related to variance restrictions in Likert-scale items.

Result and Discussion

This chapter presents the findings from the mixed-methods assessment of the opportunities and challenges of brain drain among Information and Communication Technology (ICT) lecturers at two selected higher education institutions in Zambia. The methodology employed an embedded correlational mixed-methods design, incorporating both quantitative data collected via structured questionnaires (N=44 current lecturers) and qualitative insights from interviews with former lecturers (N=7).

The findings are organized in line with the three research objectives and are presented by first detailing the demographic information, then followed by quantitative findings, and its corresponding qualitative thematic analysis, with themes and illustrative quotes specifically aligned with sectoral and domestic mobility (brain drain to other industries or local universities).

Demographic information

Regarding the demographic variables, the analysis utilized descriptive statistics to identify patterns in the perception of brain drain's impact. The Total Impact Score indicated that both male lecturers (Mean = 28.1, SD \approx 2.4) and female lecturers (Mean = 26.7, SD \approx 2.1) shared a high, similar level of concern regarding how brain drain affects productivity, mentorship, and institutional development. The small-observed mean difference and overlap in standard deviations indicate that gender does not meaningfully influence perceived impact in this sample.

However, when examining perceptions based on years of service, early-career lecturers consistently reported the highest scores. This suggests that the less experienced faculty perceived the negative consequences, particularly the loss of mentorship and research leadership, more acutely than their senior colleagues.

Quantitative findings

Objective 1: To Investigate the Perceptions of Lecturers Concerning the Factors Influencing Their Decisions Regarding Institutional Retention or Departure

An Analysis of Variance (ANOVA) was conducted to test the null hypothesis (H_0)—*There are no statistically significant differences in ICT lecturers' perceptions of factors*

contributing to retention. Table 2 presents the ANOVA results comparing these perceptions by age group.

Table 2: ANOVA – Perceptions of Factors Influencing Retention by Age Group (n=44)

Factor	Sum of Squares	df	Mean Square	F	Sig.	η^2
Career progression is unclear	5.804	2	2.902	4.985	0.034	0.20
Contributions not adequately recognized	6.462	2	3.231	5.762	0.022	0.23
Working conditions influence decision to stay/leave	3.027	2	1.514	2.433	0.125	0.11
Salary reflects qualifications	4.667	2	2.333	3.428	0.058	0.15
Lack of professional development	1.809	2	0.905	1.103	0.354	0.05

Source: Research Data 2025

The ANOVA results presented in Table 2 indicate that the null hypothesis (H_0), which posits no differences in mean perceptions across age groups, was partially rejected. The analysis revealed statistically significant and practically meaningful differences associated with specific motivational factors.

Effect size analysis using eta squared (η^2) elucidates the practical significance of these observed differences. Career progression ($\eta^2 = .20$) and recognition of contributions ($\eta^2 = .23$) exhibited large effect sizes, indicating that age accounts for a substantial proportion of the variance in these constructs.

Conversely, while working conditions demonstrated a medium-to-large effect size ($\eta^2 = .11$), the associated p-value ($p = .125$) did not reach statistical significance, suggesting that differences in this domain are potentially meaningful but less consistent. Similarly, salary reflections yielded a large effect size ($\eta^2 = .15$) yet marginally failed to achieve statistical significance ($p = .058$); this implies that the magnitude of difference is noteworthy despite the lack of conventional statistical significance. In contrast, lack of professional development ($\eta^2 = .05$) reflected a small effect size, indicating minimal variation across age cohorts.

Collectively, these findings support the conclusion that concerns regarding career progression and recognition are significantly more pronounced among younger lecturers.

Objective 2: To Analyze the Potential Opportunities Arising from Brain Drain for National Development

To address Objective 2, the study explored lecturers' perceptions of the potential opportunities that brain drain may create for national development. Descriptive statistics were used to summarize the extent to which respondents agreed that brain drain facilitates collaborations, strengthens research networks, and contributes to broader developmental benefits. Table 3 presents the mean ratings and standard deviations for these perceived opportunities.

