
Universities and the knowledge hubs of the developing world: An in-depth look at the City of Knowledge in the Republic of Panama

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Abstract

This study examines the recent phenomenon of knowledge hub creation and how transnational education has helped convert this into a potential strategy for developing countries' capacity building and competitiveness. It reviews trends over the past decade and ongoing initiatives toward this end in Asia, the Middle East and Latin America. The research concentrates on the role of the international university in these knowledge hubs and focuses particularly on the case of the Republic of Panama and its City of Knowledge. Findings suggest that the role of the international universities in Panama's City of Knowledge has evolved differently from what was proposed originally and differently from the way it has developed in other regions. Most of this deviation appears to have resulted from financial and human resource issues. Unlike most other developing country knowledge hubs, Panama's City of Knowledge is run by a semi-autonomous private foundation and as such does not rely on government funding. This scenario has forced a more entrepreneurial aspect on the hub and made strategic investment activity more difficult. Nonetheless, a decade into the endeavor, progress has been made and with its designation as the *de facto* hub for the United Nations agencies' regional offices for Latin America and the Caribbean, prospects for future development remain positive.

Introduction

With increasing globalization and knowledge-based production, the technological ease of transferring data and information, and the pro-

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liferation of outsourced administrative and productive units, one might argue that the importance of agglomeration and spatial clustering of knowledge is diminishing. The evidence, however, suggests otherwise. The growth of knowledge societies appears to intensify the relevance of location and foster the creation of knowledge clusters and knowledge or education hubs (Evers, 2008; Carayannis & Campbell, 2006; Feldman, 1994). Over the past decade or so, cities of knowledge, education cities, research triangles, and knowledge villages have sprung up around the world. Silicon Valley is the archetypal model for the knowledge hubs of the 21st century—for both developed and developing countries alike. Thus, the crux of these hubs worldwide is generally based on university-industry research and development (Evers, 2008; Olds, 2007).

Academics claim that transnational education is leading the most fundamental of the changes taking place in higher education today (Altbach *et al*, 2009). Massification of higher education around the globe is prompting the redrawing of boundaries on such cross-border provision. Establishing control over transnational education involves the increasing impact of regulatory frameworks, quality assurance regimes, and trade agreements on offshore programs and institutions. McBurnie and Ziguras (2007) argue that one of the main reasons for the success of offshore education provision is its ability to circumvent the tight regulation imposed upon local institutions in both the foreign university's home country and the host country. Others stress instead the opportunity transnational higher education offers for countries, particularly in developing regions, to expand beyond their own horizons to broaden their access to learning and research (Birdsall, 2005; Lundvall, 2007).

What the recent explosion of transnational education means for the creation of the knowledge hub is that the university component becomes much more fluid—and its origin may be far away from its contribution to the new hub. This paves the way for the concept's potential as a capacity building strat-

egy for developing countries and a potential means of leap-frogging with regard to global competitiveness (Kinser & Lane, 2010). Countries may employ a variety of modalities, legal structures and physical logistics arrangements toward this end. Nevertheless, the universal aim is to import industrialized countries' university education, learning and research capacity to aid development and competitiveness. Each country seeks to attract foreign universities and research with the hope that this will create an engine for national and regional economic development.

This study examines developing world knowledge hub trends and focuses on the evolution of the City of Knowledge in the Republic of Panama. It seeks to answer the question of what the role of the international universities is in these hubs; specifically, it concentrates on (1) how this role was strategically conceptualized, and (2) how it has developed in reality—particularly for the case of the Republic of Panama.

The research is based on semi-structured interviews, classroom observations, and document analysis with regard to the City of Knowledge in the Republic of Panama; it relied solely on document analysis for its review of knowledge hubs in other parts of the world. The results are presented in a case study format as described by Robert K. Yin (2002). All participants completed a one-on-one semi-structured interview with one of the researchers. The semi-structured nature of the interviews allowed for common themes to be explored across interviews. Classroom observations took place over a six-month period. The document analysis included government and legal documents, websites, journal publications, and newspaper and magazine articles. Interviews were transcribed verbatim and translated. A content analysis approach was used for constructing tables from the interview data and identifying and coding the trends or particular themes associated with each question's responses. The data tables reflect the frequency of mention for specific topics and detect tendencies within and relationships among the topics. This content analysis was complemented by

input from classroom observations and document analysis. Findings suggest that the role of the international universities in Panama's City of Knowledge has evolved very differently from what was proposed in the original vision and differently from the way it has developed in other regions.

Literature review

There is no single, universally accepted definition of a knowledge or education hub. Interpretations of the term vary depending upon the context or part of the world in question. The Cross-Border Education Research Team (C-BERT) at the State University of New York at Albany, which has done considerable research on and monitoring of these burgeoning efforts, offers one of the most workable, all-encompassing descriptions for our research framework:

“...a designated region intended to attract foreign investment, retain local students, build a regional reputation by providing access to high-quality education and training for both international and domestic students, and create a knowledge-based economy” (C-BERT, 2010).

