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Knowledge hubs, challenges ahead for Arab spring

Roundtable 4

STPs at different economic and social stages

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Knowledge hubs, challenges ahead for Arab spring

Executive Summary
This study suggests that the functions that the Egyptian society commonly attributes to the universities and research centres are expected to be shared with a wide range of institutions in the context of the knowledge-based economies after 1/25, to create an innovative learning environment for its local community. Within such a context, the paper is trying to raise a group of arguments:

- To what extend can the concept of “Knowledge Hubs” help the Egyptians to transfer into a leading democratic society?
- What are the expected risks associated with the ”Knowledge Hubs” script in reviving community afterheat a huge political shift, facing extraordinary challenges such as poverty alleviation and economic reform?
- Which urban setting for the emerging KH fits more the Egyptian case: Science Parks, IBED or Research Intensive Clusters (RIC)

Also, using SWOT analysis approach to formulate and evaluate four expected scenarios for the intended "knowledge hubs" concept in Egypt.

Keywords: science parks; Knowledge hubs, Research Intensive Clusters (RICs); Middle East, Egyptian revolution, 1/25, Arab spring, competitiveness

1. Introduction

A well connected chain of revolutions spelled all over the Arab world, the ice ball pattern leaded to the grand Egyptian public revolution in January 25th 2011.

> "Change, Social Justice and freedom" were the main slogans for the Egyptian revolution, led the Egyptians to an intermediate stage of economic austerity. But still, the creative city discourse is undoubtedly very attractive to the "newly expected" Egyptian leaders especially in a context of economic recession.
> This paper draws on recent conceptual approaches to economic growth, in which the accumulation of knowledge is the fundamental driving force behind growth. This assumption is based on the thesis of creative class by Richard Florida (2002), which is considered as a complementary approach to the human capital model.

Now, the Egyptians are shaping a new mindset for their political life, ultimately, the success of Egypt's political transition will be measured not at the ballot box, but at the breadlines. Egypt needs a national economic vision to transform its political aspirations into reality. But first the country must undergo a national mindset revolution.

Egyptians must ask themselves and their leaders the clichéd question: where do they see themselves in the next five, 15, or 50 years? Will Egypt remain a foreign aid recipient whose fortunes twist in unpredictable political winds? Will its economic path continue to be paved with off-the-rack structural adjustments thought up in the halls of the World Bank and International Monetary Fund? Will Egyptians continue to accept -- and expect -- economic mediocrity?

2. The Four (4) sins of Mubarak regime (1981-2011):

"Bread, liberty, dignity and social justice," the popular aspirations of the young Egyptian revolution in January 2011, and reflects the aspirations of the Egyptian society towards a better future after thirty years of wasting all kinds of resources and energies under the weight of a corrupt and autocratic political regime. People may differ about which the most serious sin was committed by ousted former president Hosni Mubarak. Personal corruption, attempts to hand over power and political corruption are the major alleged crimes most commentators cite. Nevertheless, these things do not describe what took place.
In our scope, for Knowledge Hubs conception, Lake of Connectivity, entrepreneurship, Innovation and Talents were the major reasons which prohibited Egypt from establishing a well prepared nation for the knowledge era.[1]

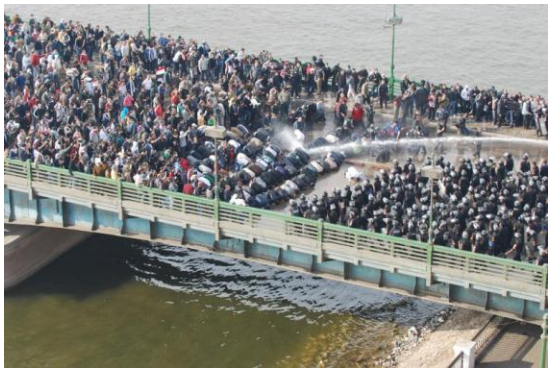


Figure 1 : 20 million citizen exploded the Egyptian Revolution against Mubarak Dictating Regime , January 2011

Sin 1- dictatorship governance- Anti – connective:
, Corruption on the part of Mubarak was a case of the kleptocracy that had reached an unprecedented extent in Egypt under the former president's rule, and it is in these terms that the creation by Mubarak

[1] Norris, Donald, "**Revolutionary Strategy for the Knowledge Age**",SCUP,USA,1997

and his son Jamal of a power base formed of co-opted military and security leaders, top government officials and leading businessmen should be viewed.[2]

Sine 2- debt & repays-Anti- entrepreneurship:
,For the Rich world, Mubarak was indeed an excellent client. In fact, when Mubarak came to power Egypt had already gone through thirty years of dictatorship. And before that, there was overwhelming dissatisfaction with the multi-party democratic system under the monarchy. The end of democracy in 1952 was celebrated with celebrations as big as the ones we're saying now. Today, Egypt repays its loans, many of which were undoubtedly run up in the interests of the regime rather than the people, at a rate of around $3 billion a year. This money has diverted what could otherwise have been used to improve the lives of ordinary Egyptians. Since 1981, Egypt has paid the equivalent of $80 billion dollars in debt and interest repayments, helping redistribute money from Egypt's poor to the global rich.3

Sine 3-mindset malady-Lake of innovation:
Mubarak, as he resorted to classical methods to curb potential opponents Egypt suffers from a mindset malady that has stunted its economic growth and development. Years of corrupt and ineffectual rule have led the country to regress decades, disenfranchised the majority and deflated national self-esteem.

