Berlin-Adlershof Science and Technology Park, and Valley of Technology, Ismailia

a Comparative Study

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***Abstract*— the development of science and technology parks is considered to have an intensive consumption of time, human and economic resources. An investigation to the evolution and development of successful science and technology parks around the world helps to determine the best key measures and policies shaping their success.**

The aim of this paper is to compare two practices of developing science and technology parks. The Science and Technology Park Berlin-Adlershof, one of the most successful high-tech parks in Germany that reached its cruising speed in terms of performance and turnovers. The second is Valley of Technology, Ismailia (VTI), a 21 years old project reintroduced within the new Suez Canal Area Development Project. Since the initiation of the project, the project has been criticized for its underperformance and for missing its planned completion date in 2009. The adapted methodology is to present both case studies and to analyze them comparatively in order to extract learned lessons and recommendations to optimize and enhance the development model of VTI.

Keywords*— Science and Technology Park, Berlin-Adlershof, Valley of Technology, Ismailia. Regional development, Innovation.*

I. Introduction

The integration of urban planning and spatial economic strategies has been a key policy in achieving sustainable long term development. Many countries around the world launched projects for the establishment of science and technology parks (STPs), with the aim of spurring and sustaining regional economic growth, integrating into the knowledge economy and increasing job opportunities for new graduates [1]. Stakeholders engaged in developing STPs include different entities, such as the government, the university and the industry. According to the International Association of Scientific Parks (IASP). The term "Science Park" could include "Technology Park", "Research Park", and "Technopole". The association defines a *science park* as an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and competitiveness of its associated business and knowledge-based institutions [2].

STPs became a major source of revenue generation in developed countries. They work as an intermediary channel to foster schemes of knowledge transfer and to promote the commercialization of research and knowledge [3]. *Commercialization* is a tool of transforming knowledge into products, services and institutes by having a comparative advantage to attain regional economic growth. [3].

Intermediate channels for technology transfer is becoming increasingly vital as universities role in commercializing their services and products is not fully capitalized [4]. Universities are at the central position of economic growth of any country by actively participating in research and development [5], they constitute a major actor in within the dynamics of STPs. Today, their role is no longer limited to teaching and research, commercialization and knowledge transfer to society has become an additional mission to fulfil [6].

In general, *science and technology parks* are planned as an organization of clustered buildings within a spatial proximity. According to Bathelt, H. 2005, a cluster is a geographical proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities. The cluster is characterized by four dimensions; horizontal, vertical, institutional and external [7].

The horizontal dimension describes co-presence at a location that facilitates the observation of competitors, the comparison of products and processes, and thereby the improvement of individual solutions. The vertical dimension is based on the input-output linkages of complementary units. The institutional dimension is related to the formal and informal institutions, regulatory system, trust and reliability that promote competitive strength. And finally, the external dimension argues that a cluster has to overcome the risk of lock-in." [7].

In order to introduce the both case studies, table I below highlights the main facts and figures of Berlin-Adlershof in relation to VTI, the facts highlight the main differences between the two projects; the data in the table help to draw a picture to assess the projects performance.

TABLE I. THE CASESTUDIES IN NUMBERS

STP	Initiation date	Total governmental investments	Project Area	planned completion date	Project turnover in 2015
Berlin-Adlershof	1991	Budget: - Spent: 1598 Mio. Euro [1]	4.2 km^2	-	766 m EUR Mio. Euro[2]
VTI	1995	Budget: 470 Mio. EGP Spent: 53 Mio. EGP [3]	69.3 km^2 phase 1: 12.6 km^2	2009	-

[1] [8] . [2] Excluding subsidies, in 2015 [9] . [3] [10].

The study of the planning process of both clusters and their history will help to justify these data in detail. Table I highlights the project start date of VTI that is nearly equal to

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Berlin-Adlershof. The project budget is substantially higher from VTI budget, even when compared with the previous currency exchange rates. An additional sum of 90 million EGP has been allocated to build a wastewater treatment plant in 2015 [11]. In terms of project overall Area, Berlin-Adlershof kept a compact urban setting and utilized less area than the VTI, only 6% of VTI Total area.

Berlin-Adlershof is continuously under development, either by planning new buildings or developing the current project infrastructure. In VTI's case, the project was supposed to be completed by year 2009, the progress on site today can barely be seen and the project is still not functioning.