Additionally, these hubs may include different combinations of domestic and international institutions, branch campuses, and foreign partnerships, within the designated region (C-BERT, 2010). Jane Knight (2010) adds that it is helpful to distinguish between a knowledge or education *hub* and a knowledge or education *city*. Knight notes that many countries, China, India and Malaysia among them, have adopted strategies that work to develop knowledge or education hubs without actually committing to the development of a particular place in which to concentrate this activity. In such cases, attracting prestigious national and international university partners for the endeavor is part of the agenda, though designating and developing a specific locale in which to house them all is not. Institutions may be connected virtually but

spread out physically throughout the country. Kinser and Lane (2010) make reference to this distinction by differentiating between “Acropolis” and “Archipelago” strategies. The former brings institutions together in a single location, while the latter does not depend on a geographic concentration of academic efforts. This study concentrates on the “city” (Knight, 2010) or “Acropolis” (Kinser & Lane 2010) initiatives, though the terminology is used interchangeably.

The role of the international university in these hubs around the world also takes different forms, in terms of both modality and strategic function. With regard to modality, Olds (2007) suggests four major categorizations for foreign university participation: import, export, partnership and network models. The import model represents the classic approach of Western universities to internationalization; local campuses establish individual international programs to draw in foreign degree students as well as foreign faculty. The export model bases core faculty of the foreign university at a central campus to retain critical mass and allow the faculty to transfer knowledge through research and teaching. The partnership model, the more common lower-risk mechanism, involves a foreign university entering into a type of joint operation with a local university. Finally, the network model creates global linkages via mergers of institutions in geographically different places, which leads to the foreign university establishing some sort of new branch campus. This last is the most resource intensive and riskiest of the modalities, though it may offer a better chance of establishing continuity and sustainability.

A developing country's motivation for creating and promoting a regional education or knowledge hub generally revolves around the objectives of 1) building or strengthening a knowledge- and service-based economy; 2) educating and training skilled labor for the domestic and regional marketplace; 3) attracting foreign direct investment; and, ultimately, 4) increasing domestic and regional economic competitiveness (Knight, 2010). However, these objectives are weighted differently in the current diversity of hubs, depend-

ing upon the host country's strategic priorities, along with those of the surrounding region or sub-region. The functional role the international university plays within the hub will reflect these national and regional strategic priorities. It will depend largely on the host country's purpose for creating the hub and the types of incentives offered for foreign institute participation. Typically, the international participation is set up to operate in a North-South direction, with the foreign institution coming from an industrialized country. There are exceptions to this, however, with the Pakistani and Indian institutions in Dubai and Singapore serving as examples (Altbach, 2009).

Examining current literature on developing world knowledge hub scenarios (Knight, 2010; Lane 2010; Davis, 2010; Sidhu 2008), four specific roles for the international university can be identified. These four functions are by no means mutually exclusive; in fact, there is often a degree of functional overlap within and among the universities participating in the hubs.

1. *Absorption of demand* - This involves meeting the needs of existing demand for higher education among the current population of domestic and international residents. It provides an opportunity to access higher education without having to leave the area or engage in distance learning.
2. *Internationalization of education and training* - The focus here is on teaching and the goal is to provide a type of education or training that is not available in the existing domestic public or private sector. The objectives are to produce skilled labor and knowledge workers for the domestic and regional market, broaden the educational offer and introduce different international pedagogical models and curricula.
3. *Creation of demand and "branding"* - This builds on the existing reputation for quality and experience of the international institution and utilizes it to create additional demand for the institution and for the local system. The idea is to

attract local and regional students that may have chosen to pursue higher education abroad elsewhere and sell a selection of international higher educational opportunities and degrees. This, in turn, helps establish or strengthen geopolitical status by branding the hub as a high-quality higher education destination in the region.

4. *Generation of knowledge and innovation* - This is the broadest and most ambitious of the mandates as it goes beyond training and education into the production and dissemination of knowledge. It targets foreign universities known for research and development and seeks to use them to establish a critical mass of talent and expertise in the region. The ultimate aim is to develop local as well as international research capability, generate new knowledge, and promote it for commercialized purposes.

Regardless of the modality or functional strategy decisions made by both host country and participating foreign institutions, the evolution of the international university role in developing world hubs depends largely on specific factors in the local context. Government policy and investment, local partners, the regulatory framework, and local and regional demand, all influence the development and success of imported international university programs; or, as put forth by Douglass (2005), all globalization of higher education ends up becoming local.

This review of developing country knowledge/education hubs includes the more visible and established of the endeavors to date. Asia has taken the lead with this type of activity, though the Middle East is seeking to catch up as quickly as possible. Latin America has done much less, and Africa is just beginning to explore the concept. This paper concentrates on providing a brief overview, by region, of the key initiatives in Asia, the Middle East and Latin America.

Asia

Singapore's Global Schoolhouse project is the best known of the emerging Asian knowledge hubs.

Launched in 2002 and heavily supported and steered by the government, its aim is to become the “Boston of the East” (Olds, 2007). It now boasts a couple dozen leading international private university institutions, 44 pre-tertiary schools and a total of over 1,200 private education organizations. Singapore’s goal is to develop a community of pre-tertiary, tertiary and corporate educational institutions in order to become a global talent and knowledge hub and regional center for higher education and research. To date, the Global Schoolhouse has attracted 86,000 international students and promoted faculty collaboration with some 7,000 multinational corporations and 100,000 Singaporean enterprises (EDB, 2010; C-BERT, 2010).