Sin 4-Brain Drain- incapacity:
As talents spill out, Thanks to Mubarak regime, the Egyptian Expatriates ratio exceeded 1 out of 8, which is a huge brain drain for the Egyptian nation? Moreover, a big branch of those are highly educated with graduate and postgraduate degrees (35,000 enrolled in doctoral programmes),Egypt is the middle east's powerhouse for doctoral studies.[4]

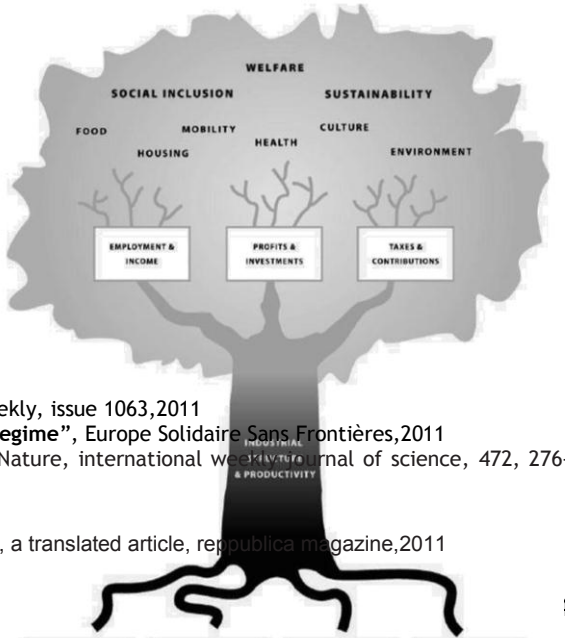
3. Post-Mubarak Egypt, the seeds of potential:

"In material terms, Egyptians can't expect much. Egypt has some oil, the Suez Canal, not enough arable land, low labour productivity, restrictive social rules (which will now become worse), and too many people. There is no source of massive international aid in sight. "[5], few words mentioned by Barry Rubin reflects the western mind provision for the Egyptians' near future, which represent the crime of Bulldozing the Egyptian talents out of the country . This only, resulted in losing billions of dollars due to the drainage of the Egyptian minds.

The table below represent a group of knowledge economy competitiveness indicators for the Egyptian case as SWOT analysis (table 1).

3.1 Egypt as a regional pole for Science & Technology - potentials and challenges:

Despite the inappropriate context , and the pessimistic for the Egyptian Economy, still Egypt produce around 50% of the Arab world scientists, researchers and engineers, whom considered as one of the major pillars for establishing "the Arabic Knowledge society", this fact urges the Egyptians to host the main core of science and technology field of economy in the middle-east region. Whilst, struggling



[2] Ahmed El-Tonsi, **"Mubarak's original sin"**, Al-Ahram weekly, issue 1063,2011
[3] Dearden Nick ,**"Egypt's debt must fall with Mubarak's regime"**, Europe Solidaire Sans Frontières,2011
[4] David Cyranoski, Natasha Gilbert,**" The PHD factory**", Nature, international weekly journal of science, 472, 276-279 ,2011

[5] Barry Rubin , "**Reflections on the Egyptian revolution**", a translated article, repubblica magazine,2011

against three tuff compotators in the region: Israel, Turkey and Iran.

Accordingly, Egyptians must adjust the lens through which they see their economic potential. For years, it assumes wrongly that the oil and gas exporting model is the only alternative to economic mediocrity in the Middle East. Meanwhile, Egypt is distinguished with the following characteristics:

- Egypt's economy is not natural-resource based. But neither are the world's largest and most innovative economies.

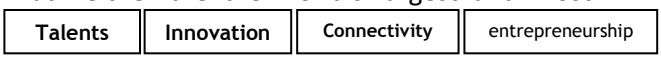


Figure 2 – Norris vision for the major seeds of establishing Knowledge driven community

- The Egyptian human capital is considered as an inexhaustible well of innovation for the worldwide, especially for the developed world. More than 2600 Egyptians are leading the most distinguished scientific centers of excellence for R&D all over the globe.
- Flanked by the Red and Mediterranean seas, anchored by the Nile, and central between Africa, Asia and Europe, Egypt is physically well placed to be a strategic trading hub and production base.
- The Suez Canal and Egypt's ports are clear manifestations of Egypt's geographic value. Geography is an invaluable platform for growth across industries, sectors and markets.
- Egypt's cultural resources -- historic, media and entertainment and tourism -- are well known. But they have yet to be developed to full capacity. Instead, the country has pursued a largely one-dimensional cultural tourism model.

Table (1) Egypt S&T challenges ,SWOT analysis

	indicators[5]	Egypt score	World mean	Top score	Egypt's position
Strength	Availability of scientists and engineers Scientist & engineers / million habitant (2011)	1128	1050	6309 Japan	Above average (40/142)
	FDI and technology transfer (2011)(out of 7)	4.7	4.9	6.4 Ireland	Above average (67/142)
	Advanced specialist/work force (2005)	5.6%	8.5%	14.6% Germany	Low
	Physicians/ workforce (1998)	2.1	2.9	4.6 Israel	Low
	Nature of competitive advantage (2011)	3.6	3.7	6.3 Japan	Above average (51/142)
	Capacity for innovation (2011)	2.8	3.8	6.0 Japan	Lower average (83/142)
	Utility patents granted/million pop (2011)	0.2	2.2	27 Taiwan	Above Average (74/142)
	Availability of research and training services(2011) (out of 7)	3.9	3.9	6.1 Switzerland	Average (83/142)
	PH.D holders & Enrolled students[6] (2009)	34,000	-	50,000 China	High (5/15)
Weakness	University-industry collaboration in R&D (2011)(out of 7)	2.6	4.0	6.3 Switzerland	Lower average (128/142)
	Quality of scientific research institutions (2011)(out of 7)	2.8	4.1	6.7	Very Low

[5] The Global Competitiveness Report 2008-2009 , 2008 World Economic Forum

[6] David Cyranoski, Natasha Gilbert," The PHD factory", Nature, international weekly journal of science, 472, 276-279 (2011)