Table 3: Descriptive Statistics for Perceived Opportunities of Brain Drain (N=44)

Statement	Mean	Standard Deviation
Brain drain contributes to diaspora-led collaborations	4.67	0.55
Brain drain facilitates research networking	4.80	0.48
Brain drain offers general development benefits	2.93	1.10

Note. M scores are based on a Likert scale (typically 1 = Strongly Disagree to 5 = Strongly Agree).

Source: Research Data 2025

Table 3 presents the descriptive statistics regarding respondents' perceptions of the opportunities associated with brain drain (N = 44). The results indicate a strong consensus regarding the specific academic benefits of migration, while views on its broader developmental impact remain ambivalent.

Participants reported the highest level of agreement with the notion that brain drain facilitates research networking (M = 4.80, SD = 0.48) and contributes to diaspora-led collaborations (M = 4.67, SD = 0.55). The relatively low standard deviations for these items (SD < 0.60) suggest a high degree of homogeneity in the responses; participants consistently view the expansion of professional networks and the fostering of diaspora linkages as the primary positive outcomes of skilled migration.

To align with the study's embedded correlational design, Pearson product-moment correlation coefficients were computed to examine the bivariate relationships among the primary quantitative variables. Table 4 presents the correlation matrix, detailing the associations between perceptions of opportunities (specifically, diaspora-led collaboration and research networking), general development benefits, and the institutional impacts of brain drain.

Table 4: Pearson Correlation Matrix for Key Quantitative Variables (n = 44)

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Variables	1	2	3	4	5	6
1. Diaspora-led collaboration	-	0.72	0.41	0.55	0.58	0.62
2. Research networking	0.72	-	0.38	0.60	0.64	0.69
3. General development benefits	0.41	0.38	-	0.46	0.42	0.50
4. Mentorship impact	0.55	0.60	0.46	-	0.71	0.78
5. Research productivity impact	0.58	0.64	0.42	0.71	-	0.81
6. Composite brain drain impact score	0.62	0.69	0.50	0.78	0.81	-

Source: Research Data 2025

The correlation matrix presented in Table 4 elucidates significant associations among the key study variables. Diaspora-led collaboration and research networking demonstrated a strong positive correlation ($r = .72$), suggesting that lecturers who engage with the diaspora concurrently experience expanded networking opportunities.

Notably, mentorship impact and research productivity impact exhibited the strongest correlations with the composite brain drain impact score ($r = .78$ and $r = .81$, respectively). This indicates that the attrition of senior faculty is perceived to directly diminish institutional supervision capacity and research output. Conversely, general development benefits displayed moderate correlations with the other variables (ranging from $r = .38$ to $r = .50$), reflecting more nuanced and heterogeneous perceptions regarding the broader national utility of brain drain.

Collectively, these findings substantiate the utility of the study's embedded correlational design. They illustrate the complex interrelationships between institutional attrition, diaspora engagement, and developmental outcomes, thereby offering deeper insight into the dynamics of brain drain within the ICT sector.

Objective 3: To Evaluate the Impact of Brain Drain on Research Productivity and Scholarly Contributions

The third objective of this study was to evaluate the extent to which brain drain impacts research productivity, mentorship, and the quality of graduate education within higher education institutions. Descriptive statistics were employed to summarize lecturers' perceptions regarding these adverse effects. Table 5 presents the mean scores and standard deviations for each assessed item.

Table 5: Descriptive Statistics for Perceived Negative Impacts of Brain Drain (N=44)

Statement	Mean	Standard Deviation
Brain drain negatively affects research productivity	5.00	0.30
Brain drain negatively affects mentorship availability	4.80	0.45
Brain drain negatively affects graduate education quality	4.60	0.55

Note. M scores are based on a Likert scale (typically 1 = Strongly Disagree to 5 = Strongly Agree).

Source: Research Data 2025

Table 5 presents the descriptive statistics regarding the negative impacts of brain drain on institutional capacity. The results reveal a near-unanimous consensus among respondents that the loss of human capital severely compromises academic performance.

