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The use of special economic zones to drive sustainable development in Egypt: A case study on the Suez Canal region

Dona Alaa Ali

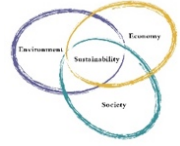Follow this and additional works at: https://fount.aucegypt.edu/etds

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The Use of Special Economic Zones to Drive Sustainable Development in Egypt: A case Study on the Suez Canal Region

A Thesis Submitted to Graduate Program in Sustainable Development in partial fulfillment of the requirements for the degree of Master of Science in Sustainable Development

by

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Abstract

One major problem facing Egypt is improper allocation of the country's resources that potentially enhancing Egypt's development. The Suez Canal Zone is one of these misused resources. In recent years, the Suez Canal area has not been efficiently exploited in parallel to its geographical importance in the world trade route. Thus, it is essential to set a sustainable development strategy and implemented it properly in order to upgrade this area and reap its potential advantages which may contribute to the country prosperity. Unless the Suez Canal region is efficiently managed, Egypt risks losing valuable development opportunities. This research argues that Special Economic Zones (SEZs) could offer a successful way to drive sustainable development in the country, provided this economic zone is appropriately established and customized to fits Egypt needs. The concept of SEZs is gaining global recognition and acceptance, particularly since its successful performance in the Asian Tigers countries, amongst others. Despite these achievements, SEZs in certain developing countries have negatively impacted on the sustainable national growth. Because there is no unified model to suit every situation, it is essential to plan a well-defined framework in the Suez Canal economic zone (SCZone) that supports inclusive growth in Egypt generally and in the Suez Canal region particularly. Such a framework could be built around a long-term commitment which supports economic growth in Egypt, relying on solid social and environmental standards. This dissertation focused on analyzing the role of the current Egyptian special economic zones in achieving its objective, and accordingly proposed a sustainable strategy that supports Egypt vision 2030 in the SCZone. Ultimately, this dissertation found that during 2002-2018 period, SEZs in the Suez Canal region have a significant positive impact on the economic growth whereas they have a significant negative effect on the social and environmental standards. Thus, for making growth more inclusive, the government should have more responsibility for improving the human capital and supporting clean production practices in the SCZone.

Keywords: Special economic zones, Econometric Model, Suez Canal Economic Zone, Egypt Sustainable Development Strategy, Green Production, Eco industrial park.

Acknowledgements

Dedication

It is with pride and affection that I dedicated this thesis to my dear father who passed away a few months ago. My father was immensely proud that his daughter was working on her master degree. Until the last moment in the hospital, he was asking me if I have finished my thesis or not. He was always believed in my ability to be a successful person. My father is gone but his belief in my success in the academic arena has made this journey possible. I am really sorry that my father did not get to see my completed dissertation. So, this work is for you dad. I wrote this dissertation while you are around all the time. Every single moment you have been around inspired me and encouraged me to finish what you have always asked me to finish. Thank you for everything. You held my hand for a short while, but you will hold my heart forever.

Rest in peace Insha'Allah, **Alaa El Din Mohammed Ali** (1959, 2019).

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Glossary

Acronym	Description
ADB	Asian Development Bank
ASR	Automotive shredder residue
CAPMAS	Central Agency for Public Mobilization and Statistics
CDE	Centre for Development and Enterprise
CEPZ	Chittagong Export Processing Zone
CIEP	The Composite Index of Environmental Performance
CO_2	Carbon dioxide
CO	Carbon monoxide
CP	Cleaner production
EPZ	Export Processing Zone
EIP	Eco industrial parks
ECOSOC	Economic and Social Council
EEA	European Environment Agency
EEE	Electrical & Electronics Engineering
EKC	Environmental Kuznets Curve Hypothesis
EPI	Environmental Pollution Index
EQI	Environmental Quality Index
EDI	Environmental Degradation Index
FBT	Food, Beverages and Tobacco
FTZ	Free Trade Zone
FDI	Foreign direct investment
GAFI	General Authority of Investments and Free Zones
GHG	Greenhouse gas
GDP	Gross domestic product
ICT	Information and Communication Technologies
IS	Industrial symbiosis
MIMIC	Multiple Indicators Multiple Causes
MCA	Multi-criteria analysis
MSME	Micro, Small & Medium Enterprises
MCP	Marketing and communication plan
MSW	Municipal solid waste
NAFTA	North American free trade agreement
OLS	Ordinary Least Square
O_3	Ozone pollutant
NO_x	Nitrogen oxide
PPP	Public private partnership
PHH	Pollution Haven Hypothesis
PM	Particulate matter pollutant
QIZ	Qualified industrial zones
SEZs	Special Economic Zones
Sez	North West Gulf of Suez Special Economic Zone

