BUILDING RESEARCH CULTURES THROUGH POSTGRADUATE FELLOWSHIPS WITH INDUSTRIAL PARTNERS IN ICT/COMPUTING SCIENCES

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Outline

- Background - challenges with academia and industry interaction

- Innovation studies

- The CB4ICTD Project – some lessons for enhanced academic research & industry interaction

Motivation/background - challenges with academia and industry interaction/collaboration

- There is a notion that innovation is only about product design`(is also about the process involved), hence the need to re-think the way industry and academia relate
- There is no clear picture about the impact linked to their interaction:
  - **Patents** are one way the relations between industry and academia are quantified.
  - Another indicator used to measure the relations between academia and industry is **Gross Domestic Expenditure in Research and Development (GERD).**
  - Using Kenya as an example – these indicators show very low level of interaction
- Intermediary organizations/institutions (e,g, business associations) lack capacity to support effective uptake of knowledge generated in academia to the industry.
- There is a disconnect and lack of trust between universities and the private sector/industry that stems from lack of shared understanding of the value of collaboration.
  - The main issue is – how to convince the industry to see the value of interaction with research organizations/ universities regarding innovation
  - Universities are skeptical of firms/industry motives and relevance to publications, while firms are skeptical of academic research and its application to their context.
  - There are mismatches in the reward systems and unclear institutional policies and guidelines to support learning based collaboration.

How would a broader focus on innovation (innovation studies) assist in addressing some of these challenges?

- To strengthen industry/academia collaboration we need to have a broader focus on innovation studies as a starting point. There are 2 roles played by academia; i) doing research on innovation studies or ii) doing research in innovation studies.
  - How should researchers help industries develop products and services to commercialize their products/ services? This ponders on the analysis of the innovation space (research on innovation) but focus has been placed on research in innovation.

Innovation Studies - Context

First Aid emergency drone. Source (https://www.meee-services.com/first-aid-emergency-drones/

- Innovation is a buzzword commonly heard in any tech hub, start-up or even many established firms on the African continent.

- However, study of innovation – how innovation can be promoted in firms and by governments and why it is important for economic and social development – less discussed in many African countries.

- Many Universities lack full time university courses for studying the academic social science fields of 'innovation studies' or 'science and technology studies'; two academic fields that are significantly established in many other parts of the world

Innovation studies cont'd

- Traditional innovation-oriented courses at universities focus on provision of practical skills e.g. in business such as how to commercialize a product, how to protect ideas from exploitation by others or how to encourage learning and knowledge sharing within a firm.

  – These are important skills and knowledge for development, but these courses do not sufficiently interrogate the barriers and opportunities to firms and provide recommendations for improved policy and practice.

Innovation Studies/Innovation & Development studies

How we understand innovation studies within AfricaLics?:

This field of study - Studies the processes of (science, technology) innovation and the system (actors, linkages, institutions) that support these processes

- It is 'research on innovation' NOT 'research in innovation'
- It asks how innovations impact – positively or negatively – on economic and social development.
- It asks other questions like:

  - Who does innovation in different environments? How can marginalized groups be included in innovation processes?
  - Are there particular combinations of actors that are more likely to produce innovation that is beneficial to economic and social development?
  - Is there a difference between what innovation looks like in the formal and informal sectors and what are the impacts of different types of innovation in these sectors?
  - What other enabling environment factors are important? Is the idea of having a form of enabling system – an innovation system – useful?

- Combines innovation studies' 'and 'development studies'

- Started within:
  - economics (why are some countries developing faster than others, how can they 'catch up'?)
  - organisational economics/ sociology (how can firms become more efficient?)
  - geography (how can regions develop?)