Participants identified the **impact on research productivity** as the most critical consequence (M = 5.00, SD = 0.30), suggesting that the attrition of specialized ICT talent directly and immediately undermines R&D output. Furthermore, respondents reported high levels of concern regarding **diminished mentorship availability** (M = 4.80, SD = 0.45) and the **reduced quality of graduate education** (M = 4.60, SD = 0.55). The consistently low standard deviations across these items indicate a high degree of homogeneity in the participants' responses, underscoring a shared recognition of these institutional challenges.

Qualitative Findings (Objectives 1-3)

The qualitative findings presented in Table 6 integrate the thematic analyses derived from interviews with former ICT lecturers (N=7), organized by the study's three core objectives. Themes and illustrative quotes focusing on the movement of talent to other sectors, including industries and local universities are presented. Note that letters identified all participants.

Table 6: Integrated Thematic Analysis of Brain Drain Factors and Effects

Research Objective	Theme	Illustrative Quote
Objective 1: Factors Influencing Retention/Departure	Theme 1: Management Impartiality and Meritocracy	"The key issue is not poor conditions as such, but the need for a more output-oriented and impartial approach in decision-making." (Lecturer B)

	Theme 2: Performance- Based Recognition	<i>"Management should strengthen output-based performance management so that recognition and promotion depend on results." (Lecturer A)</i>
	Theme 3: Extrinsic Factor Stability	<i>"Not really. From my experience, the salaries were okay... However, brain drain may still occur if management is not consistent in creating a supportive environment." (Lecturer C)</i>
Objective 2: Potential Opportunities Arising from Brain Drain for National Development	Theme 4: Strategic Diaspora/Sectoral Contribution	<i>"Yes, it can. When lecturers migrate, they can still contribute through remittances, knowledge transfer, networks linking local students to international opportunities, and return programs." (Lecturer D)</i>
Objective 3: Impact of Brain Drain on Research Productivity and Scholarly Contributions	Theme 5: Disruption of Research and Supervision	<i>"When experienced lecturers leave, research supervision becomes strained, publication output reduces, and institutional research visibility drops." (Lecturer E&F)</i>
	Theme 6: Loss of Institutional Continuity	<i>"If a senior lecturer who had secured international research grants leaves, the projects stall because no one else has the same expertise." (Lecturer G & A)</i>
	Theme 7: Vulnerability of Junior Staff and Students	<i>"Students have to be reassigned for supervision, delaying their completion timelines." (Lecturer B)</i>

Source: *Research Data 2025*

The integrated thematic analysis presented in Table 6 provides a qualitative dimensionality to the statistical findings, offering substantive corroboration for the study's quantitative results.

Factors Influencing Retention (Objective 1)

The qualitative data reveal that attrition is driven primarily by institutional governance rather than purely economic factors. Themes centering on Management

Impartiality and Meritocracy (Theme 1) and Performance-Based Recognition (Theme 2) elucidate the ANOVA results, which identified career progression as a dominant concern ($n^2 = .20$). Participants emphasized the necessity of an "output-oriented and impartial approach," validating the quantitative finding that intrinsic motivators (recognition) supersede hygiene factors (salary) for specialized ICT staff. This is further reinforced by narratives regarding Extrinsic Factor Stability (Theme 3), where respondents noted that attrition persists even when salaries are adequate, provided the institutional environment remains unsupportive.

Potential Opportunities (Objective 2)

Consistent with the high mean scores for research networking ($M = 4.80$) observed in the descriptive statistics, the qualitative analysis identified Strategic Diaspora Contribution (Theme 4) as a key opportunity. Participants articulated that migration fosters "knowledge transfer" and "networks linking local students to international opportunities," thereby confirming the quantitative consensus that the primary benefit of brain drain lies in the expansion of professional networks rather than general economic development.

Institutional Impact (Objective 3)

The qualitative themes regarding the Disruption of Research and Supervision (Theme 5) and Loss of Institutional Continuity (Theme 6) offer a mechanistic explanation for the severe decline in research productivity ($M = 5.00$) reported in the survey. Respondents described how the departure of senior staff causes grant-funded projects to "stall" and supervision to collapse. Furthermore, the Vulnerability of Junior Staff and Students (Theme 7)—typified by delayed completion timelines—directly substantiates the strong correlation found between mentorship loss and overall institutional degradation ($r = .78$).