SDS	Sustainable Development Strategy 2030
SDGs	Sustainable development goals
SCA	Suez Canal Authority
SCZone	Suez Canal Economic Zone
SMEs	Small & Medium Enterprises
SIP	Sino-Singapore Suzhou Industrial Park
So$_2$	Sulfur dioxide
TSP	Total suspended particle
TEDA	Tianjin Economic-Technological Development Area
UNEP	United Nation Environment Program
VAT	Value-added tax
WECD	World Commission on Environment and Development

1. Introduction

1.1. Background of the Problem

Poor utilization of the competitiveness of the Suez Canal zone is one of the ambiguous issues that has held the Egyptian economy back from a genuine chance towards sustainable transformation and rapid economic growth. Since Nasser's nationalization of the Suez Canal in 1956, development in the Suez Canal zone has been slow, focusing only on maritime navigation aspects without attempting to cope with changing global conditions. However, inability to adapt to these global changes may threaten the Suez Canal competitive edge in the near future. In this context, development in the Suez Canal region is essential to expand its role from trade facilitator to contributor in global trade which reinforces its economic growth, contribute to solve various socio-economic problems, and promote the environmentally sustainable practices in Egypt. Accordingly, the Egyptian government started their first wave of the transformational reform in 2014, introducing its sustainable development strategy "Egypt's Vision 2030", and by 2015, the Suez Canal area was declared a special economic zone. These initiatives provided new roadmaps covering the inclusive green growth in the country that could be achieved through sustainable utilization of the Suez Canal zone. In a developing country like Egypt, accelerating economic growth while also protecting the environment are interlinked challenges, neither of which can supersede the other. Accordingly, it is important to support the sustainable development in Egypt to achieve the country's prosperity without destroying the environment.

In this regards it is essential to answer this question, why sustainable development is a must in this era? On the international level, developing countries have to stop 1.4 billion people out of abject poverty by enhancing their economic growth; meanwhile, ensuring that these economic activities are correlated with the low carbon growth which reduces the aggregate carbon footprints. Subsequently, countries like Egypt should explore new development strategies that minimize the greenhouse gas (GHG) emissions to accomplish clean growth. In the Egyptian context, the current growth pattern is not only unsustainable but also inefficient. Egypt suffers from numerous socio-economic problems due to the country's low productivity rate. This weak productivity is caused by the low domestic and foreign direct investment, lack of export and high unemployment rate that accelerates the internal migration. Thus, for solving all these socio-economic challenges, it is essential to set out a national strategy for the sustainable development in mega projects that can tackle all these circumstances without deteriorating surrounding environment, and Suez Canal development is one of these projects. This is

extensively indispensable for the prosperity of not only the Suez Canal area but also for the Egyptian economy. Supporting the sustainable development in the Suez Canal economic zone is the efficient way to battle various macroeconomic challenges that hinder the country's development without polluting the environment.

