



KNOWLEDGE PARKS: HYPE OR HOPE FOR THE DEVELOPING WORLD?

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It is indeed an honour and a privilege to speak at this important international conference. I thank the organisers for this opportunity to share some reflections on the growing phenomenon of Knowledge Parks and their implications for the developing world. I bring to you greetings from my President and co-author, Sir John Daniel, whom many of you know as a former ADG/ED, UNESCO.

In this paper, we first situate Knowledge Parks within the global knowledge economy and identify how the second generation of Knowledge Parks in the global ‘south’ differ quite substantially from their early precursors. We look at whether the great expectations generated by the establishment of Knowledge Parks were met and whether developing countries have reason to hope that this intervention will lead to innovation and wealth-creation. This will then lead us to questions of where the Knowledge Parks fit within the growing phenomenon of the open source movement. Finally, we will look at how international organisations such as COL and UNESCO can contribute meaningfully to harnessing technological innovation for the development of all.

I. Knowledge Parks: offspring of the knowledge economy?

When we think of a “park” the images that cross our minds are of flowers and gardens, of birds and animals, of amusements and sporting extravaganzas. However, the concept of the park has evolved and extended to include more serious and possibly, more significant themes in life and work. Parks now include Animation Parks, Business Parks, Biotech Parks, IT Parks, Techno Parks. In short, science, technology and, indeed, knowledge itself, have emerged as major themes for parks. How did this happen?

Perhaps the first signs of this evolution emerged when the world of knowledge (academia) and the world of work (industry and commerce) began to interact and converge. These two worlds had for centuries existed at opposite ends of a spectrum: academia was the world of lofty ideals and noble pursuits that barely concealed its contempt for the world of commerce with its preoccupation with material wealth. How would the twain meet, and where? Where was the meeting point?

In the 19th century, as the industrial revolution gathered pace in Britain, some of the individuals making fortunes in businesses such as cotton and steel helped to fund the creation of ‘civic’ universities in cities like Manchester and Sheffield. Whilst these institutions did give attention to research and teaching in support of the local industrial base they remained the exceptions. It was not until a century later, in the latter half of the 20th century, that university-industry partnerships began to dominate the discourse on tertiary education. The crux of the discourse lay in bridging the gap between theory and practice. Theories evolved from practice and applications added value to theories. But there often remained an implicit assumption that those engaged in the world of theories were intellectually superior to the practitioners.

Around the middle of the previous century, some of the large universities struck upon an innovative idea: they invited on their large campuses, major industries who were looking for fertile fields to incubate promising ideas. What we call ‘Knowledge Parks’ today have their origin in the Science Parks of the early fifties when the Stanford Research Park (1951) and the Cornell Business & Technology Park (1952) were established in the United States. These parks ensured that academic institutions could continue to engage in leading edge research as well as to promote technology applications as an entrepreneurial venture to support their operations. This innovative “park” concept laid the foundation for the creation of the legendary Silicon Valley. Today, the Stanford Research Park has 140 companies in electronics, software, biotechnology and other high-tech fields and employs 23,000 persons.¹ The Park represents a symbiotic relationship between the academic and industrial worlds, offering the opportunity for industry to form linkages with some of the finest research institutions in the world. The early seventies witnessed the growth of science parks within UK universities such as Heriot-Watt and Cambridge (1972). By the end of the century, the Cambridge Science Park housed 64 companies and employed 4,000 people. It also encouraged the growth of a cluster of 1,200 companies around it employing some 35,000 people in the 1990’s². The creators of the science parks hoped that they would include some companies created by local academics to exploit the findings of their research.

The ICT revolution of the closing decades of the twentieth century transformed the ways in which the world lived, worked, thought and learned. Today, knowledge and its applications are the key to life and work. From agriculture in the Middle Ages to manufacturing in the industrial age, the 21st century world is moving to ‘service’ as the core of its global economic engagement. Traditionally, knowledge generation was the function of universities. With large numbers of universities across the globe facing a resource crunch and cuts in research funding, it has become necessary for multiple agencies to come together with innovative initiatives to respond to this situation. The establishment of Knowledge Parks is potentially one such important initiative. This has also begun to impact on the developing world, where the establishment of Knowledge Parks as incubators of ideas has created major wealth-generating enterprises.