					Israel	(113/142)
	Company spending on R&D (2011)		2.7	%42	%72 Japan	Lower average (106/142)
	Quality of scientific research institutions (2011)(out of 7)		2.8	4.1	6.7 Israel	Very Low (113/142)
	Sources of expenditure on R&D (2003)	Government	90%	55%	91% Hong kong	Very High (Negative)
		Private	10%	45%	82% Japan	Very Low (Negative)
	R&D workers %(sectors) (2003)	Industry	13.7%	40%	80.5% USA	Very Low (Negative)
		Higher Education	73.3%	39%	73.3% Egypt	Very High (Negative)
		Services	13%	26%	52% Mexico	Low-Negative
Opportunities	Knowledge Regions Index (2008)		49/134		USA CHINA	Above Average
	Geographical competitive advantages Logistics, Suez canal Renewable energy exports Added value (2030)		60 billion US$	-	-	High potentials
	Tertiary education enrollment, gross %* (18-22 Age,2011)		28.5%	45%	93.2% Korea Rep.	Low (77/142)
	Tertiary education enrollment, gross %* (Sector,2003)	Public	82.2%	66%	100% Greece	Above Average
		None Profit Private	0.0%	7.6%	100% UK	Very Low
		Private	17.8%	26.4%	80% Korea Rep.	Low
	Higher educated in workforce (%) (2005)		16%	22%	81% Korea Rep.	Lower Average
	Foreign HE students (2008)		27,000	-	590,000 USA	Above Average (26/63)
Threats	HE students enrolled in science & Engineering% (2001)		12%	30%	49% Israel	Very Low
	R & D Expenditure (2003)		1%	1.65%	3.4% Sweden	Lower Average
	Quality of the educational system (2011)(out of 7)		2.3	3.7	6.2 Switzerland	Very Low
	Higher Education Expenditure per student (2008)		870 US$	7500 US$	25,000 US$	Very Low
	Annual Salary HE Faculty Members (2005)		First Salary	2260 US$	20,000 US$	54,000 US$ Switzerland
			15 years expert	4400 US$	28,000 US$	70,000 US$ Switzerland
	High-Tech Exports % (2008)		1%	16%	31% USA	Very Low
	Brain Drain (2011)(out of 7)		2.5	3.5	6.2 Switzerland	Very low (122/142)

The SWOT analysis below shows the contradictory case of Egypt, Huge amount of highly educated and PhD holder expert standing aside with inadequately educated workforce and inadequate supply of infrastructure.[6]

[6] World Economic Forum ,"**The Global Competitiveness Report 2011-2012**",2011

3.2 revolution aftermath: fears & threats

Currently, the post-revolutionary government is likely to follow policies that will subvert economic development. To keep the people happy, subsidies for vital goods (especially food) will be raised; to ensure that young people don't cause trouble, the government will continue to follow the method used by previous Egyptian governments: create unproductive government jobs funded by the state budget. to provide useless jobs that are basically subsidies to those who otherwise would be unemployed.

On the contrary, the rational policy for the time being is to provide low-paid, low-skilled but highly productive jobs for the urban poor, which would probably sustain Egypt's economic growth for a while. But still, with no source for major foreign aid available, the country is likely to be in serious trouble. For this stage, the likely model for Egypt, then, will be not China, Brazil but Greece. A return to the statist economy of earlier years seems likely.[7]

4. New strategies for establishing the Egyptian Knowledge Hubs (EKH):

The cure for Egypt's malaise is an alternative narrative for the future, starting with a truly national economic vision that breaks with the passive, self- limiting and un-ambitious mentality of the past and present.Indeed, Egypt is bleeding for a set of inter-related technological and social innovations that paves the way for an increase in productivity for regional and national economies. Among other issues, this development has opened up a new range of investment and profit opportunities to enhance well-being and to create more and better jobs. Such a change implies a new combination of technological and economic competitive edges for regions. However, we need to bear in mind that the total impact of the recent developments also goes far beyond R&D, innovations and the technological change itself. It brings with it a restructuring of the productive system and restructuring of the forms of cooperation between all the actors of the economy. The characteristics of the current era of development also include:

a) New well-functioning, flat organizational structures and fewer hierarchies both in public and private entities;
b) New skill requirements of the labor force;
c) New patterns in the location and targets of investments, i.e., investments directed at facilitating the introduction of new products and processes and the dissemination and application of new knowledge and expertise widely in the economy and society.

4.1 The global concern for the "knowledge hubs" conception:

Today, more than 1000 "Science and Technology Parks" have been developed around the world as a means of stimulating start-up and growth of technologically intensive, knowledge-based businesses, and of facilitating the links between the research and industrial communities. These are typically designed to serve: as an incubating base for private sector ventures; as training base for persons with new, innovating skills; and as an experimental zone for new technologies.[8] When looking at the regional-level development that has taken place in Europe and around the world during the past few decades, it seems obvious that spatially uneven development is an unavoidable feature of the process of technological change and capital accumulation.[9]

Research and innovation-related activities play an important role in these processes. It has been shown that research, innovations inspired by R&D, and their various spin-off effects have a major

[7] Dearden Nick ,"**Egypt's debt must fall with Mubarak's regime**", Europe Solidaire Sans Frontières,2011

[8] www.unesco.org/new/en/natural-sciences/science-technology/university-industry-partnerships/science-parks-around-the-world/

[9] Dicken, P.," **Global Shift: The Internationalization of Economic Activity**". London: Pual Chapman Publishing, 1992.

beneficial effect on the regional economy.[10] But still, a big debate is occurring against the feasibility and the reliability of this concept for the economic growth and urbanism, especially for the developing regions. Moreover, as we know that creative city concept is still loosely understood from city planning point of view, despite the growing popularity of this paradigm in the area of urban policies. [11]

Also still, the concept of knowledge city didn't show clear reinforcing pillars for these aspects either from the theoretical nor practical wise. We need to more practical test for Richard Florida and Gary Gates statement: "firms in today's knowledge-based economy are increasingly making location decision based on where talent pool is located".[12] The raising question within such a debate, is it possible for the Egyptian model after 1/25 to accomplish A fast recovery for its economy by adopting the concept of "knowledge hubs" ,which showed some notices success in the Chinese , Korean, Indian and Brazilian case?