The SCZone has tremendous potentials towards the prosperity of the whole country. N Gage Consulting (2016), estimated that the projects that will be established in the Suez Canal economic zone are supposed to generate 12 billion dollars annually once they are complete. In addition to that, the former minister of investment Ashraf Salman, after declaring the Suez Canal region a special economic zone, he stated that the Suez Canal economic zone (SCZone) in the future years will be responsible for 30 percent to 35 percent of the Egyptian economy (N Gage Consulting S.A.E, 2016). Globally, special economic zones (SEZs) have become an integral instrument to enhance the country's economic development. Per the World Bank, the establishment of a special economic zone in developing countries is a useful path to achieve the country's inclusive green growth (FIAS, 2008). These zones contribute directly to achieve the following: increasing the foreign exchange earnings; magnifying the country exports; integrating host country to the global markets; increasing the government revenues; increasing the technological knowledge transfer; and reducing unemployment. The Asian Development Bank (ADB, 2015), claimed that SEZs played a significant role to support the trade and investments during the economic recession in some countries. However, others skeptic (Hamada, 1974, Warr, 1987) doubted that SEZs have a positive significant impact on the host country as it has presented in the literature. Hence, assessing the impact of all the current sorts of special economic zones in the Suez Canal region is a necessity to hypothesize the extent to which these economic zones can achieve their objectives in Egypt, and what are the major changes that are required to expand SCZone successfully. Inside the SCZone, the government should aim to attract more investments which means stimulating more job opportunities and technological advancement. Meanwhile, the government should foster other economic activities outside the zone through generating synergies that encourage backwards and forward linkages with the whole economy (The World Bank, 2017). This means that SCZone under certain measurements could be the instrument that helps the country to stimulate economic growth inside and outside the economic zone. Furthermore, ADB (2015) asserted that SEZs were significant tool to test the grounds for incentives and structural reform before expanding across the whole economy, as a result, SCZone could also be an experimental field to assess new policies reforms before implementing these policies in a larger scale. Thus, SEZs can play an important role in the Egyptian economic development, if there is a good business environment and policies. As per

ADB (2015) the success of the special economic zone depends on two factors: the extent to which these economic zones are linked with the whole economy, and the capability of the economic zone to support the economic transformation from a manufacturing basis to technological innovation. Therefore, this thesis will study the performance of the current economic zones in the Suez Canal region to achieve the economic, social and environmental sustainability in the country. In addition, it will propose a sustainable development strategy that relies on achieving the economic, social and environmental standards using sustainable policies that enhance green production technologies.

1.2. Research Gap

As the literature will show, special economic zones (SEZs) are not a static scheme, they have different characteristics that evolved over time due to changing the economic conditions of countries in which they operate in. This accordingly encouraged most previous researchers to study the impacts of special economic zones on enhancing the development in host countries throughout the world (Hamada, 1974; Balassa, 1978; Warr, 1989; World Bank, 1992; Chen, 1993; Madani, 1999; Jayanthakumaran, 2003; Monge-Gonzalez, et al. 2005; Graham, 2004; OECD, 2006; Arunachalam, 2009; Das, 2009; Palit & Bhattacharjee. 2009; Zeng, 2010; Farole, 2011; Zeng, 2015). Particularly in Asia (Aggarwal, 2007; Aggarwal, 2012) and Latin America where SEZs have had a wide influence on the countries' prosperity. However, the effectiveness of SEZs to achieve its objectives was a contradictory issue among scholars throughout the past period. Some researchers showed that SEZs have positive impacts in attracting foreign direct investments, creating jobs, and increasing the exports; showing a peripheral positive cost-benefit effect (Warr, 1989; Chen, 1993; Jayanthakumaran, 2003; Graham, 2004; Monge-Gonzalez, et al. 2005; Arunachalam, 2009; Das, 2009; Palit & Bhattacharjee. 2009; Zeng, 2010; Farole, 2011; Aggarwal, 2012; Zeng, 2015). While other scholars asserted that SEZs in some countries encountered several problems such as the inefficiency of the governmental management, insufficiency of the provision of infrastructure, the vulnerability of SEZs to the changing conditions in the international economy, the exploitation of the indigenous and female labor force (Wong & Chu, 1984). Therefore, they claimed that the success of the SEZs restricted to certain conditions that have limited time horizon considering SEZs as the second or third best development option, depending on the weak performance of SEZs in some countries (Hamada, 1974; Madani, 1999). Hence, this means that more studies should carried out to explain the variance among the impact of SEZs on countries.