In terms of the university partners, it originally targeted primarily U.S. research institutions. Massachusetts Institute of Technology (MIT), Georgia Tech and Duke University were recruited to run a variety of graduate programs. Johns Hopkins University was signed on to conduct biomedical research and offer doctoral training. The University Of Chicago Graduate School Of Business became a partner in the establishment of a campus. Wharton Business School was contracted to provide academic expertise for setting up the Singapore Management University, the country’s third public university. Singapore went on to include non-U.S. partners as well that would focus on more technical and creative disciplines. Examples include INSEAD, a European business school, the Indian Jain School of Management, and New York University’s TISCH School of Arts. Singapore’s National Research Foundation is also working with a number of the elite research universities to develop the Campus for Research Excellence and Technological Enterprise (CREATE). CREATE will house and fund a series of research centers that will collaborate on projects with Singapore-based universities and institutes.

Along with its early successes, the Singapore hub has suffered setbacks. In 2006, Johns Hopkins opted out of the endeavor after targets for attract-

ing PhD enrollments and medical researchers were not met. A year later, Australia’s University of New South Wales announced the closure of its Singapore campus after just one semester in operation, citing low enrollments and expectation of further financial losses as reasons for the decision. Both groups invested heavily in the project alongside the Singaporean government and sustained significant losses upon withdrawal (Gribble & McBurnie, 2007).

South Korea is building a similar knowledge hub within its Incheon Free Economic Zone, an ambitious 52,000-acre industry-education development inaugurated in 2006 by the city of Incheon and Yonsei University. Though it has not won over as many big names as Singapore, the Yonsei Songdo Global Academic Complex has begun to lure academic investors with offers of rent-free campus buildings, million-dollar seed funds, interest-free loans, and a 700-unit student dormitory. Another of Incheon’s selling points is its geographically attractive location, with its nearby international airport and proximity to China and Japan. One stipulation is that participants not repatriate profits but instead invest any surplus back into the campus (McNeill, 2008; 2010).

Incheon has been successful in signing agreements for degree programs and research projects with the State University of New York at Stony Brook, George Mason University, North Carolina State University, the University of Delaware, University of Southern California and George Washington University. The global economic situation of recent years has reduced some of the original commitments, but Incheon has continued to aggressively pursue partnerships. The University of Missouri, the Georgia Institute of Technology, and Britain’s University of Surrey are reportedly linked to the project and negotiations are underway with the University of Florida. Hub planning also includes attracting more Korean universities, such as the Korea Advanced Institute of Science and Technology (KAIST) and the Seoul National University. Operations are scheduled to begin in the fall semester of 2011 (McNeill, 2008; 2010).

Hong Kong and Malaysia, as well, are pursuing similar strategies but Hong Kong is not targeting international universities for participation. Rather, it is relying on the power of its own local universities to draw students from the surrounding region. Therefore, it is not examined in any depth within the context of this study. Malaysia, on the other hand, is following Singapore in an effort to develop another Asian knowledge hub. It has two major projects toward this end: the Kuala Lumpur Education City (KLEC) located in and around the capital and the Iskandar EduCity situated in a special economic zone in Johor, which borders Singapore.

KLEC aims to attract world-class higher learning institutions, primary and secondary education providers, and research and development facilities. It has signed agreements with the Cambridge Judge Business School, Royal Holloway-University of London, and Epsom College of the UK, as well as with the University Sains Malaysia and is reportedly in negotiations with a number of other British institutions. The project will be developed in stages over the next decade and is expected to draw an international faculty and student population of over 100,000 by 2030. The project's Phase I Academic Park in Bandar Enstek is slated to open in 2013 (C-BERT, 2010).

Iskandar, like Incheon in South Korea, consists of several anchor zones devoted to various economic development objectives. One of these includes the EduCity. The British University of Newcastle has established a medical school enrolling its first class in 2011. The Raffles Education Corporation, the largest private education provider in the Asia-Pacific region, is also investing with plans to open the Raffles University-Iskandar (C-BERT, 2010). The media reports more recent agreements signed with the Masterskill University College of Health Sciences (MUCH) and the Management Development Institute of Singapore (MDIS). The Iskandar Investment Berhad (IIB), an investment holding company, works in close partnership with the Iskandar Regional Development Authority to drive these efforts

and is supported by the federal government with offers of special incentives to investors that include tax breaks, the lifting of restrictions on foreign ownership, and facilitation of business processes through a governmental regulatory authority. Iskandar also has in its favor an advantageous geographic location, with proximity to Singapore and access to international rail, air and sea transport.