4.2 The feasibility of "knowledge hubs" model for the Egyptian case:

In order to verify the real role of Science Parks or Knowledge Hubs in fostering the regional economy, especially in the developed world, Egypt must look within for solutions. And its economic policies must be calibrated for a world in which, alongside North America and Europe, markets in Asia, Latin America, the Middle East and Africa play significant roles. If Egypt is to meet its economic potential, the pattern of passivity, unipolarity and external dependence must be broken. One need only look to "Third World" success stories, such as Brazil, India, China and the Asian Tigers, to see that economic advancement is born of an ambitious national vision and sustained by local will.

4.2.1 Success Stories: Two countries –Tow Techno-political models

4.2.1.A. Model one: CHINA[13]

China went through several stages with development to gain real benefits from its science & technology strategies. These stages can be divided into two stages:

- **Stage I - the wrong stating point**:

During the Deng Xiaoping era, the state gave priority to telecommunications investments in the coastal regions and allowed industry to focus on major metropolitan areas. This increased the divide between the poorer and richer 5 regions. China has wrought very little change in rural life, where 80% of its population resides, and this economic gap between the coastal areas and the hinterland is widening. This was a real threat for the prospects of this emerging giant economy.

- **Stage II – Radical corrections for road map:**

Then, the real path correction turning point for China launched in November 1996 Asia-Pacific Economic Cooperation (APEC) 4th Leader's Informal Conference, Jiang Zemin pointed out, "The most important pioneering work in our century on the industrialization of scientific and technologic achievements is to initiate and develop science and technology industry park. This kind of combination between industry development and science and technology activities, have solved the difficult problem of the separation of science and technology from economy, and made the discovery or invention of mankind transfer smoothly to the industry fields, to realize their economic and social benefit."

- **Stage III :Clear action plan:**

The Ministry of Science and Technology initiated and implemented the China Torch Program (CTP). The CTP is aimed at realizing the commercialization, industrialization and internationalization of scientific and technological achievements in China. It embodies China's strategy of "Nation Building through Technology and Education". A key focus of the CTP is the development of high technology

[10] Florida,Richard. **"The rise of the creative class: And how it's transforming work, leisure, community and everyday life"**. New York: Basic Books. 2002

[11] Landry, Charles and Franco Bianchini." **The Creative City"**. London: Demos. 2005

[12] Shearmur, R. 2010. L'aristocratie du savoir. **"Quelques réflexions sur les thèses de Richard Florida. In La classe créative selon Richard Florida : un paradigme urbain plausible?"** Tremblay, 107-126. Québec: Presses de l'Univ. du Québec.

[13] Meheroo Jussawalla, Richard Taylor."**Lessons of Investment In Technology Parks and Their Role in Bridging the Digital Divide"**, Virtual Global Super Projects Conference November 2001

industry development zones. CTP began by building on an existing foundation of industry parks and continued to develop new parks. By 1997 the total number of the new high technology industry development zones at the state level reached 53, which spread over 29 provinces, autonomous regions and municipalities directly under the Central Government.

- **Current stage: sustainable growth:**

Finally, By the year 2005, the accumulative annual income of China's new high technology industry development zone from technology, industry, and trade is expected to be 1,750 billion Yuan. The export earning in foreign exchange is projected to be 35 billion Yuan. There may be 50 zones with annual total income over 10 billion Yuan and 5 zones with annual income over 100 billion Yuan.[14]

4.2.1.B. Model Two: INDIA

May be the democratic approach for the Indian development model was more successfully. The development of India's information technology industries has been highly dependent on changing policy attitudes toward the balance between economic self-sufficiency and participation in the global economy. Again, India went through some well planned steps to reach one of the world top rankings in Science and technology industry:

- **Step I-starting with limited revenue**:

In 1991 India initiated a new fiscal policy encouraging foreign investment by liberalizing trade, devaluing the rupee, and easing foreign exchange transactions. The 1991 reforms and subsequent policies boosted economic growth. The World Bank reports that the economy grew at 7.5% a year in the mid-nineties. Unfortunately, this growth has had little impact on the overall poverty level, which dropped only one point from 35% to 34%. Higher numbers are reported in the rural areas, where most of the population resides. The economy is still heavily dependent on agriculture and industry, which comprise more than half of GDP output.

- **Step II – Establishing the critical mass of knowledge workers:**

The growth of the ICT sector is due in large part to the large pool of highly educated, low-cost, English-speaking technology professionals. Indian universities are producing 125,000 engineers a year (Business Week, February 2001) and they are the foundation of software and hardware production in India. There have been major developments in the areas of basic telecommunications, software engineering, business-support services, television, and space, resulting in an economic growth rate factor of 6% in the information technology sector, among the fastest rates in the world.

- **Step III – The Technology Parks spread:**

India's investment in the development of technology parks has played a critical role in many of these areas. The Indian software industry grew from US$150 million in 1990-1992 to US$5.7 billion (including over US$4 billion worth of software exports in 1999-2000, the government hopes that the spread of IT will unify a nation divided by cultural, religious, and economic differences. There are software technology parks and electronics hardware parks, each administered under policy "schemes". The Software Technology Park (STPI) Scheme (under The Ministry of Information Technology, Government of India) is a 100% export oriented scheme for developing software for export via data communication links.