  Note: innovation scholars are economists, sociologists, geographers, engineers, biochemists, medical scientists, agriculturalists etc - interdisciplinary field

Capacity Building for ICT Development (CB4ICTD) Project

Building research cultures in Kenya through postgraduate fellowships with industrial partners

Main strategy

Pilot an approach to **build institutional capacity** for the field of computer science in Kenya by establishing **industrial fellowships nested in a suite of support** including mentorship, peer-learning, and training

Key definitions

…following Pickering (1992) in understanding **<u>research culture</u>** as the field of resources necessary to get research done –

- this view acknowledges social and organizational factors (norms, structures, strategies, values) as resources (Harsh et. al 2018).
- The view is in line with definitions in policy, such as: "A culture of research provides a supportive context in which research is uniformly expected, discussed, produced, and valued." (Hanover Research, 2014, p.5)

<u>Institutional capacity</u> - range of *enabling capabilities* that are essential to providing a conducive research environment, includes: linkages and networks with industry and other universities; mechanisms and policies to support acquisition of research funding; norms of mentorship, peer-support, and scholarly communication; and strategies and structures that create space to balance research and teaching. Institutional capacities can act to connect other capacities and create a research culture which values and supports research across sectors and organizations (Jones, 2008; Marjanovic et al., 2012, Whitworth, et al. 2008). This in turn, helps couple supply and demand for knowledge, leading to research that has intellectual merit and local relevance (Figure 1).

Figure 1: Capacities necessary to support cross-sectoral research cultures
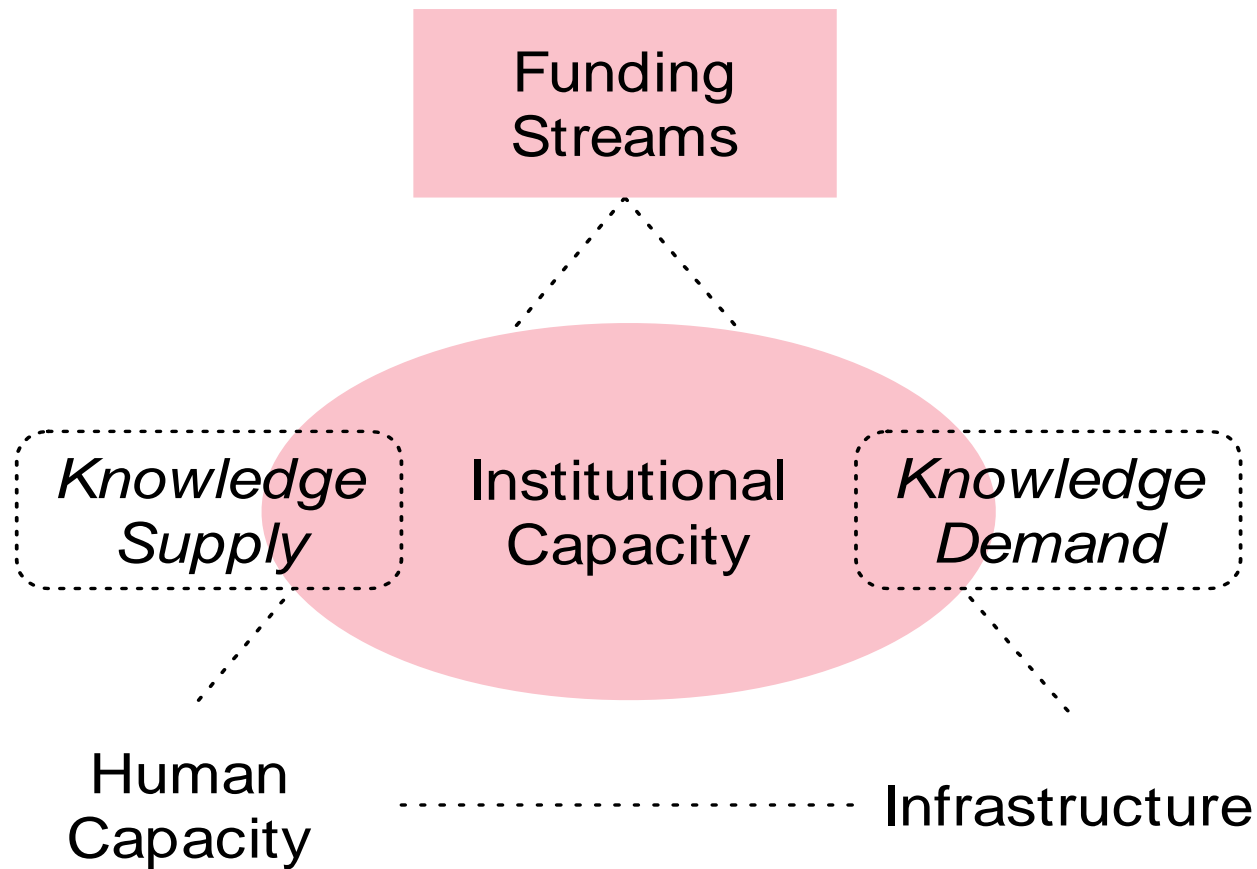
CB4ICTD – Research Questions