Why call these “parks”, one might ask. Because “parks” traditionally are not places where people go to work: these are also places where people engaged in serious work can relax de-stress, commune with nature, and carry out their business in more conducive environments. However a close examination reveals that these parks incorporate tastefully done offices that offer the very latest in international lifestyle trends, state-of-the-art connectivity, excellent conferencing facilities, high quality management systems, options for recreation like gyms, swimming pools and amphitheatres, with attractive gardens and even food courts offering a wide range of culinary options. Is this then a preview of the futuristic workplace? Are we witnessing a convergence of work and play? These Parks are not about all play and no work; they are about all work that also happens to be play!

II. What’s in a name? From Science Parks to Knowledge Parks

ICT-led Science Parks in the developing world emerged in the closing decades of the twentieth century. Perhaps one of the most striking examples is the development of China’s Science Parks, which began in the mid-eighties. They contributed significantly to economic development; their numbers grew rapidly at both the national and regional levels with 38,000 businesses and nearly 5 million employees. Haidian Science Park, China’s Silicon Valley, was launched in 1998. With central government support in the form of preferential treatment and tax breaks, this park has become the leading innovation centre in the country, and is home to 138 top research institutions, 6,000 hi-tech companies and 400,000 employees.³

Launched in 1990, Technopark Kerala was the first of its kind in India, supported by the state government. Over 125 companies employing more than 17,000 professionals are located on this park that accounts for 70% of Kerala’s exports. It offers several advantages such as reliable infrastructure and connectivity, highly trained professionals, high incentives and a safe and productive environment.

The Middle East boasts a number of Knowledge Parks: the Knowledge Oasis in Muscat, Oman was inaugurated in 2003, to facilitate links between the ICT-based industries and the academic community and the facilities of the Sultan Qaboos University, seeking to promote Oman as a key player in the global knowledge economy. Education City, situated on the outskirts of Doha, is a variation on the Knowledge Park concept, offering world-class education and research facilities from early childhood education to postgraduate study. The Qatar Science and Technology Park, which was set up in 2004 and is located in the City, facilitates a tripartite partnership of companies, government agencies and academe to promote research and innovation. The Science and Technology Park is a ‘free zone’ offering easy access to foreign companies.⁴

We have seen that Science Parks that began in the ‘north’ are increasingly taking root in the global ‘south’. Known initially as ‘science parks’, they are now adopting the more generic term ‘Knowledge Park’. Today there are entities with names like Technoparks, Research Parks, Innovation Centres, Knowledge Oases (Muscat) or more colourful titles such as the Knowledge Pearl (Hyderabad). The name denotes the emphasis. A Technopark will focus on high-tech manufacturing while a research park may place emphasis on R&D. An Innovation Centre may be an incubator to support new start-up companies. A Knowledge Park is a term often used in countries other than the UK.

What then is a Knowledge Park? The definition provided by the United Kingdom Science Park Association (UKSPA) is helpful. The UKSPA defines a science park as ‘a cluster of knowledge-based businesses, where support and advice are supplied to assist in the growth of the companies. In most instances, science parks are associated with a centre of technology such as a university or research institute.’⁵

Features of a Knowledge Park would include a focus on:

- the design and development of knowledge-based enterprise
- technology transfer
- capacity building and services for the onsite companies
- linkages with higher education and research institutions.

In which ways do the Knowledge Parks in the developing world differ from their counterparts in the ‘north’?

First, while prestigious universities such as Stanford and Cambridge attracted industry to the campus, in the developing world we see Knowledge Parks developing on neutral grounds offering attractive incentives to both industry and academy on their precincts.

Second, we can see the emergence of two generations of knowledge parks. The Knowledge Parks of the seventies and eighties in the developed world still maintained the centre/periphery gap evident in the traditional concept of the university’s role in a society. The parks of the nineties in developing countries changed the approach by trying to link global knowledge to local development needs.

Third, while all Knowledge Parks aim to tap into capital flows, the developing world is particularly interested in attracting foreign investment. Having studied twenty knowledge parks in developing countries, Rhonda Phillips proposes three models of Knowledge Parks⁶:

1. indigenous model
2. recruitment model
3. mixed model

The aim of the indigenous model is to encourage new business development by facilitating technology transfer and innovation. The recruitment model places its emphasis on attracting foreign investment, while the mixed model balances the development of indigenous business by attracting established foreign companies. The Kerala Technopark and the Doha Science and Technology Parks are examples of the mixed model while the Bangalore ICT Park, is meant to promote innovation in the Indian Institutes of Technology (IITs) and the Indian Institute of Science (IISc) is an indigenous model.