- **Current Stage – Indian Grand Knowledge Hubs:**

For exporting ICT, Business and consultancy services, India founded a huge hub in Karnataka State: The Bangalore STP. Karnataka has a state-of-the art international technology park with 1.5 million sq ft of developed space, 6 new private technology parks with 6 million sq ft, STPs at Mysore, Hubli, Manipal, and Mangalore with high speed data communications, and the best telecommunications infrastructure in country. Karnakata leads India in software exports and the electronics industry, and was the first state in the country to have a software park. The Bangalore Software Park is the first to offer software services, information service provider (ISP) services, training and consultancy, videoconferencing, and is the first park with International Standards Organization (ISO) certification (Naidu, 1999). There is also substantial IT development underway in the area around the City of Hyderabad, which may even exceed that around Bangalore.

[14] (//http://www.chinatorch.gov.cn/Etorch/index.htm, 2001)

4.2.2 Learned Lessons: Two countries –Tow Techno-political models[15]

In order to explore the viability of establishing a Science and Technology Park Mechanism to focus on international partnerships for sustainable development, some Proposed Tasks for Knowledge Hubs Development will need to be undertaken[16]:

1. ***Review the Experience of Existing Science and Technology Parks.***

2. ***Target Sustainable Development Technologies.***

3. ***Explore Potential of Opportunities for Fostering Partnership through the Science and Technology Park Mechanism.***

4. ***Estimate Financial Needs and Develop Sustenance Programme.***

5. ***Establish a Plan to Develop the Partnership through the Science-and-Technology-Park Mechanism.***

6. ***Disseminate Information on the Establishment of the Science and Technology Park.***

4.2.3 The embedded seedbeds for the Egyptian Renaissance:

As mentioned above, adding to the strategic provision for Egypt 2030, we can conclude that science & research is expected to act as the key driver for the Egyptian economy for the next decades. After the Egyptian revolution in 2011, hopes for re-constructing a civilian and democratic regime can retain the economic and social reform of Egypt. This transfer into a democratic nation will produce an ideal environment for Direct Foreign Investments (DFIs) in a remarkable manner. Also, the expected return for the immigrant minds will be a mandatory asset for sustaining the technological and scientific revival of the Egyptian community, same as the case of China, India and South Korea.

Which means that important element of human resources within the system of national policies and social and economic conditions to support the competitiveness and increase the relative advantages of the territory to the territory, and this means that the capacity of local institutional and technical skills are needed now more than ever to maximize the competitiveness of the city / region. Here appears the role of higher education institutions.

The Egyptian Universities will play a central role to construct these new Knowledge Hubs all over the region, also Cultivating science and technology in Egypt has lots of seedbeds based on the availability of six Key elements of the evolving strategy are predicated on a broad understanding of key external factors in each priority area. These are: **Money (financial capital), People (human capital), Things (physical capital), Know-how (intellectual capital), Global positioning (market capital), and Growth of networks (social capital).**

5. The road map for S&T driven Regional Development in Egypt:

5.1 conceptual frameworks:

[15] This proposal was discussed and shaped at the Beijing Forum on New and Emerging Technologies and Sustainable Development, held in Beijing, China, from 15 to 17 April 2002. Plans to proceed with the development of such an entity could be one of the concrete initiatives announced at the World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa, in late August and early September 2002.

[16] China Torch Program (CTP),"**Proposal for the establishment of A SCIENCE AND TECHNOLOGY PARK NETWORK MECHANISM designed to foster international partnerships for sustainable**" ,Beijing, China(2002)

Witnessing the era of knowledge in many urban regions growing an emerging set of functions competitive advantages - such as higher education, research and human resources development- within the functions and responsibilities of development partners in the city or region urban and this means that the capacity of local institutional and technical skills are needed now more than ever to maximize the competitiveness of the city.

And refute Mustafa Madbouly[17] of four major factors affecting the ability of the city or urban region competitiveness, namely: economic structure, the advantages of regional, human resources and institutional framework. These factors are considered mandates for establishing the techno-economic driven models, national and regional systems of innovation, learning region, industrial clusters and triple helix – on the role of R&D, inter-active processes of innovation and education. These more theoretical views have influenced both the EU and its Member States' approaches and decisions regarding how STI policies need to be developed. In most of the cases, the different approaches refer to the technological and social changes in industrial and service sectors over time and in different geographical scales. Currently, the focus is on knowledge-intensive business activities that specialize in ICT, biotechnology and nanotechnology, for instance, and on innovations particularly based on the introduction and application of R&D results, technologies and expertise of these fields.

Egypt can easily adopt the regional development framework in Europe; a novel feature has been that new initiatives bringing together business and RTD institutions (with their own areas of specialization and fields of strength) are mushrooming in all EU countries. These initiatives typically involve universities, public R&D institutes and industrial and service businesses that rely on new research results and technologies. These challenges raise a group of arguments, which are related to the following:

5.2. Argument 1: Egyptian Knowledge Hubs VS uneven development:

This debate was the major challenge for the Chinese model of development, especially in the early years for S&T driven development model of china in the early 90th of the last century. The proper strategy is to establish a group of governmental and non-governmental institutions responsible for monitoring and monitoring the social equity aspect in the development model. Demographically, uneven development was the major problem for most of the Egyptian regional master plans over the past decades, while still, the urban canters pattern is overwhelming the Egyptian settlements, enriched with harmonious economical, cultural and social diversity among all Egyptian urban centres:

- The central hub for governance, industry, science, technology and research in greater Cairo region(hosting more than 24 variant universities),
- The second touristic, cultural and industrial hub of Alexandria city within northern coast region,
- The third industrial center for transportation and logistics hosted in the strategic city of Suez within Suez Canal urban corridor,
- The major scientific and industrial center of Assiut City, acting as the vibrant heart of Upper Egypt,
- the touristic hub of Sharm Al-Sheikh the capital of south Sinai province, and
- Aswan and Luxor urban region, as the center of archeological tourism.