II. Research Methodology

For the data collection phase, the paper depends on both literature review and site visits. During the course of literature review, the author reviewed several key articles investigating the establishment of STPs as a tool for attaining regional economic growth. Consequently, the author reviewed the literature investigating each case study. Since both projects nearly share the same goals, components, and the same initiation date, the research hypotheses assumes that the present performance of each project is nearly equivalent.

In 2013, a site visit was conducted to Berlin-Adlershof, the site included a guided tour through the cluster and attending an official presentation on the urban development of the park. For the case studies analysis, qualitative method is used to present both case studies and to analyze them comparatively. The comparison is conducted over several key aspects including the project aim, location & accessibility, context of development, economic status, components and human capital. The comparison is developed to extract recommendations and learned lessons that would help to optimize and enhance the development model of VTI.

III. Berlin-Adlershof

The decision to develop an integrated landscape combining commerce and science in Berlin-Adlershof was made in 1991. Three years later, in 1994, Berlin's Federal State Government established the development agency Adlershof GmbH (WISTA-MANAGEMENT GMBH) and commissioned a master plan for the area. The main idea behind the cluster initiation was to create new connection between new enterprises with education and research institutes, this connection is based on spatial proximity of units. Thus, rational development of networks will start without the need for a network management system.

The Park is one of Berlin-Brandenburg technology centers. Berlin and its close regional area in the State of Brandenburg has 14 technology centers, this infrastructure provides the best conditions for technology oriented companies to settle down in berlin. On the micro level and within and the concept of spatial proximity and specialization, Berlin–Adlershof attracted several key research and technology fields such as photovoltaic energy microsystems, Materials, IT, Media, biotechnology and environmental technology. This year, 2016, the park hosts 1,013 companies and scientific institutions that attracts 15,996 people for work and 6,524 for study [9].

The park is located about 15 km away from downtown Berlin, it's connected to two main airports, the Schönefeld airport (about 6 km away) and the Tegel airport (about 20 km away). On the local level, the park has an excellent access to public transportation and highway networks. In terms, of public transport, the access is provided to the park through different modes of mass transit systems, the local railway (S-Bahn) and the tramline (Straßenbahn) which is active on the park level and branches through the park providing reliable accessibility on the regional level. Furthermore, two bus lines are connected to the city. In terms of vehicular mobility, the city is 15 minutes away from downtown Berlin [9].

Berlin Adlershof blends with the urban fabric of the city while maintaining local image and profile, In terms of housing provision, different types of residential units available within the park from privately owned single-family housing to the student's dorms of the Humboldt University. Additional housing units are being built to meet the housing demand. Moreover, the different modes of public transport available helped to facilitate the access of commuters from outside areas [12]. Humboldt University constitutes a core element of the park with six institutes: Computer Sciences, Mathematics, Chemistry, Physics, Geography and Psychology. In 2016, the number of employees reached 1,055 and the number of Students reached 6,524.

One of the preliminaries of initiating science and technology parks is the existence of the trained human resources in the area or town [2] [13]. The Human capital had a major role for enduring the development of Berlin-Adleshof. During the different historical phases of the area and with every change in the geopolitical base, the human capital kept its dynamic responses through creating new enterprises or implicating new institutional and governmental entities in. Nevertheless, the formal establishment of a high technology park after the reunification of Berlin has embarked a new era of development that could be examined and studied. The population of Berlin is approximately 3.5 million capita with three main universities.

After Starting with the establishment of three complementary cornerstones such as enterprises, universities and research institutes in Berlin-Adlershof, spatial economic policy was initiated by the establishment and support of startup companies. Berlin government established a public-private partnership company called WISTA in order to operate the park, it's responsible for the construction, lease and operation of the technology and incubator centers.

"WISTA, is the operating company of the park, and it is responsible for the construction, lease and operation of the technology and incubator centers. Today, it offers rental space and maintains properties for sale, it promotes research and promotes research and business networks as well as national and international joint ventures, and it is responsible for public relations, marketing and sales activities for the entire development area.