III. Does the Hype match the Hope?

Traditionally, Knowledge Parks are expected to provide a) increased employment, b) better support to new small firms; c) closer links between academic institutions and industry and d) a seed-bed for innovation. These are attractive outcomes for the developing world; however, the second generation of Knowledge Parks is too young for impact statements and substantive data. Let us then look at some of the findings of research on the first generation of Knowledge Parks in the UK to draw lessons that will enable us to align the hope with the hype.

Increased Employment?

A study of employment figures in 1986 and 1990 shows that in the UK parks surveyed, there had been an increase of 71% in four years.⁷ Employment in UK parks grew from 3,317 in 1985 to 58,171 in 2004. This is substantial growth, but, as Massey et al. point out, many of the firms entering science parks were not new but were simply relocations of existing companies, and two-thirds of them had relocated from the same city. What is needed then is research into the impact of Knowledge Parks and an examination of how they can generate employment both within and outside their precincts.

How do the parks contribute to local employment? Of the 158 parks surveyed in 1986, 40% of the employees were qualified scientists and engineers, 17% other professional and managerial categories; 19% clerical and administrative cadres.⁸ Interestingly, only a third of the total jobs were held by women. In the Aston and Cambridge Parks, only 10% of the qualified scientists and engineers were women, 11% constituted professional and managerial staff while 87% of the clerical staff were women. Most of the local populations outside the parks are employed in low-level service jobs, such as construction workers, janitorial staff, etc. This inequity in job opportunities can become a major irritant to the local population. What can Knowledge Parks do to avoid such situations? Digiport, Jamaica, offers programmes to help local people develop skills so that they are ultimately qualified to apply for park jobs.

Support to new firms?

Massey et al. state that parks have so far 'been only moderately successful in their stated aim of specializing in being seed-bed areas for the start-up of new independent companies....'⁹ A survey of 20 UK parks found that two-thirds of the firms (119 out of 185) had previously been located elsewhere and only 49 out of 185 were new start-ups. Similarly, a UKSPA Tenants Directory (1987) indicates that of 200 establishments, two thirds were relocations (126) and 29 % (58) were start-ups.¹⁰ How can this change? How can developing countries give the necessary support to start-up companies? The Kerala Technopark matches young local businesses with larger corporate partners and finds that this approach has been successful. Since young firms do not have the required seed capital, the ICICI Knowledge Park in India, has set up an innovation fund to fund 'IP creation in both IT and life sciences.'

Better links between academy and industry?

The Cambridge Science Park has a comparatively low percentage of enterprises started by academics. Similarly, a survey of 18 business establishments at Heriot Watt (1985) found that only three had strong academic input. Another study (1986) shows that 60% of science park firms had informal links with academics, 28% firms used consultancies or part-time academic staff and 12% sponsored academic research. In a 1997 study, it was found that while formal links were not strengthened, 'informal and human resource links were enhanced by the geographical proximity offered in science parks'.¹¹ This situation is likely to continue unless universities explicitly redefine their mandate of teaching, research and extension to explicitly i) include contribution to social economic and environmental development as a core function and ii) integrate science technology and innovation into its mainstream policies and activities rather than relegating business-related research and development to the periphery of the universities' activities.

Seed-beds for innovation?

One of the characteristics of Science Parks is the focus on information technology. A 1985 UKSPA survey shows that 49% were principally involved in IT, and another 10% in the biotechnology, pharmaceutical and chemical sectors. The UKSPA-OU-CURDS survey of 1986 shows that the majority of the 183 establishments surveyed were in computing microelectronics and related sectors.¹² Interestingly, Massey et al. conclude that while 'science park establishments are sophisticated technologically', they tend to be 'small innovators rather than involved in major innovative breakthroughs, and indeed often to operate as diffusers rather than innovators per se'.¹³ If we look at the share of patents lodged by science park establishments in two years, the Science Parks account for 28% compared to the 18% in off-park establishments.¹⁴ How can Knowledge Parks become engines of innovation and growth for the developing world?

There are lessons here for the second generation of Knowledge Parks. How can the concept be analysed further and the findings incorporated to create better and more effective models of Knowledge Parks?