5.3 Argument 2: major driving sectors for the Egyptian future plan 2030

According to hundreds of studies done by a wide group of researchers, academics and official authorities, they almost agreed on 5 promising sectors as corner-stones for developing the Egyptian

[17] Madbouly, Mostafa.**"Reinforcing the competitiveness capacity of Arab cities and regions confronting the global challenges"**, white paper conference of Arab world challenges ahead.(2006)

regions, especially for the next three decades. It was noticed the all these sectors are sharing one major feature: Science & Research. They are the key points for fostering the competitive advantages of Egypt within the aggressive market of MENA region or even worldwide.

Thanks to the Chinese[18], Indian and Brazilian[19] model, it was proven that establishing an appropriate environment for research and innovation to achieve such a target can be better applied, especially in the first stages of development, on campus of Science & Technology parks, Research Intensive Clusters (RICs), rather than the off campus New Technology Based Firms (NTBFs).

Hence then, a mindset plan can be proposed for the Egyptian model according to the givens of the regional report done by ANIMA Investment Network in 2010[20],which classified the 5 promising economic sectors in Egypt as follows:

5.3.1 Sector A- Science & Technology sector:

- **Challenges**: Banking on Egypt's fast-developing telecom infrastructure and large multilingual skilled workforce (16,000 engineering and 14,000 science and technology graduate every year), Egypt ranked 6th worldwide in the 2009 AT kearey Global Services Location Index. The report cited the competitive cost and availability of qualified people on top of Egypt's biggest attractions.
- **Opportunities**: Telecom equipment and infrastructure: BPO and Call centres (4 languages); software development.
- **Type of R&D model**: High-Tech Science Parks, This sector also includes informatics and software engineering/development, telecommunications and Internet.
- **Recommended Location**s: Greater Cairo Alexandria, Damietta, Urban Centres.

5.3.2 Sector B-Pharmaceutics, drugs & Healthcare:

- **Challenges:** Egypt has the basic catalysts to become a major destination for health tourism, as qualified workforce (8000 annual graduates from medical schools), and competitive costs (average wage in the health sector at 15.4 dollars/week), private hospitals to be renovated and to be built in the coming years. In addition to the wide targeted market (Middle East) for Egyptian pharmaceutics and drugs (especially generic), Medical and diagnostic equipments.
- **Opportunities**: Many recent M&A, bio-tech research centres, Greenfield projects (south Korea, India), and Brownfield investments from locally established MNCs (Pfizer).
- **Type of R&D model**: A Biotechnology Science park, this sector also includes pharmaceutics and bioinformatics.
- **Locations**: Cairo, Mansora City, Giza, Alexandria and 10th of Ramadan City.

5.3.3. Sector C-Textiles, leather and Ready-Made Garments (RMG):

- **Challenges**: Egypt is home to the only fully integrated textile industry in the Middle East.RMG accounts for nearly 75% of the industry, Egypt weighs 35% of the world production of high quality

[18] Sanni, M; Egbetokun, A and Siyanbola, W **"A Model for the Design and Development of a Science and Technology Park in Developing Countries"**, National Centre for Technology Management, Inder science Publishers.(2009)

[19] Fabio Queda Bueno da Silva ."**A city and its Science Park: building a local innovation system for urban and economic development** ",XXV IASP World Conference, South Africa.(2008)

[20] ANIMA Investment Network."**Medstatistics : all the statistics that you may need in order to invest in the Mediterranean".(2010)**

varieties(extra long staples),Egypt has plans to double this industry rates to reach 10 billion dollars by 2020,generating an extra 1 million jobs.

- **Opportunities**: Row cotton Production, yarn making, spinning weaving, fabric and feeder industries.
- **Type of R&D model**: Agro-Food Science parks: This sector also includes food, leather, textile and wood processing as well as agro machinery and re-engineering.
- **Locations**: Suez Canal region, Alexandria region, Greater Cairo, Mahala city(Delta), Sohag city(upper Egypt)

5.3.4. Sector D-Agricultural Products processing:

- **Challenges:** Egypt offers 2.86 million HA of cultivated land, the largest agricultural workforce in the region (6 million,30.2% of national labour force),booming food processing sector with annual growth over 34%,targeted overseas sales 1.5 billion dollars by 2020,with 500,00 new jobs.
- **Opportunities:** added-value products for export to Europe / the Gulf by establishing more research canters for developing the productivity of the Egyptian food processing and agriculture sector.
- **Type of R&D model:** Research Intensive Clusters to be spread all over the agricultural zones.
- **Locations:** Traditional agricultural regions (Nile valley and delta)+ land reclamation for mega-farms in Sainai and Toshka Region.