In this regards, previous scholars have examined the effects of special economic zones on economic growth, social spillover (Warr, 1989; Chen, 1993; Jayanthakumaran, 2003; Mongé-

Gonzalez, Rosales-Tijerino, & Arce- Alpizar, 2005; DeborahBräutigam, 2014; Olson et al., 2014; ADB, 2015; leong, 2016; Alkon, 2018), and environmental degradation (Zeng, 2016; Kechichian & Jeong, 2016) based on a country experience basis. These attempts contributed to explain the variation in SEZs impacts globally; while in the national context, most of the researchers (Al-Jeddawi, 2004; Mostafa, 2007; FIAS, 2008; Farole &Akinci, 2011; Adly, 2015; Abed Mahmoud Gad, nd) that studied the Egyptian context academically to examine the role of these economic zones in achieving the Egyptian prosperity were qualitative, focusing mainly on one type of SEZs. This zone is the Enterprise Processing Zones (EPZ) or what is called free zones that were established in the beginning of the 1970s. Noted that, national studies (Soliman, 2014; Dar Group, 2015; Fattah, 2016) that emphasized on the special economic zone that is located in North West Gulf of Suez (Sez) were limited. And Soliman (2014) is the only one who attempted to assess the economic impact of the Suez Canal new projects on the country using descriptive analytical method. He gathered data from 2003 to 2014 on the Egyptian economic growth rate, employment rate and foreign direct investment (FDI) size to link this data with the current and estimated revenues of Suez Canal. Surprisingly, these studies are the available sources that can be found in the Egyptian context regarding the special economic zones in Egypt, without any major focuses on the environmental aspect. Thereby, in the light of the insufficient empirical studies that done on the Egyptian context. This research will contribute to filling this gap through collecting and analyzing data from the secondary sources based on an in-depth study for all the special economic zone programs in the Suez Canal region during the 2002-2018 period, with a wider coverage of their economic, social and environmental impacts on both the macro and the meso levels.

1.3. Research Questions

Based on the research background and knowledge gap, this study will be driven by a set of research questions, and these research questions are:

- **What is the role of current economic zones that locate in the Suez Canal region on promoting the country prosperity economically, socially and environmentally at the macro and meso levels?**
- **What is the potential SCZone strategy that can support the sustainable development in Egypt?**

1.4. Research Objectives

This research aims to assess the performance of the current SEZs in Suez Canal region in order to define the appropriate strategy required in SCZone to prompt green economic growth in Egypt. Thus, by the end of this research, there will be a clear vision that demonstrates the potential benefits that can be gained from SEZs in the Suez Canal region. Correspondingly, this study can assist the Suez Canal Authority (SCA) to realize the extent to which SCZone can sustain the development in Egypt through supporting the economic, social and environmental sustainability standards this region. Thereby, all these happen through the following:

- Outlining types of the special economic zones in Egypt and the future plans that settled to the SCZone.
- Quantifying the impacts of the current economic zone programs on the Egyptian growth through measuring the impacts of such zones on the economic, social and environmental standards at the macro and meso levels.
- Proposing a sustainable development strategy for the SCZone that can enhance not only the socio-economic sustainability but also the environmental sustainability through promoting industrial symbiosis (IS) that is based on cleaner production.

