Determinants of International Research Collaboration in Uganda: An Analysis of Research Registered with the Uganda National Council for Science and Technology

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Abstract

Over the past two decades, International Research Collaboration (IRC) has significantly increased, especially within the Global South. This study investigates the determinants of IRC in Uganda, examining the propensity of researchers to engage in cross-border collaboration and the characteristics of research teams that participate in such endeavors. Eleven explanatory variables were considered, including gender (Kwiek, 2018), region where the principal investigator (PI) obtained their highest research qualification (Confraria et al., 2020), and field of science (Vabø et al., 2014). A binary logistic regression model was employed to identify key determinants of IRC, while a beta regression model assessed the extent of collaboration propensity. Findings reveal that gender, region of qualification, type of research sponsor, research field, research type, and budget significantly influence IRC participation. Researchers in health sciences were found to be twice as likely to engage in IRC, whereas projects funded by the Ugandan government were less likely to involve international partners. These results underscore the need for low- and middle-income countries (LMICs) to establish resilient national research ecosystems in order to participate more equitably in the global research landscape. Furthermore, targeted policies that promote inclusivity—particularly enhancing women's involvement in IRC—are essential. Although IRC is shaped by contextual and institutional dynamics, its effective advancement must be strategically aligned with national priorities and deliberately embedded within university research systems.

1. Introduction

In the era of globalization, international research collaboration (IRC) has emerged as a key driver of scientific advancement. The exchange of knowledge, expertise, and resources across borders accelerates innovation, improves research quality, and addresses transnational challenges such as health crises, climate change, and technological development. IRC also strengthens the capacity of developing countries by facilitating access to global networks and increasing the visibility of local research. However, participation in IRC remains uneven, often skewed in favor of researchers and institutions in high-income countries.

In Uganda, research activity is increasingly guided by national development priorities and the regulatory frameworks of bodies such as the Uganda National Council for Science and Technology (UNCST). Despite growing engagement in IRC, empirical understanding of the factors influencing Ugandan researchers' participation remains limited. This study investigates the determinants of IRC in Uganda by analyzing data from research projects registered with UNCST. Specifically, it examines how individual, institutional, and contextual factors influence both the likelihood and the extent of international collaboration.

By identifying the factors that shape IRC participation, this study provides evidence for policy formulation aimed at strengthening Uganda's research system and enhancing equitable participation in global scientific endeavors.

2. Methodology

2.1 Research Design

The study adopts a quantitative, cross-sectional research design. It is based on secondary data extracted from the UNCST research registry between 2018 and 2022, focusing on projects led by Ugandan principal investigators (PIs).

2.2 Population and Sample

The dataset consists of 1,072 research projects registered with the UNCST. Projects were selected based on the completeness of records, and only those with full details on collaboration, sponsorship, field of science, and budget were retained. The final sample comprises 856 projects.

2.3 Variables

Dependent Variables:

- IRC status (binary): Whether the project involved at least one international co-investigator or institution.
- Propensity to collaborate (continuous): Percentage of collaborating institutions that are

international.

Independent Variables:
1. Gender of PI (male/female)
2. Region of highest qualification (Africa, Europe, North America, Asia)
3. Field of science (Health, Social Sciences, Natural Sciences, Engineering, etc.)
4. Type of research (basic, applied, operational)
5. Source of funding (government, international, institutional)
6. Total research budget (in USD)
7. Affiliation type (university, research institute, NGO)
8. Duration of project (in months)
9. Presence of postgraduate students (yes/no)
10. Number of team members
11. Region of institutional affiliation (Central, Eastern, Western, Northern Uganda)

2.4 Analytical Methods
Two main statistical models were applied:
- Binary Logistic Regression to estimate the probability of IRC participation.
- Beta Regression to model the proportion of international collaborators within each research team.

3. Results

3.1 Descriptive Statistics

Out of the 856 research projects analyzed:
- 38.2% involved international collaboration.
- 61.8% were locally led without foreign partners.
- The Health Sciences field accounted for 42% of internationally collaborative projects.
- Male PIs represented 67% of the total sample.
- 48% of PIs attained their highest qualification outside Africa, predominantly in Europe and North America.

3.2 Binary Logistic Regression Findings

Key predictors of IRC participation:

Variable	Odds Ratio	Significance (p-value)
Gender (Male)	1.46	0.042
PI’s Degree from Europe	2.17	0.001

Field: Health Sciences	2.05	0.005
Field: Social Sciences	1.67	0.023
Government-funded Project	0.53	0.019
Research Budget (log scale)	1.31	0.008

3.3 Beta Regression Findings

For projects with existing international collaboration:
- The proportion of international partners was positively associated with:
  - Higher research budgets (β = 0.21, p = 0.012)
  - PI's overseas academic training (β = 0.33, p < 0.001)
- Gender remained a marginal factor in determining depth of collaboration (p = 0.076).

4. Discussion

These findings confirm that IRC in Uganda is both systematically and structurally shaped. Researchers trained in Europe or North America are significantly more likely to engage in IRC, aligning with Confraria et al. (2020) and Kwiek (2018). This suggests that overseas academic networks play a critical role in sustaining collaboration beyond borders.

Gender disparities persist, with male researchers having a higher likelihood of participating in IRC—an observation supported by prior research on gender imbalances in global science (Vabø et al., 2014). Institutional support mechanisms for women in STEM and policy frameworks to close gender gaps in research participation remain insufficient.

Notably, government-funded projects tend to be more locally focused, with lower levels of international collaboration. This points to a potential misalignment between national funding structures and Uganda's aspirations for global research integration.

The predominance of IRC in the health sciences reflects broader global funding priorities and transnational health challenges. However, it also raises concerns about thematic imbalances—fields such as agriculture, engineering, and the humanities remain underrepresented in IRC, potentially undermining holistic national development goals.

5. Conclusion and Recommendations

This study highlights that IRC in Uganda is shaped by gender, training background, research field, and type of sponsor. While Uganda has made strides in fostering research collaborations, disparities in participation and structural barriers continue to hinder inclusive engagement.

To enhance Uganda's effectiveness in global research ecosystems, we recommend:
1. Policy Alignment: Government research funding should incentivize collaboration with global partners while aligning projects with national development goals.
2. Capacity Building: Support early-career researchers—especially women—through mentorship, travel grants, and research leadership programs.
3. Diversification of Fields: Promote IRC in underrepresented disciplines through targeted funding and international academic matchmaking.
4. Strengthen University Systems: Embed IRC strategies within institutional research offices to facilitate long-term partnerships and reduce dependence on individual networks.

Ultimately, international research collaboration should not be an accidental byproduct of individual networks but a strategically guided process, embedded in Uganda's higher education and science policy frameworks.

References

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