Middle East

The Middle East is not far behind Asia with its knowledge hub activity. The UAE offers perhaps the most interesting example of the Middle Eastern knowledge hubs because of its complexity, scale and multiple hub locations. The UAE is made up of seven independent emirates that operate somewhat independently of each other in a combined federation. Traditionally, UAE higher education has been overseen by the federal Ministry of Higher Education and Scientific Research and has revolved around the three public higher education institutions that operate through various campus locations. Any private institution is required by law to be licensed and accredited by the federal accrediting body. In recent years, however, three of the seven emirates—Dubai, Abu Dhabi and Ras Al Khaimah—have indicated their intentions to develop independent educational hubs. They have gone about this through the establishment of “free trade zones” (similar to those described above in Incheon, South Korea and Iskandar, Malaysia), designed to attract foreign investment and international university partnerships. At the same time, the free zone modality frees them from the confines of federal regulation. Like its counterparts, UAE projects have been affected by the recent economic downturn and several investors have abandoned their original commitments. Still, the UAE now accounts for more international branch campuses than any other country (Becker, 2009).

Over the past decade, Dubai has been the most aggressive emirate in its implementation of the

hub strategy. It has received the most media coverage and has the most developed complex with 25 international branch campuses from 13 different countries providing undergraduate and graduate degrees. Of Dubai's various free zones with international educational capacity, the most prominent are the Dubai Knowledge Village (DKV) and the Dubai International Academic City (DIAC). DKV, launched in 2003, houses 15 universities from Australia, Belgium, Canada, India, Iran, Ireland, Pakistan, Russia and the UK, as well as over 150 training institutes, professional and learning centers, and research operations (DKV 2010; C-BERT, 2010). DIAC was developed shortly after DKV to provide more infrastructure for DKV's rapid expansion. DIAC houses another 20 international universities, among them Cambridge College International, the University of Phoenix and the University of Exeter.

In addition to DKV and DIAC, there are several other Dubai free zones that also form part of the knowledge hub and integrate programs from international universities. The Dubai International Financial City, one of the fastest growing zones, has several leading business schools that offer different MBA programs but share a common academic space. The Dubai Health Care City is the zone that has taken charge of medical and health-related education as well as the construction of a teaching hospital. Harvard University offers continuing education courses here and plans to open degree programs in the future. Boston University's Institute for Dental Research and Education also offers Master's degrees and a variety of certificates. Finally, Dubai Silicon Oasis, established in 2004 to promote technological research and production, houses the Rochester Institute of Technology (RIT) that began to offer graduate degrees in 2008 and accepted its first undergraduate cohort in 2010. Unlike most other knowledge hub locations, Dubai promotes itself as a destination that encourages and enables 100% foreign ownership, 100% tax exemption and 100% repatriation of profits (DKV, 2010; DIAC, 2010; C-BERT, 2010).

Abu Dhabi, the UAE capital, has not been nearly as aggressive as Dubai, but still has several high profile international partners. At present, Paris's Sorbonne University and New York University have international campuses there (C-BERT, 2010; Salama, 2010). UAE's lower-profile Ras Al Khaimah emirate has been involved in building its knowledge hub for longer, but not as visibly. It boasts an array of international institutions including India's Birla Institute of Technology and the Madurai Kamaraj University, France's Vatel Emirates School, the UK University of Bolton, the U.S. Friedman School of Nutrition Science and Policy of Tuft University, Switzerland's Ecole Polytechnique Federale de Lausanne, and the American University of Ras Al Khaimah (RAKFTZ, 2010).

Along with the UAE, Qatar, through a semi-autonomous foundation, has been developing its Education City since 1998. Education City is a 2,500-acre campus on the outskirts of Doha that hosts and sponsors branch campuses from six U.S. universities. It has been relatively successful in attracting recognized names such as Cornell, Texas A&M, Virginia Commonwealth, Carnegie Mellon, Georgetown, Northwestern. Plans are also underway for a seventh U.S. institution, Houston Community College, to develop a branch campus. Originally the intent was to reduce the number of Qatari students studying abroad and also attract foreign students from the region. The Qatar Foundation provides many loans and scholarships to foreign students that will be completely forgiven with a commitment from the student to stay and work in Qatar after graduation (Qatar Foundation, 2008; C-BERT, 2010).

Saudi Arabia, as well, has taken steps toward developing a higher education knowledge hub, of sorts, through the opening in September 2009 of the King Abdulla University of Science and Technology (KAUST). KAUST is an international graduate level research institution that will operate in English with input from numerous international partners. The university is highly endowed, with \$12.5 billion available for program development, and has already

signed a series of research and teaching partnerships with Stanford University, the University of California at Berkeley, and the University of Texas (KAUST, 2010; Cambanis, 2007). KAUST is unlike the rest of the centers examined and does not fit the education “city” or “Acropolis” definition of a knowledge hub. Nevertheless, it hopes to achieve something similar and is worth monitoring if only to better understand to what extent money can buy knowledge and learning opportunities.

Bahrain, too, announced its interest in developing an educational hub in 2007. Currently three branch campuses of lesser-known international education providers operate in the country but no further action has been done to develop a true international knowledge hub (C-BERT, 2010).

Latin America and the City of Knowledge in Panama

Compared to Asia and the Middle East, Latin America is behind in its knowledge hub activity. The region has not invested nearly the sums or the time that the others have to attract talent, campuses or programs. Certain areas in Mexico and Brazil have begun to examine hub possibilities but have not actively recruited international branch campuses or franchised programs. The only acknowledged knowledge hub in Latin America that states in its official mandate a goal of attracting international higher education branch campuses for national and regional expansion of education and research is Panama’s City of Knowledge (CoK).