1.5. Research Methodology

Since the declaration of Suez Canal region as a special economic zone, it has become one of the most industrialized areas in Egypt that has its promising future potentials to be like most of the successful special economic zones in China. However, this is not a definite result as some SEZs in other countries did not achieve any of its development objectives. This means that the concept of the SEZs is still a debatable phenomenon that requires further investigations. Additionally, there is a research gap in national empirical studies that illustrate the role of all the current SEZs on promoting the sustainability in Egypt from the economic-social and environmental aspects. Thus, this study will contribute to fulfilling this gap through evaluating the performance of all the current SEZs types that locate in the Suez Canal region (Suez, Ismailia, port Said)[1] using econometric models. Namely that these statistical models will be utilized to specify the efficiency of the SEZs current performance economically, socially and environmentally on the macro and meso levels in order to forecast future development required in the SCZone. These

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[1] Noted that, zones in North Sinai will not be included in this study. This is due to the lack of data available on these zones. However, the researcher estimates that this will not affect the results as these zones are slightly small zones with low productivity rates compared to the zones in Suez, Ismailia, and Port Said.

models run on Stata software package, using data from 2002 until 2018. The data in this research gathered from different sources such as General Authority of Investments and Free Zones (GAFI), Central Agency for Public Mobilization and Statistics (CAMPAS), Global Data Lab (Radboud University), Global Change Data Lab (Oxford University), The World Bank and the Egyptian central bank annual bulletins. The economic model used SEZs investments and the employment in terms of their contributions on the GDP. This is based on a previously developed model by Zheng, et. al, (2016) who used industrial zones employment and industrial zones investments as one of the explanatory variables for GDP and the local output. The social model used SEZs investments and employment in SEZs as an explanatory variable to HDI in Egypt and per the Suez Canal governorates. Lastly, the environmental model employed the SEZs investment as an explanatory for the carbon emission changes. Pointed that in all the models used in the study, all the investments in SEZs including the domestic investments were treated as a foreign direct investment because SEZs is consider to be a foreign investment relative to the rest of the country economy[2].

To summarize, this study aims to estimate the extent to which SEZs in the Suez Canal region able to promote sustainable development in Egypt generally and in the Suez Canal governorates specifically. Additionally, it will outline a sustainable development strategy for SCZone that support Egypt vision 2030 which aims to achieve some of the sustainable development goals (SDGs). Therefore, this study involves six chapters. After the introduction, the second and third chapters present the concept behind the special economic zones (SEZs), through demonstrating in details the theoretical and the empirical literatures in the global and national context, covering the economic, social, and environmental aspect. Chapter 4 demonstrates the econometric model that will be used to tackle the research objectives. Chapter 5 involves a proposal for a sustainable development strategy that can be implemented in the Suez Canal zone to achieve sustainable development. This proposed strategy encompasses plans and policies required to promote eco-industrial zone which supports industrial symbiose and cleaner production practices. This part will be based on previous literatures and the results of the econometric models. The last chapter summarizes the findings and recommendations drawn from the study to policy makers in Egypt.

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[2] Quaicoe, Aboagye & Bokpin, (2017) considered investments in such zones to be a foreign direct investment even if it includes domestic investments.

2. Literature survey

2.1. The concept of Special Economic Zone

Special economic zone or what is called free zone is a generic term that is most used globally to cover various types of zones that have a different management framework, special customs benefits, and limited geographic location (FIAS, 2008; Farole, 2011; Zeng, 2015; The World Bank, 2017; OECD, 2017). These zones have their tax breaks and business incentives, and these incentives have evolved over years, resulting in several types of zones with almost similar objectives, but different incentives, activities and markets (FIAS, 2008). Most scholars recently defined special economic zone as a limited geographic area within the boundaries of the country that has its preferential rules that differs from country to another. These rules vary based on the investment situation, international trade, customs, taxation and the business environment of the host country (Farole, 2011). However, special economic zone has certain characteristics (FIAS, 2008; Zeng 2015; The World Bank, 2017):

- It is a delimited geographic area that is secured.
- It has a single management administration and facility that coordinated between the companies in the zone and the government.
- It is a duty-free area.
- It offers benefits to investors through streamlined procedures.