5.3.5. Sector E-Energy, Water and Environment:

- **Challenges**: by 2020, Egypt is expects renewable energies to make up for 20% of total power generation, betting principally on wind, solar plan and biomass. Existing natural gas reserves are planned to be exhausted within 57 years. By 2030, 60 billion dollars as total added value and gross revenue of using these new resources of energy.
- **Opportunities:** Research and production for Wind and solar power plant Development, production of equipments, biomass power generation (sugarcane); solid waste treatment, water treatment, irrigation and distribution technologies.
- **Type of R&D:** Science parks and RICs, This sector also includes clean and renewable energy, water and waste technologies/management, industrial ecology, biodiversity and desertification.
- **Locations:** solid waste power plants (Greater Cairo, Alexandria and urban centres),biomass in Qena, solar power in Upper **Egypt, northern coast, top** ranked wind farms worldwide in Red Sea **coasts, in** Gulf of Suez**.**

5.3 Argument 3: linking the Egyptian KH: Urban Development Strategy:

The primary goal of developing a comprehensive strategy is to raise the value added to the manpower, one of the most important indicators of the economic development of regions. It appeared to have some of the trends and attempts creative for some regions of knowledge in the world to activate the participation of higher educational institutions in the process of economic development, whether through reorganization of the institutional structure of those institutions, or re-organize content spatial and environment built, or by adding new elements to help stimulate the role (cities of Science, Technology parks, etc.), or through the provision of investment powers and incentives for the participation of the largest universities in the development and implementation of regional development plans. To maintain a coherent and balanced development for the whole nation's regions, three groups are considered as the main pillars for developing the concept of the Egyptian Knowledge Hubs Master Plan:

- First : Learner Centered Development, where the learner is a human capital development, the goal of any development tool and knowledge at the same time.

- Second: Knowledge Centered Development, where a wealth of knowledge that are used as fuel soft renewed vital for the development process.
- Third: HEIs Centered Development, Higher Education Institutions is the main driver for knowledge production, development and re-generation for sustainable Knowledge.

Region	Local Competitive Knowledge Index	Regional Relative Weight
Greater Cairo	3,114	26.4
Mid-Delta	2,453	20.8
Assiut	1,118	9.5
South Upper Egypt	1,041	8.8
North Upper Egypt	1,001	8.5
Alexandria & northern Coast	898	7.6
North Delta	802	6.8
Suez Canal	690	5.8
Red Sea	340	2.9
Sainai	319	2.7

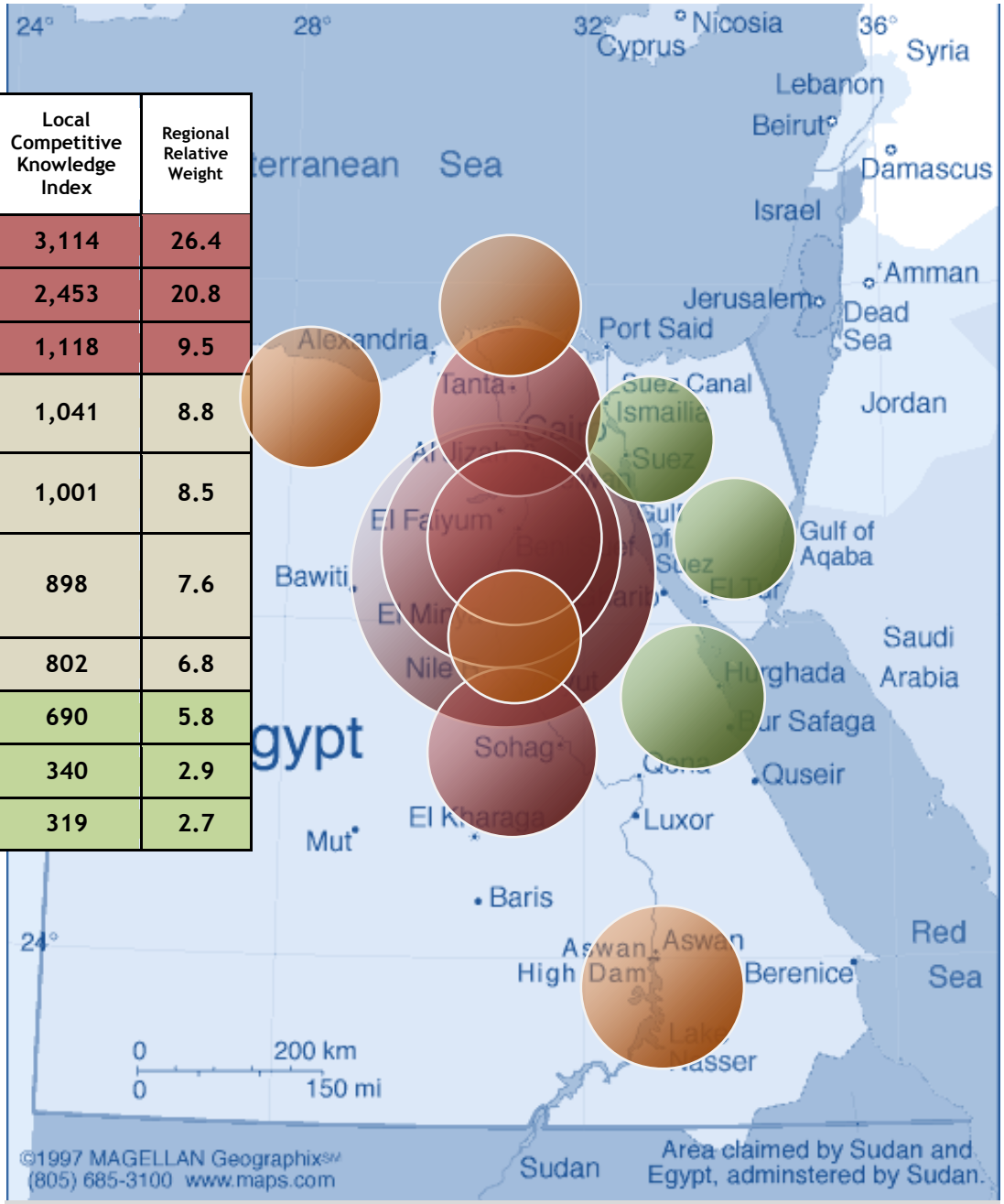
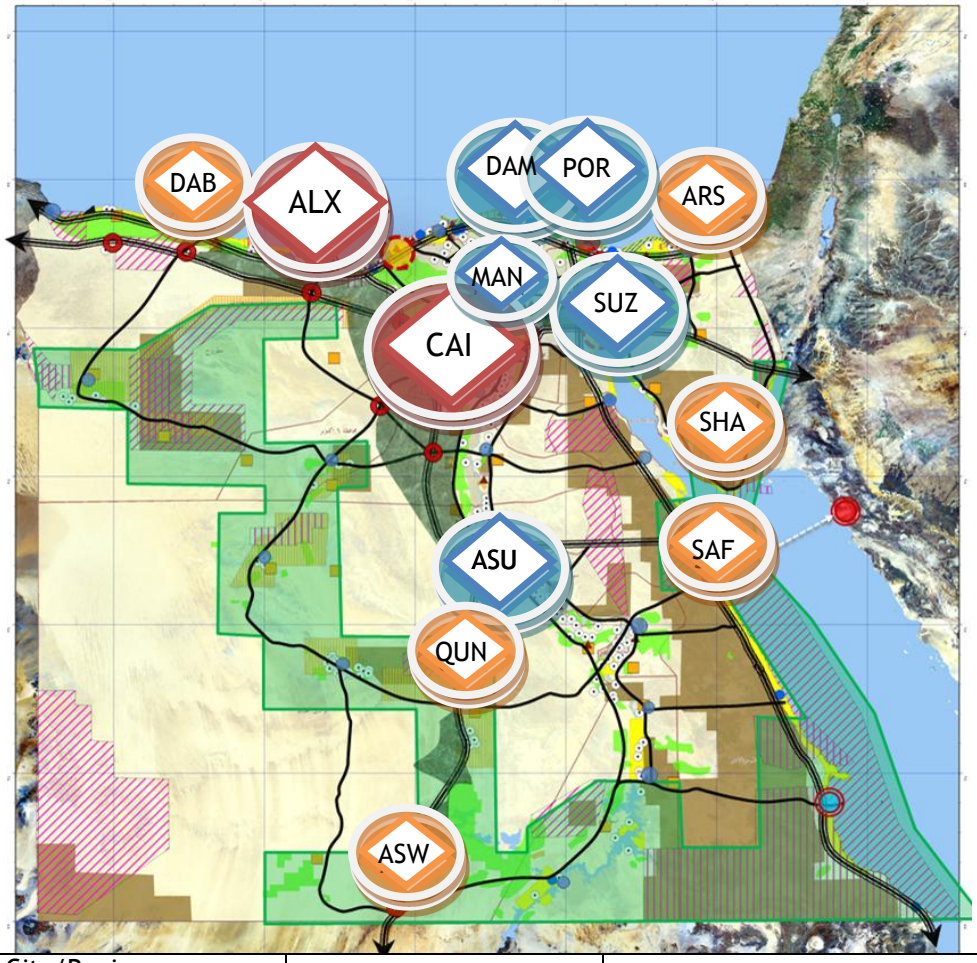


