INNOVATION AND PERFORMANCE IN THE CAPE TOWN'S SOFTWARE AND ICT SERVICE SECTOR

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Our research proposal concentrates on an important – yet largely unexplored – source of growth in South Africa, namely the adoption and use of information and communication technology (ICT), especially in Cape Town's software and ICT services sector (or 'creative software design and development sector'). We aim to understand drivers of firm performance (growth, productivity) in this sector, factors facilitating ICT adoption, and the role of ICT in innovation and growth.

A key component of this research would be a survey of about 50+ growing companies operating in the ICT services sector in Cape Town, specifically those listed in 'Digital Gateway to Africa: Cape Town's Creative Software Design and Development Sector'. While the list in this publication is not exhaustive, it focuses on 'some of the start-ups that have already grown substantially or have the ability to grow substantially'. As such, this group of enterprises would provide useful insights into the role of ICT in their performance, as measured by profits, productivity and growth. A control group would consist of 50 companies operating in the ICT sector that do not grow/perform.

I. Background

A vibrant private sector is key for growth and may lead to innovation, increased employment, and poverty reduction. Innovative entrepreneurs have over the past 20 years driven expansion in internet and mobile usage worldwide.[1] In developing and emerging countries in particular, digital entrepreneurship has major implications for socio-economic progress, and in particular inclusion and productivity. At the same time, adoption of ICT is influenced by both public policy (e.g., incentives, regulations) and the business environment. The factors driving technology adoption and the ICT impact, especially the inclusive aspect of technology adoption, thus need to be better understood.

According to a recent report, "e-Transform Africa", Africa is leapfrogging in adoption and use of ICT. In Cape Town the software and ICT services sector has been booming with more than Rand 1.5 billion invested since 2006. The sector has been supported by a completion of Rand 125 million, 500km optic fiber network project, which increased the Cape Town's bandwidth by 1,000 times (Wesgro, City of Cape Town and Pwc; 2013). This network further connects people to new technologies and facilitates emergence of new tech-entrepreneurs in the city and region.

Given a very high youth unemployment in South Africa (around 50% of the relevant labor force), the ICT service sector provides opportunities for greater involvement of young innovators in the economy, recognizing that young people are often more tech-innovative than adults. Improved ICT's ecosystem would encourage innovation, youth entrepreneurship and employment. The following issues need to be addressed to support ICT innovations among the African youth:[2]

- Collaboration between universities, ICT research centers, governments and private sectors.
- Conditions for developing ICT clusters.

[1] Please see http://www.inc.com/michael-chui-james-manyika/how-digital-startups-will-develop-the-world.html. In Africa, these include young tech-entrepreneurs such as Ronnie Apteker of Internet Solutions (South Africa).

[2] Improved ICT's ecosystem to boost youth entrepreneurship, innovation and youth employment in Africa at: https://ideas.itu.int/post/29519.

- Enabling innovation climate.
    - Access to credit, funds, and loans to ICT innovation (Venture Capital (VC), Business angels, Funds to supports young innovators)
    - Structures that support and manage ICT innovation in Africa

II. Motivation and Objective

Studies of entrepreneurship and ICT innovation in Africa have been scarce, and in particular on utilizing mobile technology among entrepreneurs. Our study contributes to closing this gap by directly gathering and analyzing data of about 50-60 growth entrepreneurs in Cape Town (South Africa) in comparison with 50-60 non-growth firms. Cape Town is particularly suitable for study of ICT innovation given the support to digital entrepreneurship and comparisons with Silicon Valley. We examine the extent to which the ICT driven innovation activity reflects the characteristics of the successful entrepreneur, the internal competencies of the firm, and the business environment in which the firm operates.

The objectives of the research are twofold. ***First*** is to find out which factors (institutional, social or personal) are impacting ICT entrepreneurship in Cape Town. Such evidence could inform policy-making about aspects that are working and areas requiring improvements. ***Second*** objective is to study the impact of ICT adoption and use on firm performance (innovation and productivity).

III. Data and Methodology

The research will utilize a survey that of 50-60 business owners of ICT service firms that are growing or have a potential to grow through face-to-face interviews. It will be complemented by surveys of 50-60 non-growing ICT service firms and interviews with the relevant public and private sector stakeholders. The interviews will be supplemented by two focus group discussions with digital entrepreneurs. The survey and FGDs will seek to answer the following key questions:

A. Who are the innovative entrepreneurs in Cape Town? What are the main constraints (institutional, social, personal) that they face?
    - How do education, access to credit and personal characteristics impact young innovative entrepreneurs, especially their commitment and performance?
    - How did the business environment and approaches of the main technology providers impact adoption and the use of the ICT?
    - Are entrepreneurs that either have foreign ownership or cooperate with foreign firms adopting and using more ICT?
B. What is the impact of technology adoption and use on firm innovativeness and productivity?
    - Is ICT an important driver of innovation in the Cape Town ICT firms?
    - What type(s) of innovation does the ICT drive? (product, process, marketing, and organization)
    - Is the interaction between ICT use and innovation an important factor for increased productivity?

The data will be also analyzed using econometric techniques (Annex) to help answer the above questions.

ANNEX I -- EMPIRICAL METHODOLOGY

To answer questions in section B, the following (2-step) quantitative analysis will be carried out:[3]

a. Estimating probit models (4 equations, one for each type of innovation):

$$\Pr(y_i = 1 \mid x_i, Z_i) = \phi(\alpha + \beta \cdot ICT_i + Z_i + \delta_j) \quad (1)$$

Where y_i is the probability (taking on value *0* of *1*) that firm *i* innovates, Z_i is the vector of firm's control variables (number of employees, exporter status, foreign ownership present, etc.), and δ_j stands for sector fixed effects (to control for the fact that firms in different sectors have different innovation levels).

To account for the possibility of interrelated effects, we also estimate 2 equations (one for demand and one for supply side innovation):

$$\Pr(y_{1i} = 1, y_{2i} = 1 \mid x_i, Z_i) = \phi(\alpha + \beta . ICT_i + Z_i + \delta_j) \quad (2)$$

Where y_i , *i = 1, 2* are the two innovative activities within demand and supply type of innovation. Specifically, product and marketing innovation are part of demand innovation and organizational and process innovations are supply innovations. While equation (1) has 2 possible outcomes, equation (2) has 4 possible outcomes.

We also carry out cross-sectional analysis to investigate whether differences in innovation lead to differences in productivity:

$$\ln(VA_i) = \alpha + \beta_1 \ln(K_i) + \beta_2 \ln(L_i) + \beta_3 innov_i + \beta_4 educmix_i + \delta_j \quad (3)$$

The *innov* variable will be taken from (1) and (2). Further it can also be constructed from answers to the following questions: whether (1) the firms introduced ICT and (2) the firms made organizational changes.

[3] This section builds on Fosse et al. (2013).

ANNEX II –BUDGET

BUDGET

Activity	Details		US$
Statistician 1	To help design, program the Questionnaire, testing	3 days	500
Statistician 2	To process the collected data for Excel and STATA	5 days	1,000
Communication	Airtime for enumerators, coordinator		1,000
Project Coordinator	Overall management of the project	8 days	3,000
Training of enumerators	Training of enumerators and pilots -- 10 participants	3 days	1,000
Data collections	Fieldwork, transport	10-15 days	12,000
Reserve			500
TOTAL			20,000