Panama’s CoK has been in operation for over a decade and is governed by a nonprofit foundation authorized by the government. It is part of another sort of “free zone,” akin to those described in other regions, and it aims to promote and facilitate synergies between universities, scientific research centers, businesses, and international organizations. It is located on the former U.S. Fort Clayton military base but extends beyond its physical 300-acre boundary to include dozens of other affiliated institutions. While it has been only marginally successful with the aca-

demical component of its charter, it is one of the few “Cities of Knowledge” in the region and still purports a number of advantages that could contribute to future advancements.

The City of Knowledge 1999-2009

The City of Knowledge Foundation was legally granted power to manage the project by Executive Order number 6 of 1998, whereby the state provided for the assignment of a portion of the former Fort Clayton to this venture. The motivation to create a foundation to lead the project stemmed from a desire to avoid dependency on the government and establish continuity in its administration. This step was also crucial for convincing Panamanians that the CoK was not a public entity, but rather an autonomous (and, therefore, less corruptible) operation. The original focus of the CoK was to accommodate international centers of higher education and specialized studies, open to students and professors of all nations, particularly those coming from Latin America and the Caribbean. Law 6 of 1998 declared that the CoK Foundation would keep the public interest in mind while developing and promoting the establishment of 1) research centers and innovation in the fields of science, technology, humanities and cultural studies; 2) knowledge transfer for productive uses (technology parks); and 3) study, research and training programs, maintaining quality in each activity. The CoK was also to create higher education programs and training centers of high quality, and to establish links to international organizations that could serve as reliable sources of information for opportunities in the CoK. The Foundation was charged with obtaining economic support and financial self-sufficiency.

Initially, the CoK was successful in incorporating the existing branch campus of Florida State University (FSU), established in Panama’s Canal Zone in 1957. FSU-Panama provides four-year undergraduate degrees and a “2 + 2” option that allows students to transfer to the main Tallahassee, Florida FSU campus

for termination of degrees. The CoK has also attracted other international universities over time, though many of these are not permanent programs and cater mainly to North American campus study abroad programs (see Appendix 1).

The CoK vision shifted from concentrating primarily on education and research to including “outreach” with a proposal of the United Nations immediately following the inception of the Foundation. Establishment of the CoK coincided with burgeoning UN efforts to 1) move the regional offices of the United Nations Development Programme (UNDP) out of New York and into the respective development regions (Latin America and the Caribbean, Africa, Asia, Eastern Europe and the Middle East) and 2) hub the regional offices of its numerous agencies (such as UNICEF, the World Food Program (WFP), the United Nations Environmental Programme (UNEP) and the Office for the Coordination of Humanitarian Affairs (OCHA) in an effort to create greater synergies and opportunities for collaboration and exchange.

As a result of its political and economic stability, and given the relative unrest in a number of neighboring countries, Panama quickly became a potential location for hosting the UN hub efforts in Latin America and the Caribbean. Its privileged geographic position, sophisticated air-sea transportation hub, dollarized economy, and high level of urban development further served to promote Panama as a desirable UN regional hub. In 2001, the UNDP, the UN’s flagship coordination agency, established regional offices in the CoK and was quickly followed by UNICEF, UNEP, WFP, OCHA, amongst others. The UN activity also propelled similar hubbing in the CoK of the regional offices of many other international organizations—among them, International Red Cross, Organization of American States, World Wildlife Fund, and Plan International. The International Organizations and Cooperation Department is now the CoK’s busiest office. The UN and other international organizations currently occupy a high percentage of physical space in the CoK campus, account for most

of the activity there, and (perhaps most importantly) provide for the CoK’s financial sustainability.

A recent UN report estimates the collective endeavors of this UN base contribute close to \$30 million annually to the Panamanian economy. This implies that the UN has effectively replaced a large part of the U.S. contribution to the economy that ceased with the reversion of the Canal Zone and the closure of the U.S. military bases at the end of 1999. Over the coming years, the UN and other international organizations are poised to continue this growth over the coming years. The only serious drawback to their work, as commented upon by a number of UN agency heads, is the lack of a high-level university partner. In other parts of the world, UN hubs work closely with local and regional higher education entities on research and project collaboration, but similar partnerships have not developed in Panama.

Similar to a higher education institution (HEI), the main areas of focus for the CoK include teaching, research and service/outreach (with service and outreach being operationalized through the international and non-governmental organizations). Dissimilar to a HEI, the focus on service and outreach is far more active at the CoK than any of its other areas, due to the UN/international organization involvement. This has provided the CoK with consistent real-estate leasing income and has contributed heavily to the Foundation’s financial sustainability. The research and teaching components of the CoK are much less active.

During its early years, CoK administrators visited numerous U.S. universities in an effort to recruit them to Panama, but these universities were reluctant to invest. Public U.S. universities are accountable to their taxpayers, and reaching beyond borders to develop branch campuses or research centers is often tough to justify to their constituents. In addition, private U.S. universities are accountable to their boards for financial sustainability – something that could be threatened with investments in developing countries. The CoK then reverted to a strategy of

inviting U.S. universities to operate study abroad programs in Panama and today the majority of its U.S. university relationships reflect this decision. Among such universities are St. Louis University, Iowa State, Texas A&M, Cornell, Villanova, UVA, Tulane, and the University of Miami.