To sum up, the triangulated empirical results present a consistent profile of internal brain drain within the ICT sector. First, the quantitative and qualitative data converge to indicate that attrition is driven primarily by intrinsic and structural factors specifically, the lack of performance-based recognition and transparent career progression rather than salary alone. These challenges are most pronounced among younger faculty, who exhibit the highest levels of dissatisfaction. Second, regarding institutional impact, the findings establish a strong statistical link between the departure of senior staff and a severe decline in research productivity and mentorship capacity ($r = .78$), a relationship further explained by qualitative accounts of "stalled" projects and supervision gaps. Finally, while the general developmental benefits of brain

drain are viewed with skepticism, the results isolate research networking and diaspora collaboration as the sole distinct opportunities arising from lecturer mobility.

DISCUSSION

This section discusses the findings of the mixed-methods assessment concerning the opportunities and challenges of internal brain drain (IBD) among ICT lecturers in selected Zambian Higher Education Institutions (HEIs). The discussion is structured around the study's three main objectives, integrating quantitative results with qualitative thematic insights. This revised discussion moves beyond a restatement of results to critically engage with existing literature from other African contexts, interpret findings through the theoretical lens, and articulate the study's unique contribution by distinguishing IBD from international brain drain (IBD).

Factors Influencing Internal Brain Drain (IBD)

The study indicates a critical shift in the drivers of IBD within Zambian HEIs, demonstrating that the primary retention challenge is no longer rooted merely in basic infrastructure but in the acute deficiency of professional Motivator Factors.

The quantitative analysis revealed that age accounts for a substantial proportion of the variance in perceptions of career progression ($n^2 = .20$) and recognition of contributions ($n^2 = .23$). These large effect sizes, coupled with statistically significant group differences ($p < .05$), directly support and extend Herzberg's Two-Factor Theory (Herzberg, 1968). In many African contexts, including Uganda and Nigeria, low salary (a Hygiene Factor) is often cited as the primary push factor (Muhammad et al., 2025). However, our results nuance this; while salary reflections showed a large effect size ($n^2 = .15$), the relationship was marginally non-significant ($p = .058$). This suggests that while low salary remains a baseline dissatisfier, for highly specialized ICT staff in Zambia, the critical failing is the institution's inability to provide intrinsic fulfillment (Motivators).

The failure to implement clear, performance-based promotion pathways ensures that staff view the HEI as a point of career stagnation, a conclusion similarly reached by studies examining faculty movement in South African universities (Cloete & Bunting, 2018). This organizational failure creates a profound sense of Perceived Inequity, as postulated by Equity Theory (Adams, 1965). The qualitative data (Theme 1: Management Impartiality and Meritocracy) revealed a pervasive sense of institutional failure regarding transparent rewards. This distributive injustice serves as the rational driver for the decision to correct perceived negative inequity by migrating to a domestic private sector that offers better parity. This dynamic distinctly separates Internal Brain

Drain from International Brain Drain: IBD is driven by the immediate availability of comparable, higher-reward domestic output opportunities (e.g., Zambian ICT firms or regulators) rather than the pull of foreign citizenship. Our findings challenge the simplistic application of Equity Theory, demonstrating that the reference group for this specialized cohort is not within the HEI, but the accessible domestic private sector.

Impact of IBD on Core Academic Functions

The finding that IBD critically compromises research productivity ($M = 5.00, SD = 0.30$) and mentorship availability ($M = 4.80, SD = 0.45$) demonstrates the severe vulnerability of Zambian HEIs to the loss of specialized talent. The severity of this impact is underscored by the strong positive correlations between the composite brain drain impact score and both research productivity impact ($r = .81$) and mentorship impact ($r = .78$).

These statistical associations validate the systemic erosion of capacity confirmed by Theme 5 (Disruption of Research and Supervision) and Theme 7 (Vulnerability of Junior Staff and Students). Consistent with findings in Kenyan universities, where the shortage of senior faculty has been linked to reduced institutional capacity for grant-funded projects (Muia & Oringo, 2016; Business Daily Africa, 2024), the current study extends Herzberg's Theory by interpreting this loss as a direct systemic breakdown caused by the failure to maintain Motivators. When the most achievement-driven staff depart, they take with them the capacity to lead complex research projects—functions inherently tied to the Motivator factors of responsibility and achievement.