IV. Knowledge Parks in the Developing World

As we have seen, Knowledge Parks in China and India seem to have emerged in response to a growing need to a) promote and support substantial R&D initiatives within these countries, and b) attract foreign capital and technology to augment the indigenous production capacity and enterprise. Both of these countries are significant players in the global economy with strong and extensive educational facilities and traditions. Both, however, need to strengthen their technology infrastructure to modernise their economies and cement their position as leaders in the emerging knowledge economy. At present studies tend to show these two countries still account for little of the value-added in the products and services they export. Knowledge Parks could be effective instruments in raising the knowledge content of their inputs? But would these benefits accrue in the same measure to smaller countries and their economies? Let us look at some of the ways in which Knowledge Parks can benefit the developing world.

Can Knowledge Parks arrest Brain Drain?

Knowledge Parks, by providing state-of-the-art research facilities in a world-class environment can potentially staunch and even reverse the brain drain in developing countries. A UNESCO report indicates that there are 40,000 African PhD's working in Europe alone. If adequate research facilities and employment opportunities are available within home countries, qualified professionals would stay and contribute to national development. The return of IT diaspora from the US to Bangalore, Hyderabad and other technology hubs within India is evidence that, given world-class work environments and lifestyle choices, the brains lost can be converted to brains regained! This is the motivation behind the move to create some prestigious new universities in Africa based on the models of the Indian institutes of science and technology.

All under one roof

By bringing together all the elements of wealth creation in one campus, developing countries can avoid duplication and wastage that they can ill afford. While IT specialists may have the expertise in their area of specialization, they may need to add value to their operations through the provision of technical advice in project management, content development and business start-up. Some of the key success factors in Knowledge Parks are shared facilities, public-private partnerships, financial stability and the space for networking and fostering relationships¹⁵. Providing all these elements can accelerate the

transition from a residual type of wealth creation to a more contemporary business-oriented model.

Is the World really 'Flat'?

Within the Knowledge Parks, the world would indeed seem 'flat' and it would be difficult to distinguish between Denver and Doha. But development has a certain context and each country has specific goals that need specific attention. Dr. Nachiket Mor, President ICICI Foundation, says: "Technology will play a key role in addressing many if not all of India's pressing social problems in healthcare, education, unemployment, poverty alleviation etc. For these technologies and their applications to deliver results, they will need to be appropriate for the Indian context, both from the perspective of applicability and affordability...."¹⁶

Dealing with the 'Divides'

Knowledge Parks seem to be constructed on the intersection of several divides. There is the digital divide, and then the development divide which places world class premises in an environment lacking basic infrastructure and reflecting abject poverty. There are clear divisions between the elite professionals on the campus and the rest of the outside world. Science and technology have primacy over other disciplines. Can the workplace of the twenty first century be built upon such 'divides'? What solutions can technology offer to close these gaps?

V. A New Paradigm

How can Knowledge Parks absorb the recent compelling phenomenon of mass participation and collaboration? Knowledge Parks are exclusive entities structured around professional elites and high-end technologies. Can they adapt to include a wider mass base? How can the rewards and profits of innovation be brought to the four billion people at the 'bottom of the world economic pyramid'?¹⁷

The Knowledge Parks are set up on the premise that innovation using new ICTs leads to economic development. The traditional approach has been 'to create and commercialize ideas within the confines of closed entities'¹⁸ Developments in new ICTs enable us to break out of these confines and to create global 'ideagoras' or virtual spaces in which innovation thrives through collaboration on a scale never before imagined.

Does innovation conflict with our concern for inclusive growth? The answer must be "no." On the contrary, innovation can promote the objective of inclusiveness. In recent times issues of access and equity have dominated the agenda in education, especially, higher education. No one should be excluded from accessing educational opportunities

and developments like open access, distance education, online educational provision, Open Education Resources (OERs) now give us the tools to promote inclusiveness in education.

A latent conflict remains, however. Some argue that excellence and access are mutually exclusive and open access policies will pull down the peaks of excellence that we have achieved at great cost. The pursuit of excellence has traditionally been an individual enterprise based on competition among schoolchildren, academics and institutions. But today the open education resource movement (OERs) is shifting the focus away from competition to collaboration based on the conviction that excellence can be created collectively.

