Clustering Dynamics of the ICT Sector in South Africa

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INTRODUCTION

Both the production and use of ICT are unevenly distributed across countries and regions. While this is typical of emerging and fast evolving technologies, there are particularly significant spatial differences in the patterns of ICT production. Traditional explanations for these differences include distinct factor endowments, technologies and policies. Regions with originally similar characteristics may develop in very different directions. Hence, the *locational patterns* of ICT cannot be explained in terms of factor endowments and policy regimes only (Barrow, 2001).

The tendency of knowledge-driven industries in particular (such as the ICT sector) to cluster geographically has been recognised in policy-making (Lall, Shalizi, & Deichmann, 2004). Proximity to university laboratories and other research centres provides ICT-related firms located in innovative clusters with easier access to scientific expertise and research results, thus, facilitating transfer of research into commercial applications (Acs, Audretsch, & Feldman, 1992, 1994; Jaffe, 1989). Furthermore, firms located in a science park benefit from agglomeration economies, due to the fact that numerous high technology enterprises are clustered in a relatively small area, especially if they operate in the same sector, or in closely connected sectors (Palmai, 2004). The networking opportunities of tenant firms are also widened, basically for the same reason. Finally, the park acts as a bridging institution providing tenant firms with suitable accommodation on flexible terms and technical and business services which are particularly valuable to new high-growth enterprises (Durao, Sarmento, Varela, & Maltez, 2004).

This article looks at the clustering dynamics of the ICT sector in South Africa. The article focuses on two regional (i.e. Western Cape and Gauteng Provinces) ICT cluster case studies which illustrate a clear and intensifying concentration tendency of ICT-related production and R&D, viz. the Bandwidth Barn (a flagship project of the Cape IT Initiative [CITI]) and the Innovation Hub (a component of the Blue IQ project). Finally, the author draws a number of generalisable issues from the case studies which have wider applicability for developing countries.

THE INNOVATION HUB

In March 2001, in a bold bid to position Gauteng (which is South Africa's wealthiest province) as South Africa's "Smart Province", the Gauteng Provincial Government launched an initiative called Blue IQ. The Innovation Hub is part of the Gauteng Government's ZAR 1.7 billion Blue IQ project, under the auspices of the Strategic Economic Infrastructure Investment Programme (SEIIP). Blue IQ is Gauteng Province's high-tech industrial promotion agency. The Innovation Hub's vision is to "create a unique space where high-tech entrepreneurs, businesses, education, research and venture capital can meet, network and prosper" (Innovation Hub, 2003, n.p.). The 11 Blue IQ projects focused on three sectors:

- **Smart industries:** i.e., the Innovation Hub and Gautrain Rapid Rail Link;
- **High value-added manufacturing:** i.e., Gauteng Automotive Cluster; Wadeville Alrode Industrial Corridor; Johannesburg International Airport (JIA) Freezone; and City Deep Terminal; and
- **Tourism:** i.e., Cradle of Humankind World Heritage Site; Constitution Hill; Newtown; Dinokeng; and Kliptown.

The Blue IQ initiative aimed to: (1) create an environment in which smart industries in the ICT and biomedical sectors can thrive; (2) shift Gauteng's manufacturing sector away from traditional heavy industry into more sophisticated, high value-added production; and (3) develop business tourism in order to capitalise on Gauteng's status as South Africa's commercial and financial hub.

The Innovation Hub became a full member of the International Association of Science Parks (IASP); the only full member in Africa. Furthermore, the Business Incubator at the Hub became a member of the National Business Incubators Association (NBIA) in the United States, which seeks to provide professionals worldwide with information, education, advocacy and networking resources for early-stage companies. The Innovation Hub consists of:

- A high-tech incubator;
- An entrepreneur/innovator development programme, including Coach Lab where postgraduate students are mentored to work on industry projects;
- Initiatives targeting empowerment; and
- Alliances with world-class academic and research institutions.

The Innovation Hub was developed to:

- Establish a high-tech hub in Gauteng;
- Develop infrastructure to implement and stimulate high-tech business in a conducive and mutually beneficial environment; and
- House other essential components such as incubators, venture capital funders and professional service suppliers, to form the basis for a world-class 'innovation corridor' in the province.

The Innovation Hub was South Africa's first science park and a joint initiative between the Gauteng provincial government and the Southern Education and Research Alliance (SERA), an alliance between the University of Pretoria and the Council for Scientific and Industrial Research (CSIR). Construction started in October 2003 (and is expected to be finished in late 2004/early 2005) with the objective of creating South Africa's own 'Silicon Valley'. The ZAR 300 million Hub, located in Pretoria, was being built around the concept of technological convergence. The sectors that were being targeted include biosciences and biotechnology, ICT, electronics, aerospace, advanced materials, and advanced manufacturing sectors such as automotive, defence and defence spin-offs. The Hub was positioned adjacent to the University of Pretoria and directly to the east of the Hub-just across the N1 highway-lies the CSIR. Hence the Innovation Hub, situated on a "knowledge axis", was therefore deemed to be at the centre of knowledge and information. Pretoria is only 60km by freeway from South Africa's commercial capital, Johannesburg. Furthermore, the Gautrain Rapid Rail Link, another Blue IQ project, is set to link Pretoria, Johannesburg and Johannesburg International Airport by 2006.

The provincial government saw the hub as: (1) creating a unique location in Gauteng Province where high-tech industry, academia and entrepreneurs will be able to meet and work together; (2) better positioning the province as a globally-competitive knowledge economy; (3) a catalyst to enhance the innovative and growth capacity of high-tech companies and to improve productivity and technology; 4) an incubator for high-tech start-ups; and (5) promoting black economic empowerment by acting as an incubator for innovative black start-up companies.

Processes and outputs of the Innovation Hub are benchmarked on a continual basis, against international best practice. The objectives of the incubator are:

- To facilitate the accelerated growth and sustainable development of technologically innovative start-up companies;
- To position the Innovation Hub incubator as the prime location for technologically innovative start-up companies; and
- To be a leader in South African best practice incubation.

Facilities and services offered by the incubator include:

- Flexible leases and a variety of office sizes;
- Reception and secretarial support;
- Sophisticated ICT infrastructure for the guaranteed supply of unlimited connectivity and high bandwidth;
- Management advisory and mentoring services, including structured training programmes focused at the developmental needs of the new venture;
- Business support services (financial, legal, administrative);
- Access to business networks and markets;
- Assistance in finding suitable black economic empowerment partners;
- Assistance with obtaining venture capital or financing;
- Assistance in accessing technical expertise;
- Entrepreneurship development and education;
- Participation in a high-tech cluster with access to like-minded people, i.e., being part of an entrepreneurial, innovative community;
- Being part of an established brand, *viz*: the Innovation Hub;
- Market visibility by means of corporate advertising (marketing support);
- A research interface; and
- Technological support.

The incubation programme is made up of three phases: (1) *pre-incubation phase* which was designed to last for about six months and to make sure that the start-up had a good business plan and tested the market with its product; (2) the *incubation phase* designed to last for between three to four years; and (3) the *associate stage* was designed as the final phase of the programme, as a