Initially, the CoK Foundation received some public funding (\$600,000 a year for eight years), but this government financing came to an end in 2006. The Foundation is now financed by rent, services provided, and special projects. Certain financing also comes from the European Union and the International Development Bank. The limited resources present a challenge to funding projects and overall sustainability and the Foundation must be innovative, creating synergies with entrepreneurial sectors to ensure long-term success.

The entire concept of the CoK confirms the desire to import research from abroad, yet very little research is produced in Panama locally and the majority of HEIs are lacking in resources and quality. Seeking foreign universities to set up satellite research centers in Panama and having the CoK establish its own research centers feed into the current plan to utilize an internationalization model to bring the best from abroad. The Foundation believes that important synergy can attract institutions without the offer of money; however, experience appears to indicate that mere facilitation of local networking is not enough if significant sums of money are not involved.

The pattern of failed projects proves this. University of California–Davis, Texas A&M, and Ohio State University were initially interested in programs related to agricultural sciences in Panama but are no longer present. Southern Methodist University's one-time promotion of various engineering Master's programs, which are no longer available, are further testimony to this fact. Cornell University failed because it did not have the resources to establish a permanent base and the CoK could not contribute money to the project. To date, only a Georgia Tech project involving a Master's in logistics is moving

forward (not through the City of Knowledge) and that is because the Panamanian government is investing considerable funding.

A number of factors present obstacles for potential U.S. university partners: the high cost and lack of substantial incentives to partner with the CoK in Panama; the lack of turn-key physical infrastructure such as classrooms, labs and residence facilities; and insufficiently prepared human capital, in terms of both academics and finances, to enroll in these imported programs. Nonetheless, the CoK does have a set of attractive features with which to lure higher education provision from abroad. There is a considerable amount of land and facilities (in need of renovation) that could be offered free of charge, at least initially, to interested institutions. The geographic location of Panama is convenient to the U.S. and Latin America. Additionally, cultural differences with the U.S. are not as great as those between the U.S. and other regions of the world, in part because of the countries' shared history. Panama is also a transportation hub, promoting easy travel, and the biodiversity of Panama is ideal for scientific research.

Many universities are drawn to these resources that Panama has to offer, but the realities of financial risk and lack of additional incentives remain daunting. Added to this is the fact that foreign institution tuition is not comparable to that of local institutions. Thus, while it is not the intention of the CoK to discriminate, the reality is that only students from Panamanian middle and upper classes can afford to enroll in CoK institutions unless there is some mechanism available to subsidize tuition costs or grant scholarships.

Conclusion

Returning to our initial question of the role of the foreign university in the burgeoning knowledge hubs of the developing world, several tendencies emerge from this review. The four functional roles mentioned previously for the international universities—absorption of local demand, internationalization of education and training, creation of demand and “branding”

(for the hub within the region), and generation of knowledge and innovation—appear fundamental to the knowledge hub concept throughout the world. Nevertheless, each of these functions tends to be emphasized differently depending upon the strategic objectives of the host country.

For example, KAUST in Saudi Arabia is concentrating purely on graduate level studies and research that will be conducted in English with input from Stanford, UC-Berkeley, and the University of Texas, among others. While some of the attention is aimed at teaching and internationalizing the local curricula, much of its \$12.5 million endowment is devoted to research, meaning that a large part of the KAUST plan revolves around the generation of knowledge and innovation. The UAE, on the other hand, with its range of foreign institutions, breadth of program offer and multiple physical locations, focuses more on internationalizing education and training and branding the country as a higher education hub within the region. Qatar, initially, set out to build its Education City in an effort to absorb demand and keep its students from migrating elsewhere; now, though, it is following the UAE strategy with its hub branding, affiliation with six well-known U.S. universities and extended offer of loans and scholarships designed to attract both national and international students.

Of all the cases reviewed, Singapore is dedicating itself most fully to developing all four of the functional roles for its international universities. The country has been working on its knowledge hub creation for longer than most of the others, has invested far more resources, and has designed the most strategically integrated national plan for accomplishing this. With Singapore's drive to become the "Boston of the East," there is no question about its motivation for importing prestigious institutions and recreating higher education opportunities: its desire to become the Asian hub of internationalized higher education hub is clear. Furthermore, it is moving aggressively in the same direction with innovation and knowledge generation through its National Research Founda-

tion's CREATE research and development project. South Korea and Malaysia appear to be taking their lead from Singapore and attempting implementation of similar broad-based strategies, but it is too soon to judge their results.

Within these various models and functional roles for international university partners, certain successful policies stand out. First and foremost of the factors key to the realization of hub development is abundant funding. Exact figures are difficult to obtain except in certain specific cases, but all governments in both the Middle East and Asia that aspire to develop international higher education and knowledge hubs are spending fortunes in their efforts to woo name universities, design programs, build state-of-the-art facilities, and sponsor research activity and scholarships.