Pioneered by the MIT, the Open Courseware movement, based on the principle of knowledge sharing, marks a reaffirmation of the principle that knowledge is our common wealth. The online course materials of the UKOU, with a more self-instructional style, are the second generation. The third generation is collaborative course development as exemplified by the WikiEducator, a course authoring tool being used to develop materials for the Virtual University for Small States of the Commonwealth (VUSSC).

WikiEducator is emerging as a dynamic and collaborative tool for developing freely available content. It is moving us from the notion that 'this courseware is mine' to the principle that 'this courseware is for (open) mining'¹⁹. The OER movement is largely based on four principles: i) encouraging mass ownership rather than individual possession; ii) having faith in everyone's inherent capability to self-organise; iii) enlisting amateurs as producers of content; and iv) promoting collaboration for the common good. Can these principles be applied to create the networked Knowledge Parks of the future?

The Wikipedia is a perfect example of collaboration and innovation. With five full-time employees, it is already ten times bigger than the Encyclopedia Britannica and almost as accurate. However, one of the founders of Wikipedia, Larry Sanger learned that the democratisation of information can also degenerate into an egalitarianism which can corrode professional standards and creativity. Therefore, he set up an alternative model in the Citizendium which seeks to balance 'public participation with gentle expert guidance'²⁰. The debate in the Wikipedia community between 'inclusionists' and 'deletionists' expresses nicely the creative tension between the ideal of a global intellectual commons and the importance of expert knowledge.

Can the principles of self-organisation and collaboration be applied to make Knowledge Parks more egalitarian, inclusive and profitable?

VI. Where do we go from here?

What can we conclude? Without doubt there are individual success stories which document the significant contributions made by Knowledge Parks. However, as yet there is no clear evidence to suggest that the establishment of Knowledge Parks is the only—or the best—means to promote innovations, create networks, foster cooperation and generate professional engagement in productive pursuits. How can Knowledge Parks move from the margins to the centre of the global knowledge economy? Can they make any significant difference to the ways in which the developing countries seek to address their concerns about shortage of capital, technology transfer and indigenous capacity enhancement? In short, how can we trade hype for the few with hope for the many?

What can international organisations such as UNESCO and the Commonwealth of Learning do to further this process?

I propose five directions we could follow to enable the Knowledge Park concept to move from the periphery and closer to the centre of the education/research/industry interface.

First, as we have seen there is very little available research on the impact of Knowledge Parks on national economies. There is need for further research into i) the role of national governments in supporting Knowledge Parks as a development strategy; ii) identification of the critical success factors for setting up effective Knowledge Parks; iii) lessons learned from failures; iv) issues of intellectual property and iv) the regional and cultural characteristics that contribute to the growth of Knowledge Parks in specific geographic contexts. The development of a global database of Knowledge Parks would be helpful.

Second, there is need for advocacy and support for national science, technology and innovation policies. Knowledge Parks do not function in a vacuum. The cultural and social context influence the pace at which innovations and change are embraced. Isolated oases of science, technology and innovation alone cannot generate national or regional development. If countries integrate national policies for science technology and innovation into educational policies, schools and colleges can become the incubators for innovation and excellence.

Third, Knowledge Parks can facilitate and lead in facilitating south-south collaborations. As new economies emerge, it is important to forge productive linkages and partnerships. Most of the foreign investors in the existing Knowledge Parks are from the global ‘north’. The business and academic establishments from China, India or Brazil have yet to register their presence.

Fourth, there is an urgent need to ensure that gender concerns are included in discussions of ICTs and development so that Knowledge Parks address issues related to the gender gap appropriately.

Finally, effort should be devoted to building an ideologically sound framework for establishing, refining and enlarging the concept of the Knowledge Park. This framework

would be predicated on the principles of: a) collaboration and cross-fertilisation of ideas, concepts and practices among the global community of scholars, researchers and practitioners. The results emanating from these Parks can contribute to the renewal, creation, preservation and dissemination of knowledge for the benefit of all; b) sharing of infrastructure and resources for the good of all; c) the renewal of higher education institutions to accelerate the achievement of the national and international development agendas.

As we approach the deadline of 2015 that the world set for achieving the Millennium Development Goals, a collective discussion on the role of technological innovation in general and Knowledge Parks in particular would help to chart the future. We must re-discover and pool our collective wisdom if we are to build a worthy future for humankind.

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