IV. Valley of Technology, Ismailia

With a strategic objective to transform Egypt to technology producing and exporting country, and through the establishing a wide productive base in this field. The Egyptian State initiated VTI within the framework of national mega projects. The project aims at bringing a new urban community depending mainly on the modern high-tech industry to keep up with the advanced comprehensive development [14]. Recently, in 2015, according to the Presidential Decree No. 330 for the year 2015, the project was incorporated within Suez Canal Area Development Project [15].

The valley is planned to be developed as a part of the national strategic project for developing Sinai based on three main development corridors over the peninsula . It is located within the third and southern corridor, Ismailia - Ras al Naqab [10]. VTI aims to create a new urban community across the eastern desert fringe of the Suez Canal, the valley is planned to depend on the hi-tech industries such as renewable energies, medical industries, software programing, electronics, microchips, communication technology, microsystems, space technology, and environmental protection industries. The spatial proximity to the high purity silica sand in South Saini is considered a chief asset [16]. The government is the sole initiator of the project. In 2007, available data regarding the organizational structure of VTI unveils that VTI's local management is limited to a project manager and five employees affiliated with Ismailia Governorate [17].

Instead of being located within the urban fabric of the mother city Ismailia, VTI was located approximately 10 km away from the eastern bank of the Suez Canal; the valley is approximately 110 km away from Cairo airport, the nearest civil airport.

Several projects were established by the Egyptian government in order to increase connectivity with Sinai Peninsula along the Suez Canal, e.g. Egyptian-Japanese Friendship Bridge, Martyr Ahmed Hamdi Tunnel, Al Ferdan Bridge for railway traffic. However, within the Ismailia Governorate, crossing the Suez Canal for vehicular traffic is limited to the furry system. In 2010, The Author experienced crossing Suez Canal to Sinai Peninsula in Ismailia using the furry. Unfortunately, the process was very time consuming and indicates that daily commuting to reach VTI is a backdrop. However, Suez Canal will no longer be considered as a physical barrier to Sinai. Since 2015, the Egyptian Government embarked a project to construct two tunnels under the Suez Canal, one for vehicles and the other for railways. The tunnels (to be completed by the end of 2016) are expected to reduce the time and effort used to reach the project substantially.

In terms of housing provision, the project stands in the eastern desert fringe of the Suez Canal without residential capacity for 21 years. The strategic plan was to build two inclusive housing arears that constitutes 15.4 % of the project area. Recently, in 2014, the Egyptian government initiated a project to build the New Ismailia City five kilometers away west of VTI in Sinai, with an area of (2157 feddan) nearly 13% of the area of VTI (16500 feddan) and with a total number of 57,000 housing units. However, studies on the integration between both projects are still missing and there is no signs of complementary planning measures that could have been taken to develop the two projects within an integrated regional development model. Moreover, the image and profile of the new site of the New Ismailia city happens to be higher than VTI. The city has a view of the Suez Canal and a frontier of artificial lakes [18]. New Ismailia city first phase is planned to be inaugurated in April 2016 [19].

Two universities are planned within VTI. The first is the Ismailia University for Applied Science and the second is Heliopolis University, a private university [12]. Within Ismailia governorate, there is a broad consensus that the availability of the human capital necessary for the development of the park is insufficient [20]. However, the population of Ismailia Governorate (approximately 1.3 million residents with one university) might overcome this backdrop. In addition, the Information Technology Institute (ITI) established its new branch in Ismailia in 2013, with the vision of preparing the human infrastructure base for VTI [21]. The institute is a governmental entity and follows the Ministry of Communication and Information Technology.

There is no much to say about the current progress on site, VTI has failed to attract any investors or institutional entities to settle down in the cluster [22], today, after 21 years after the project initiation, the site consists of few abandoned buildings connected by a series of street networks merely covered by sand. The first constructed phase according to VTI's project manager is provided with basic infrastructure, water, electricity, a service center and a gallery, additionally, water treatment plant is being constructed [23].

For the private sector, land ownership helps to increase company's assets, accelerates growth based on their own equity and encourages banks to finance the company. However, land ownership is prohibited in Sinai. In VTI, land is granted to investors by usufruct to limit the risk of selling the land to third parties.

Land is leased to the investors with a price of 2.25 EGP per m^2/year the price is reduced after the construction to 50 %. Another recent information in 2014 unveiled that the price increased to 17 EGP for m^2 provided with infrastructure and 7.5 EGP without infrastructure to a 30-year renewable term.