1. What social and cultural processes and practices are key to creating lasting institutional capacity in academic computing departments?

2. What is the demand within industry for the uptake of computing research and how is it acquired and adopted?

3. What are the most effective ways to facilitate knowledge translation so as to increase research impact?

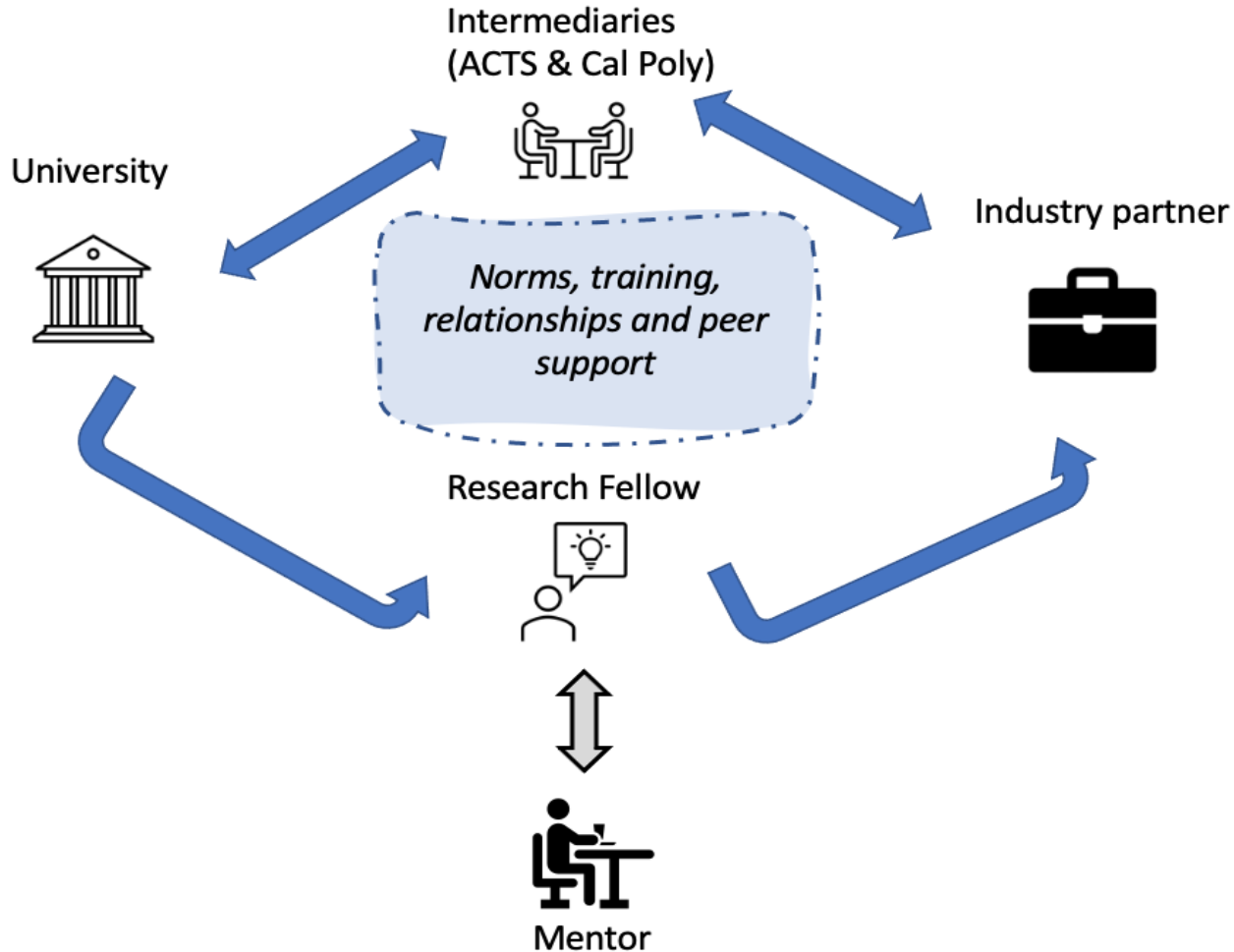4. How can institutional capacity building for computing research be scaled to other disciplines and regions?