Furthermore, an unexpected pattern in our data, contrasting with older literature (e.g., Mulenga, 2020), is the de-emphasis on infrastructural deficiencies in the departure calculus. Despite working conditions showing a medium-to-large effect size ($n^2 = .11$), the result was not statistically significant ($p = .125$). This contradiction suggests a contextual evolution: highly skilled ICT professionals are willing to tolerate basic infrastructural deficits if their professional growth is guaranteed. When both are deficient, the retention failure becomes absolute.

Brain Gain Opportunities

The findings for objective three validate the strategic potential for brain gain and circulation (Docquier & Rapoport, 2012), a mechanism vital for national development in the Global South. Quantitatively, lecturers reported high agreement that the academic diaspora can contribute through research networking ($M = 4.80$) and diaspora-led

collaborations ($M = 4.67$). Crucially, the strong positive correlation between these two variables ($r = .72$) indicates that networking is not viewed as a passive benefit but as an active mechanism for collaborative output.

Theme 4 (Strategic Diaspora/Sectoral Contribution) confirmed this sustained commitment. This pattern is particularly powerful as it challenges the sufficiency of Equity Theory as a sole predictor of post-departure behavior. While staff leave the HEI due to inequity in extrinsic rewards, their subsequent willingness to initiate collaborations suggests their strong intrinsic commitment to the academic mission remains intact. The output failure of the institution did not eliminate the intrinsic motivation tied to the input (sharing specialized knowledge). This finding aligns with observations in Kenya and Ghana, where diaspora academic networks are leveraged as essential tools for knowledge transfer (Odhiambo, 2012; Noyoo, 2017). The study thus concludes that for Zambian HEIs, internal mobility can be strategically leveraged, transforming a local loss into a cyclical advantage necessary for national digital development.

Conclusion

This mixed-methods study concludes that brain drain among ICT lecturers in selected Zambian higher education institutions is predominantly driven by deficiencies in intrinsic motivational factors rather than purely financial considerations. Grounded in Equity Theory and Herzberg's Two-Factor Theory, the findings demonstrate that unclear career progression and inadequate institutional recognition significantly contribute to lecturer dissatisfaction, reflecting weaknesses in meritocratic practices and organizational justice. The departure of ICT lecturers has substantial negative consequences for institutional capacity, particularly in terms of reduced research productivity and limited mentorship opportunities, with early-career academics being the most affected. At the same time, the study highlights the strategic potential of brain circulation, as the academic diaspora is widely perceived as a valuable resource for research collaboration and knowledge transfer. Overall, the study underscores the need for comprehensive institutional reforms that prioritize transparent promotion systems, recognition mechanisms, strengthened research and mentorship infrastructures, and structured diaspora engagement, while also calling for future research to establish competitive retention benchmarks through a clearer understanding of wage and resource disparities between academia and the non-academic ICT sector.

The findings imply that institutional leaders in higher education must move beyond short-term or salary-centered retention approaches and instead adopt

strategies that foster long-term commitment among highly competitive ICT lecturers. Effective responses should emphasize the establishment of meritocratic systems through transparent, output-based performance management and clearly articulated career pathways that provide fair recognition and advancement opportunities, thereby addressing the core motivational and equity-related drivers of brain drain. In parallel, institutions need to invest strategically in capacity building by strengthening ICT infrastructure, expanding access to research and development resources, and institutionalizing structured mentorship programs to safeguard early-career academics and sustain research continuity. Furthermore, the results recommend formalizing mechanisms for engaging the academic diaspora so that international mobility is transformed from a loss into an asset through systematic knowledge transfer and collaborative research. Finally, future research is recommended to generate empirical benchmarks by quantifying wage differentials and resource gaps between higher education institutions and the non-academic ICT sector, enabling institutions to design evidence-based and competitive retention policies.

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