



UGANDA INSTITUTION OF PROFESSIONAL ENGINEERS' RESEARCH AGENDA 2024-2029

AUGUST 2023

FOREWORD

This Research Agenda 24 – 29 positions the Uganda Institution of Professional Engineers (UIPE) to address practical challenges around its operations and operations of its constituent members and partners. It will guide the promotion of engineering in a number of unexplored spheres such as technology transfer and research partnerships. The research agenda is aligned to the institutional policies and national planning frameworks such as Vision 2040 and the Third National Development Plan.

Through UIPE's stakeholder consultations and membership needs assessment carried out, the Research Agenda will provide solutions to practical challenges such as a) growth of membership portfolios, relative support services and programmes, b) national technology transfer process gaps, c) local content laws, d) low numbers of practicing women engineering professionals, and e) the general safety during and after engineering project implementations. Specifically, the objectives of the research agenda include; conduct technical assessment on gaps that would grow the engineering profession, building institutional branding through research and information dissemination, promote research groups within the UIPE membership to solve common problems that affect engineering practice in Uganda and create a solid linkage between academic research and industry through practice-based research.

The UIPE Research Agenda has further identified research priorities which will lead to more successful research for the next 5 years in order to make the institution relevant and helpful to the community it serves. My sincere hope is that this first institutional research agenda will guide the current and future leadership to more strategic partnerships and engagements for the betterment of the institution



30th September 2023

Eng. Andrew Muhwezi
PRESIDENT

Date

1. INTRODUCTION

1.1 Background

The Uganda Institution of Professional Engineers (UIPE), established in 1972, is an member-based umbrella organization that provides professional engineering development training, Research, advocacy and advice to its members and the Government of Uganda on matters of engineering education and practice.

According to its Strategic Plan (2020-2024), the vision of UIPE is *Engineering excellence transforming the nation*. The mission of UIPE is *to nature and promote excellence in the science and practice of engineering in Uganda*. According to the 2016 revised constitution of UIPE, two objects of UIPE are worth mentioning regarding the mandates of the Institution. One object is to cooperate with universities, other educational Institutions and public educational authorities for the furtherance of education and training in engineering in science and practice. The other object is to initiate research programmes and to co-operate with Government, private research Institutions and private individuals in promoting research into engineering science and technology.

Engineering evidently plays a key role in politico-socio-economic transformation of a nation. It is in this regard that UIPE Council resolved to develop a research agenda that positions the institution to address practical challenges around its operations and operations of its constituent members and partners.

2. MOTIVATION FOR A RESEARCH AGENDA

The development of the Research Agenda was motivated by a renewed drive to promote engineering in a number of unexplored spheres such as technology transfer and research partnerships. For consistency, by and large, the research agenda is aligned to the institutional policies and national planning frameworks such as Vision 2040 and the Third National Development Plan. Based on stakeholder consultations and a recently conducted needs assessment by UIPE, key concerns that motivated the institution to develop a Research Agenda are identified as follows.

The Institution desires to grow its membership portfolio, and relevant support services and programmes, but is challenged with financial instability and increasing operational

costs. The institution needs to devise concrete means to ensure financial sustainability to meet its mandate. This could entail doing forensic research on financial performance of the institution as well as attracting research grants to enable it perform its duties.

UIPE is further challenged with national technology transfer process gaps that need to be addressed so as to support innovators to move their prototypes through full intellectual property protection and commercialisation. UIPE needs to strengthen the linkages between industrialists, researchers, innovators so as to build a national eco-system for engineering technology.

Local content laws need to be exploited by the professional body to position local engineering contractors to favourably compete for local and international engineering contracts. To inform this effort, there is a need to research on the actual potential of the local contractors, and generate a database for easy identification and sourcing.

UIPE is still challenged with the low numbers of practising women engineering professionals. UIPE efforts to promote women in engineering have been in place for the last six years; there is now a need to review the performance of these efforts against the intended objectives. Probably more research studies on what can be done to promote girl or woman education might be necessary. These studies will help pinpoint the right stage for future intervention (primary, secondary or tertiary). More study on incentives for women in the engineering profession to meet the national aspirations of a science-led economy are also important.

The general safety during and after engineering project implementations has become a serious issue to the both the professional body, and the respective regulator. These move hand-in-hand with professional engagement with local communities and support professions on standards and best practices.

3. OBJECTIVE OF THE RESEARCH AGENDA

The overall objective of the Research Agenda is to provide solutions to practice-related engineering challenges that the institution and engineering professionals encounter in the field of practice.

3.1. Specific Objectives of the Research Agenda

The specific objectives are to:

- i. Conduct technical assessment on gaps that would grow the engineering profession
- ii. Building institutional branding through research and information dissemination
- iii. Promote research groups within the UIPE membership to solve common problems that affect engineering practice in Uganda
- iv. Create a solid linkage between academic research and industry through practice-based research

4.0 RESEARCH THEMES

Based on the objectives of the research agenda (Section 2.0), the following themes have been derived:

4.1. Sustainable Institutional Development

Under sustainable institutional development, the research agenda of the institution is to ensure that dependable financial resources are established to sustainably run the programmes of the institution. Among these is the establishment of the

- a) Grants Office to manage grants and support the grant sourcing process
- b) Develop and approve the incentives policy

Under this theme, information gathering will be done on grants and research partnerships on industrial gaps that can provide business opportunities for the institution.

4.2. Innovation Cluster Systems

This theme promotes interface between innovators industrialists and financiers in the domain of engineering. Through the innovators' platform and other collaborations, the promotion of research for further improvement of innovations and commercialization will also be supported.

The National Engineering Innovation System requires an interactive triple helix alliance between Government, Industry/businesses and Research Institutes. Therefore, under this

theme, the establishment of the innovation platform is eminent to allow for interaction between technology transfer players. The platform will:

- Create innovation cluster research initiatives
- Link engineering businesses to academia for research support
- Link engineering businesses to Government institutions for policy support
- Provide relevant training for engineering business, process or product improvement.
- Facilitate joint acquisition of technology, and product marketing

In the short run, the engagement with the Uganda Manufacturers' Association to have quarterly symposia will operationalize the actions above.

4.3. Advancement of Women in Engineering

This theme calls for fundamental research entailing tracer studies of women engineering professionals, their motivation, and drive to change or maintain the engineering practice. UIPE hopes to use this evidence-based study to devise ways of promoting the profession among women, and sustained practice for those who have trained. Therefore, under this theme, research topics on the following are aligned:

- a) Tracer studies for engineering practice with gender disaggregated data
- b) Career development for women engineers
- c) Industrial pathways for women engineers
- d) Research on creation of women chapters

4.4. Digital Transformation

In addition to the efforts made by UIPE to establish online application, more automation of the institution's financial procedures and general operations is important for efficiency and frugality. Therefore, UIPE will need to conduct research on technological needs for all its committees and key secretarial work for automation. These include: financial approvals, online banking, and online accreditation. As an external support service, a study on status and performance of local contractors will be done to inform the creation of a local contractors' database for future sourcing and promotion.

In order to further embrace 4IR, Artificial Intelligence promotion through technological needs assessment and research dissemination through the National Technology Conference is also important.

4.5. Responsiveness to Emerging Community Issues

UIPE seeks to contribute to a number of crosscutting challenges for which engineering solutions can be used to lessen the burden to Ugandans. Under this theme, climate change mitigation with special emphasis on e-mobility application research and infrastructure resilience will be prioritized.