CB4ICTD Project

The Intervention/Innovation:

- ACTS as a research and policy organization has credibility with universities (based on highly qualified research staff and expanded research networks) and industry (based on track record on policy relevance)

- ACTS led a training and mentorship program to support postgraduate researchers in computer science and information systems to conduct research in real world settings with industry partners. The program developed norms around mentorship and peer support as well as complementary skills in applied scholarly communication and grant-writing.

Enhancing research cultures in ICT4D

Enhancing Research cultures in ICT4D

Partner	Activities	Benefits
ACTS & Cal Poly (intermediaries)	• Recruit universities, industry partners, fellows and mentors • Coordinate training to fellows: communication, grants, innovation systems, social science research • Oversight, monitoring, evaluation	• Builds trust between all parties • Network building, learning, contribution to policy, internal capacity building and resource mobilisation support and creating new projects
Universities	Fellows • Understand industry partner needs • Implement research project • Communicate results to different audiences – academic, policy, industry • Participate in training and community building events Mentors • Help fellows connect their research project to wider academic fields and audiences outside of academia • Provide training and mentorship writing/publications/grants	Fellows • Forming a community that works across boundaries between industry and academia • Enhanced career development as a result of scholarly outputs and industry experience • Self organising skills Mentors • Deeper understanding of practical realities of different industries • Improved trust with partners, leading to larger joint research projects in the future
Industry partners	• Help fellows to refine research project • Provide access to facilities, resources, and key people • Explain/demonstrate industrial realities so fellows can target their research	• Outside perspective on firm-level challenges • Access to new research approach • Opportunity to hire leading researchers if there is a good fit

How much did it cost?

- **Core/direct costs**: stipends for fellows and mentors; travel budget for meetings

- **Overhead costs**: time, effort and travel for ACTS and Cal Poly to organize programs, recruit fellows, match with partners, develop agreements, connect fellows and mentors, monitor and evaluate program and produce policy and social science outputs.

- **Social support:** nontechnical advise and motivation

Keys to success / learnings

- Creating a community of scholars, with industry experience. This was enhanced through mentorship, peer-to-peer support, and learning of the fellows, establishing norms of writing and publishing.

- Intermediate organizations which can speak both languages, build trust and take on board feedback to improve and strengthen the relationships.

- Self organised alumni group of fellows across public and private universities

- Leveraging existing networks and programmes, particularly the Kenya Education Network (KENET) and digital economy programme at ACTS and sustained relationship building

Future work

- Integrating learning and social capacities into new projects. These include the Artificial Intelligence for Development (AI4D) and the Trilateral Research Chair in Transformative Innovation, the 4th Industrial Revolution and Sustainable Development.

- Sustained funding from donors or government agencies to firmly establish program, broaden network, and apply learning from the first cohort of fellows.

- Longer term, industry partners might invest money through a consortium model .

END

Thank you for listening

Questions!