In addition to outright financing for infrastructure and research, certain of the lesser-known hubs are trying to use national funds in more creative ways as well to attract international institutions, faculty and students. For example, the Qatar Foundation provides many loans/scholarships to foreign students, which will be completely forgiven with a commitment from the student to stay and work in Qatar after graduation. Korea is also experimenting with offers of rent-free campus buildings for university investors, green zones, million-dollar seed funds, and interest-free loans to students. These more subtle forms of marketing and development could hold considerable potential.

Another key factor to boosting education—and even more importantly knowledge hub research capacity—is the development of linkages between the local and imported education. Most of the models examined above stress the human capital development of their local population as a critical component to the knowledge hub, but only a few look beyond the inclusion of just higher education and aspire to include pre-tertiary levels as well. Singapore offers the most cohesive example of this with its goal of developing a community of pre-tertiary, tertiary and cor-

porate educational institutions directed at attracting and grooming global talent for both higher education and research. Malaysia's KLEC also combines primary and secondary education providers with world-class higher learning institutions and research facilities.

Asia and the Middle East have faced challenges along with successes in their knowledge hub development. Finding sufficient numbers of regional faculty and students with English and academic preparation levels adequate for university education (and especially graduate level study and research) is not always easy. Equally difficult is the task of raising the capacity of local faculty quickly enough so that they can become worthy and contributing partners alongside their international counterparts. It is also often a tough sell to convince faculty from prominent institutions in the U.S. to travel halfway around the world and stay for months or years. Finally, even with incredible amounts of national backing, achieving financial sustainability can be daunting. In addition, the money coming from the host countries in Asia and the Middle East is generally coming from strong, centralized, and often non-democratic governments that maintain a primary stake in the decision-making affecting their hubs; sometimes this is seen as an intrusion. In testimony to these challenges, most of developing hubs examined have experienced at some point the costly and embarrassing withdrawal of key institutions.

Presently, in the case of Panama's CoK, it is hard to define a principal role for the international university. There is only one multi-departmental 4-year degree institution at present: FSU-Panama. Moreover, this campus does not offer graduate level education. The rest of the institutions focused on a single discipline or program—ADEN, Monterrey, INIDEM and IESA with business, Isthmus with architecture, and the University of Memphis and the Swiss School with tourism—or study-abroad programs for U.S. based students, as is the case with McGill, USF, St. Louis and SIT. Most of these programs are focused on teaching and operate relatively independently of

both the CoK and each other. There is few on-going research at any of the institutions and little guiding strategy for the recruitment and promotion of international universities.

Early proposals for Panama's CoK included a prominent institution of higher education at the core, with training and research centers incorporated as complements. The focus has now shifted to research centers, graduate programs, and technology transfer offices for universities. To create research centers, however, without building training and learning centers promotes a gap in the pipeline to innovation. The current debate in Panamanian higher education is centered on quality assurance, the explosion of unregulated institutions, and the degree inflation that is occurring as a result. To assume that the importation of graduate degree programs and research centers will boost innovation is an overestimation of student and faculty preparedness. It is also a lofty ambition considering the limited funds and facilities with which the CoK currently works.

A gap exists between the internationalization model of the knowledge hub and the local context. The original ideas related to the CoK in Panama used an already existing institution of higher education as the core, to educate local and foreign students to build human capital in Panama and the region. The role of the university was once a core component of Panama's knowledge hub, whereas now research, technology transfer and innovation is the new mission of the Academic department of the CoK—but little is in place with which to develop this mission.

More focus on training and education are vital to the success of the knowledge hub, particularly if the CoK hopes to recruit foreign students and create a brain gain for the country. A policy similar to that pursued by Qatar of offering scholarships to international students could help Panama recruit students from the region and give them incentives to stay and work in research and innovation after graduation. With the CoK in Panama dependent on the leasing of its space and facilities for financial support,

the Foundation's ability to offer attractive incentives to potential foreign partners is limited. Thus, some form of innovative incentive structure—perhaps as South Korea's Yonsei Songdo Global Academic Complex has begun with initial offers of rent-free infrastructure—is essential for recruiting foreign institutions.

Ironically, institutions outside of the CoK are successfully partnering with foreign universities abroad. The Smithsonian Tropical Research Institute (STRI) has been associating with Yale and McGill University for years with academic exchanges. As well, Quality Leadership University (QLU) has been conducting its own form of “hubbing” with universities from abroad. This registered private university in Panama hosts a range of U.S. degree programs from the University of Louisville and Florida International University, among others, at less than U.S. market prices and with financial aid facilitation. QLU provides classrooms, student services, adjunct faculty, and infrastructure for U.S. universities to create joint degree programs. Students receive a degree from the foreign university while completing their coursework at QLU. This model is strikingly similar to efforts at the CoK in Panama. However, due to the lack of similar incentives provided by the Foundation, QLU is recruiting students and giving foreign degrees within Panama's borders, proving that this model can be successful.

The CoK Foundation needs to serve the local context as well as the region. The Foundation has created some partnerships with local universities, but they have been few. There are challenges with working with local HEIs due to the current debates on quality and regulation. Therefore, the change of focus away from undergraduate education in the CoK to graduate education is a missed opportunity. The inclusion of more training programs and undergraduate education holds the potential to building the human capital required for graduate level work. Linking these programs with local HEIs could insure sustainability and help to improve local institution quality as well.