On the other hand, investors have to carry on other additional costs (due to the remote location of SVT) within the fields of transportation, construction and security, this is considered as a side effect to taming a desert area in an early development phase. On the urban level, local building regulations had a negative impact on the development, the total height of any structure inside VTI should not exceed 6 meters, this is one of the regulations that were suppressed by the Ministry of Defense for security purposes [18].

In terms of attracting different companies in VTI, about four industrial projects were proposed by private investors and rejected by the planning authorities due to incomplete approvals and license documents. Ten other companies and educational entities were rejected because of their lack of seriousness in implementing their projects (according to the official statements) [18].

v. Conclusion

This paper investigated both case studies through several key aspects. In terms of Berlin-Adlershof, the analysis unveiled how a serious, consistent and comprehensive planning effort proves to be fruitful in a long-term integrated development. A key success driver for Berlin Adlershof is site accessibility, different modes of transportation systems and infrastructure help to link the park with its regional context and to provide the trained and specialized human capital to the park.

In terms of VTI, New modes of efficient and green transportation using railways would help to effectively connect VTI and New Ismailia city with the mother city Ismailia and its regional context. The new railway tunnel under the Suez Canal opens up the horizon to establish a mass transit system, enabling the region to reach a balanced social structure with different economic capabilities. Another possibility is the establishment of a bus rabid transit system (BRT) using the tunnel dedicated for vehicular traffic.

Many other success factors in Berlin Adlershof were investigated. Among them, the governmental financial support that helped to provide a safe, positive and encouraging atmosphere for innovation and creativity, effective park management and development through the public private partnership company WISTA, and finally, the political strategic determination behind the continuous support of the science and technology park.

On the other hand, VTI adapts a master plan with a total area of development that is substantially vast in comparison to Berlin Adlershof, (69.3 km^2 to 4.2 km^2). The allocated financial resources are significantly low. A key recommendation from the study of Berlin Adlershof is to maintain a compact urban setting in order to increase walkability and to cut energy and infrastructure costs. On the macro level, VTI has to cope with the rapid development of the Suez Canal area; a key action for smart growth is to link the project development with the emerging New Ismailia city, in order to realize a *balanced* and integrated regional development model.

Based on such a comparative study between both projects, several success drivers are unveiled. Among them are: the proximity of a large economic city, access to qualified human resources, international visibility, high site image and profile for the STP, a well-developed base of infrastructure, advanced networking, high site accessibility, the availability of financial resources, and the mobilization of public private partnership management model.

In case of VTI, not only there is a need to establish the necessities for running a new desert community, but also a competitive and integrated development model has to be envisioned in order to attract investments and qualified human resources. Inhabitable desert areas represent extreme urbanization challenges where different economic, social and environmental challenges have to be tackled to establish a sustainable and resilient urban community.

References

[1] M. E. Porter, "Clusters and the New Economics of Competition," *Harvard Business Review*, vol. 6, no. 76, pp. 77-90, 1998.

[2] Kamoun et al., "Technology Parks, Incubation Centers, Centers of Excellence: Best Practices and Buisness Model Development in North nd Southern Africa, Excutive Summery," UN, Addis Ababa, 2009.

[3] P. Mueller, "Exploring the Knowledge Filter: How Entrepreneurship and University-Industry Relationships Drive Economic Growth," Amsterdam, The Netherlands., 2005.

[4] R. Huggins, "Universities and knowledge-based venturing: Finance, management and networks in London," *Entrepreneurship and Regional Development*, vol. 2, no. 20, pp. 185-206, 2008.

[5] Miner et al.,, "The magic beanstalk vision of university venture formation. In: Schoonhoven," *The Entrepreneurship Dynamic.*, p. 109 –146, 2001.

[6] Baycan & Stough, "Bridging knowledge to commercialization: The good, the bad, and the challenging," *The Annals of Regional*, vol. 2, no. 50, pp. 367-405, 2012.

[7] H. Bathelt, "Geographies of production: growth regimes in spatial perspective (II) – knowledge creation and growth in clusters," *Progress in Human Geography* , vol. 2, no. 29, p. pp. 204–216, 2005.

