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Faculty of Engineering and Technology

REALIZATION OF UNIVERSITY – INDUSTRY COLLABORATION IN UGANDA

A PRESENTATION AT THE WORKSHOP ON HIGHER EDUCATION PARTNERSHIPS FOR SUB SAHARA AFRICA (HEPSSA)

Theme: University-Industry Collaborations in Supporting Engineering Education

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The Rationale for University-Industry Collaboration

- The employability and productivity of engineering graduates, as well as collaboration on innovative research and development are all made possible by the dialogue between academic and industrial leaders.

- It is an opportunity to recharge ideas and share new approaches. We learnt that whether industry or academia, we share the same enthusiasms and similar challenges: the drive always is to improve the way we work and build a better society for all.

- Engineering education is therefore ripe for change due to increasing technological disruptions that engineering graduates face and engage with. The U-I collaboration thus provides the opportunity to bring together leading thinkers to discuss the engineering education transformative actions and strengthen ties between academia and industry.

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Goals of collaboration relate to research, teaching and university management

Research

- Promote basic research
- transfer of knowledge
- develop products, innovations
- Nurture new Industries

Teaching

- Promote employability
- Promote teaching quality
- Promote lifelong learning
- Create personal relations

Management

- Support governance
- Promote strategic profiling

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Promote basic research

❖ Endowed Chairs

- Support from industry for a professorship position to conduct basic research in an area of industry engagement. The support can include full/part salary, scholarship of involved students, equipment etc. Clear rules of engagement intended to protect the academic freedom must be in place

❖Industry funding the establishment of the state-of-the-art lab at the University.

- Examples known to me are drawn from US and Germany; most of the emerging technologies labs at University of California, University of New Mexico and many others were fully or partly funded by the Alumni who went on to build global brand companies

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Transfer of Knowledge

- Local networks, workshops
- Support graduates and researchers in establishing businesses (spin-offs)
- Consultancy
- Shared facilities

Academic staff go for "moonlighting“ anyhow, could we make something planned and systematic out of it, creating benefits for the university?

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Product Development

- The innovation process is based on 5 phases: idea generation, customer focusing, development, prototyping and industrialization. A nexus of U-I is crucial at each stage.

- Best examples in our Ugandan context is Kiira EV Electric car project.

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Nurture 'new' Industries

- Enhance the entrepreneurial talent among the students to be able to give birth to research-led industrial ventures. Uganda has made tremendous progress in the establishment of industries to manufacture consumer products and very little breakthrough in the manufacture of machine tools which is a critical ingredient for industrialization.

- Develop University IP with permanent shares. This fosters continuous product improvement and keeps you thinking ahead.

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Promote employability

❖ Dual study programmes; hybrid of vocational training and academic education

- Combine the two traditionally separate spheres of vocational training and academic education - focus on employability (employed; you learn at the University and you learn at the work place-interrelated: you apply immediately what you have learnt)
- Companies, HEIs (also vocational schools) work closely together

❖ Students Internship, staff exchange/secondment

❖ Carry out final year projects, Master's thesis and PhD research within an industrial setting

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Promote Teaching Quality

- Put emphasis on applied knowledge. Create special new status of professorship with a second job: 30-50% workload in Industry while keeping professorship job in the university.
  - Intention is permanent update of curricula according to experiences in main occupation, link of professors to practice.

- Employ academic staff with minimum number of years of industrial experience.

- Implement interdisciplinary team capstone engineering design projects throughout the students study programme with both academic and industrial mentors.

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Promote lifelong learning

❖ Modularized Bologna-system enables flexible lifelong learning in cooperation with companies

Company‘s HR development offers study places at partner universities, related to HR development goals/perspectives

Combine modules of master program with modules of company inhouse training to "diploma of advanced studies“

Advanced part-time master program (consisting of modules, work-friendly mode to allow studying parallel to work)

Develop tailor-made certification courses on say Automation, AI, machine leanring, mechatronics, etc to enhance competences of industrial HR

Write master‘s thesis in company

Outsourcing of company‘s HR development to university

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Proposed Strategic Direction

Going forward, the U-I collaboration can therefore be realized by putting emphasis on FOUR pillars:-

- ✓ Pressing the peddle of transformative engineering education that will nurture a new generation of technology-based private, public and social innovators, entrepreneurs and leaders.
- ✓ Championing world-class applied research that will transform lives.
- ✓ Pioneering a vibrant entrepreneurial ecosystem that will foster co-innovation and partnership across Uganda.
- ✓ Embracing a globally-connected environment that will advance world-class innovation and enable talent to flourish.

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- There are three questions that we must answer about our engineering future

1. MUST WE CHANGE
2. CAN WE CHANGE
3. WILL WE CHANGE

HINT: The big talk today is how to integrate G4.0 in our designs. Without familiarisation with ICTs, AI, Machine learning and Cloud computing (internet of things, big data), mechatronics; we SHALL definitely continue lagging behind. Before 1990's capital intensive companies dominated the global value but today 7/10 capitalized companies are tech companies. (Amazon, Microsoft, Alphabet Inc, Apple, Facebook, Alibaba, Tencent). Others in top10 include Berkshire Hathway – Insurances, utilities, food etc; Johnson and Johnson – Pharmaceuticals; JPMorgan – Banking business.