Figure 3.The Knowledge competitive local Index-Regions

Source: M,Shokry." A Proposed Urban Model to activate the role of HEIs in urban regions development", unpublished Ph.D. thesis, Cairo University,2009



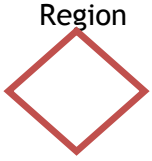
City/Region Classification	Pilot-model	Characteristics
Core Knowledge Hub :City Region 	Greater Cairo, Alexandria Metropolitan Region	• Intensive Knowledge Capacity • Highly Educated & well trained work force • Major driver for developing the surrounding regions • Strong educational and institutional framework for sustaining the regional knowledge capital
Early stages Knowledge Hub 	Port-Saied Suez Mansura Assiut	• Average density of Knowledge Capacity • Attractor for small/medium size knowledge base industries • Good magnates for attracting knowledge workers • Supplying grand ideopolis with supporting goods and sub-industries
Potential Knowledge Hub 	Tanta Aswan Ariesh Safaga Dabaah	• Promising seedbeds for new/traditional knowledge industries • Low or average of highly educated and well trained knowledge workers ratio • Basic transitional industries and plans for renewal power resources and researches

Figure 4. New Geography for the Egyptian Knowledge Hubs

Source: M,Shokry." A Proposed Urban Model to activate the role of HEIs in urban regions development", unpublished Ph.D. thesis, Cairo University,2009

5 Concluding Remarks

As a conclusion, and after exploring different thoughts, theories, visions and practical case studies, this paper presented some prober answers for the major raised questions in a sequentially structured approach to reach some scenarios for the new Egyptian Knowledge society/economy, within its expected urban and regional planned settings.

This research concluded also that the models of Science Parks, Research Intensive Clusters are suitable enough to be applied in the Egyptian case. But still, it should be further studied from the perspective of social equity and sustainable development for the case of the Egyptian community.

Therefore, this research fetched in some emerging success stories, like the Chinese and the Indian model, for the major requirements of establishing the techno-economic approach of development in Egypt, especially after 25 January Revolution.
Also, it has been concluded that the development of higher education institute links is assumed to encourage innovation and production of a sustainable development for both developed and developing regions. Hence, locales with highly interlinked higher education institutes are expected to have enhanced levels of wealth creation and job generation.

Although still, many authors feel that this thesis has not been empirically tested, this model put forward a link between a concentration of human capital and economic growth at the regional level, taking into account the level of education as a measure of human capital .

Finally, it's becoming increasingly as a demand from all thinkers, innovators and researchers in the urban economy field globally, to support this amazing model for peaceful transition towards an active partner for enriching the human civilization in the knowledge –based era or the "third industrial revolution age".

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