[8] Adlershof, "Berlin Adlershof City of Science, Technology, and Media presented to Union of the Baltic Cities, UBC Business Commission," 2013. [Online]. Available: file:///C:/Users/Anas/Downloads/www.ubc.net_5250%20(1).pdf. [Accessed 27 March 2016].

[9] Facts, "Berlin Adlershof: Facts and Figures," 2016. [Online]. Available: http://www.adlershof.de/en/facts-figures/adlershof-in-numbers/. [Accessed 26 March 2016].

[10] CAICT, "Central administration for information and communication technology - Ismailia Governorate," 2012. [Online]. Available: http://www.ismailia.gov.eg/investment/Investment/Forms/AllItems.aspx. [Accessed 26 March 2016].

[11] M. Metwaly, "The completion of infrastructure for the Technology Valley Project," October 2015. [Online]. Available: http://www.mobtada.com/details_news.php?ID=398516. [Accessed March 2016].

[12] Rogala et al., "Business model of Scince and Technology Parks: Comparison of European best practice," *Meiji University Press*, no. 1, pp. 15-28, 2014.

[13] F. Thalji, "The Planning and Design of Science and Technology Parks," Jordan, 2005.

[14] Abdel-Fattah & Sheta, "Egypt's Scince and Technology Parks Outlook: A Focus on SRTACity (City for Scientific Reserch and Technology

Applications)," *World Technopolis Review*, no. 2, pp. 2:96-108, 2013.

[15] A.-A. Mohamed, "Sout Alarab, Naima Moheb: "Technology Valley" is a protective shield to protect Sinai from the threat of terrorism (in arabic)," 4 March 2016. [Online]. Available: http://soutelarab.net/topic/33767/. [Accessed March 2016].

[16] M. Youssry, "Almidan - Project Manager of the Technology Valley: the valley is ready to receive the high-tech projects within the Suez Canal axis (in arabic)," March 2014. [Online]. Available: http://www.almydan.com/ar/content/10573. [Accessed March 2016].

[17] Z. &. Zalat, "AlMasry Alyoum, Valley technology .. Egypt's national project that never saw the light (in arabic)," 1 July 2007. [Online]. Available: http://today.almasryalyoum.com/article2.aspx?ArticleID=66867. [Accessed 4 March 2016].

[18] N. Ismailia, "Pictures and video ... the minister to review the final plans for the new city of Ismailia, Elgornal.net, (in arabic)," December 2014. [Online]. Available: http://elgornal.net/news/news.aspx?id=5507166. [Accessed March 2016].

[19] N. Abdelrouf, "Masr Alarabyia, The establishment of 10 thousand new housing units in Ismailia (in arabic)," 16 March March. [Online]. Available: http://www.masralarabia.com. [Accessed 2 April 2016].

[20] BawbaNews, "The transfer of project "Technology Valley" for the area west of the canal (in arabic)," November 2015. [Online]. Available: http://www.albawabhnews.com/1633525. [Accessed March 2016].

[21] ITI, "ITI, Minister of Communication and Information Technology visits ITI branch in Suez Canal region," 8 November 2014. [Online]. Available: http://www.iti.gov.eg/news/1151/minister-of-communication-and-information-technology-visits-iti-branch-in-suez-canal-region. [Accessed 4 Marcch 2016].

[22] D. Sims, Egypt's Desert Dreams - Development or Disaster?, Cairo: American University in Cairo Press, 2014.

[23] M. Abdelaziz, "Naima Moheb: "Technology Valley" is a protective shield for Sinai aganist the threat of terrorism (in arabic)," March 2016. [Online]. Available: http://soutelarab.net/topic/33767/. [Accessed March 206].

[24] Sanni et al., "Munich personal RePEc Archive A Model for the Design and Development of a Science and Technology Park in Developing Countries," September 2009. [Online]. Available: https://mpra.ub.uni-muenchen.de/25342/. [Accessed March 2016].

[25] Link & Siegel, "University-based technology initiatives: Quantitative and qualitative evidence," *Research Policy*, vol. 3, no. 34, pp. 253-257, 2005.

[26] Jamil et al., "A Review of Commercialization Tools: University Incubators and Technology Parks," *International Journal of Economics and Financial Issues*, no. 5, pp. 223-228, 2015.

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