Another largely untapped resource exists in the CoK's growing UN and international organization regional base. This platform provides not only potential bilingual students and possible future researchers from all over Latin America and the world, but it also houses a wealth of human development knowledge and information that is not currently utilized beyond the immediate needs of each individual organization. More could be made of this asset to propel the Foundation's education and research objectives. If this captive audience of nearly 1,000 international development professionals could be harnessed toward this end, additional regional and global institutions could likely be attracted to the CoK. By focusing on specialized programs from known institutions that capitalize on the human development/social science hub already in place, it would be possible to attract degree prospects along with regional research opportunities. This represents a particularly interesting possibility given that no other country in Latin America and the Caribbean is currently set up to do this. The resulting regional demand for degrees at all levels and research and consulting projects could be sizable. In 2010, the World Bank portfolio alone of projects in Latin America totaled over \$32 billion (World Bank, 2010). Human development activity is highly endowed; thus, research and education linked to this can be highly profitable and productive. Panama's CoK is the recognized human development hub for the region; as such, its opportunity for developing education and research in this area is enormous.

The challenges for Panama's CoK remain considerable: 1) financial resources to facilitate the creation of incentives for foreign institutions to establish a presence locally; 2) the promotion of education and training to prepare local and foreign students for research, 3) linkages with local HEIs to foster a culture of technology transfer and work to develop graduate programs of high quality, and 4) creation of policies to keep graduates in Panama to increase human capital development locally and regionally. Still,

the country is well situated in many respects to face these challenges creatively.

Panama has a centralized geographic position, a sophisticated global air-sea transportation hub, a dollarized economy, and a high level of development in its capital city to further promote Panama as a desirable knowledge hub location. The country has also had success with hub building in the past, beyond the construction of its Canal. Panama's international banking sector is the second largest in the world; its Colon Free Zone is the largest re-export hub in Latin America

and the Caribbean; and its Copa Airlines is one of the largest aviation companies in the region and the most profitable. Panama is also developing the Howard Panama Pacifico project, a former U.S. military base being converted into a hub of world-class business, logistics and commerce by London & Regional Properties, one of the biggest private property companies in Europe. Panama has a future in the CoK, if the administration of its policies and practices can look to other global models to develop successfully.

Appendix 1
The Republic of Panama City of Knowledge Affiliate Universities, 2012

Partner Institution	Program Description
ADEN Business School – Universidad de Alta Dirección.	<ul style="list-style-type: none"> • Master's degrees in business from Aden Business School's Universidad de Alta Dirección, a multinational with various centers in Latin America, Europe and Asia. • Executive training and corporate consulting services.
FSU – Florida State University.	<ul style="list-style-type: none"> • Bachelor's degrees from FSU (Tallahassee, Florida) in Computer Science, International Relations, Latin American Studies and Social Studies. • International professors. • Study abroad program for FSU Tallahassee students.
IESA – Instituto de Estudios Superiores en Administración (Institute of Higher Studies in Management).	<ul style="list-style-type: none"> • Master's level and executive business degrees from the joint offer of IESA (based in Venezuela) and the Tulane University Business School. • International and local professors.
INIDEM – Instituto Internacional de Derecho y Empresa- Business Law School.	<ul style="list-style-type: none"> • LLM in Law and Management. • Supported by the ESADE law school of Spain and the Harvard affiliated INCAE business school of Costa Rica. • Professors from ten different countries.
Isthmus School of Architecture and Design.	<ul style="list-style-type: none"> • Bachelor's and Master's degrees from Isthmus (based in Colombia) in architecture and industrial design. • International professors. • International exchange and internship opportunities.
McGill University.	<ul style="list-style-type: none"> • Field study abroad program with the Smithsonian Tropical Research Institute for Master's and PhD students in neo-tropical studies. • Inter-institutional educative project to stimulate human investigative potential in Panama.
Panama International Hotel School.	<ul style="list-style-type: none"> • Academic Alliances include: George Brown College (internship and culinary arts partner), The Swiss School of Tourism and Hospitality (two International Diplomas and credit recognition for continuing ed. students), and The University of Memphis (hotel management partner). • Programs of Culinary Arts, Hospitality and Tourism.

School of International Training.	<ul style="list-style-type: none"> • Study abroad programs for undergraduate students from over 200 sending institutions worldwide.
Tecnológico de Monterrey (Monterrey Institute of Technology and Higher Education) (Mexico).	<ul style="list-style-type: none"> • MBA and other postgraduate diplomas. • International and local professors. • In class and online education option.
UMIP – Universidad Marítimo Internacional de Panamá (International Maritime University of Panama).	<ul style="list-style-type: none"> • Undergraduate and technical degrees from the Panamanian International Maritime University. • Primarily local professors.
University of South Florida (USF) – Health International Foundation.	<ul style="list-style-type: none"> • Academic and training courses in public health. • Study abroad program with USF in Tampa. • International Field Experience placements. • Research projects.

Source: City of Knowledge. (Ciudad del Saber). (2012). Historical background. Panama City, Panama. Retrieved January 20, 2010, from <http://www.cdspanama.org>

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