Thus, SEZs is a district within a country with a zone management that provides an infrastructure and services to tenant investors, and it has different set of policy instruments that are not applied to the rest of the country to promote multiple companies in one location in order to enhance the vertical and horizontal agglomeration (Hamada, 1974; The World Bank, 2017), and this agglomeration can reduce costs and enhance efficiency. Because firms in one region will benefit from the backward and forward linkages related to companies inside and outside the SEZs. This drawn from the Marshall (1920) assumption in regards to the transportation cost that attached to moving goods, labors and ideas. Thereby clustering of consumers, intermediate suppliers and producers of final product in core region will build an ecosystem that encourages more firms to the SEZs, reinforce a wide scale of high skilled workers in and around the SEZs, and transfer technological spillovers in specialized SEZs (The World Bank, 2017).

Historically, the first modern zone has established in Brooklyn 1937 on the East River side of New York harbor. This zone drives similar zones to be established in United State to enhance exporting. In 1959, the first European zone, was established in Ireland. In mid 1960s, zone development started in Latin America particularly in Colombia 1964, then SEZs opened in the

Dominican Republic 1965, India 1965, South Korea 1970, Malaysia 1971, Philippines 1972, and Indonesia 1973 for achieving different objectives (The World Bank, 2017). In 1970, the United Nations Economic and Social Council (ECOSOC) called for improving trade facilities, ports and customs to develop SEZs. After then the establishment of SEZs in developing countries has accelerated and many African countries started the development of such zones in their countries (The World Bank, 2017). Currently, there are 2301 zones in 119 developing and transition countries, and China alone owned about 19 percent of all these zones as SEZs assisted the Chinese's transition to the market-based economy (FIAS, 2008). Meanwhile, there are around 3000 zones in 135 countries worldwide that contribute in generating over 68 million new job opportunities and increase the value added of the direct trade by over $500 billion. Nevertheless, the development of SEZs in some countries such as Kenya and Madagascar, did not have a transformative impact on the economy growth (FIAS, 2008).

Various scholars (Madani 1999; Cling and Letilly 2001; Leong, 2013; FIAS, 2008; Farole 2011; Zeng, 2015; The World Bank, 2017) argued that the special economic zone was established to achieve one or all of the following objectives:

1. Promoting economic growth in the country through enhancing the exports.
2. Attracting the foreign investors and increasing the foreign currency earnings.
3. Upgrading labor skills and transferring the technological advancement.
4. Increasing the employment.
5. In transforming economies, SEZs used to test new capitalist policies and approaches before implementing it in a wider scale[3].

These objectives are the main cause behind the popularity of these zones. Thereby, various economic zone types were established throughout the whole world to accomplish these objectives. However, the results were not the same as some countries succeed to gain benefits from these economic zones while others failed (FIAS, 2008; Farole, Akinci, 2011; Leong, 2013; Zeng, 2015). In the African context, FIAS in their report in 2008 mentioned that some economic zones were failed to achieve the development objectives behind establishing these zones because almost of the same reasons. Noted that most countries that appeared to have a progressive step towards the dynamic potential of the economic zone faced enormous challenges such as: i) the ineffective business environment; ii) poor strategic plans; iii) poor institutional, legal and regulatory framework; iv) lack of experts and poor operational zone

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[3] This development objective correlated with most of the SEZs that were established in China as mentioned by Zheng, et. al, (2016).

management; v) poor infrastructure; vi) the government failure to maintain their commitment to zones; vii) failure to tackle land ownership and resettlement issues (Zeng, 2016). Therefore, ADB (2015) claimed that successful SEZs should have common features that include the following:

- A strong government with a high commitment and consistency policies.

- A transparent and efficient institutional system.

- A strategic location that connect between resources and major trading destinations.

- Abundancy of labor supply and cheap factory sites.

- A service sector that supports high technologies and various facilities such as research and development centers as well as training and recreational centers.

- A national development strategy that integrates economic zones to have a broad national wide influence.

2.1.1. Types of SEZ incentives

One of the main features that can differentiates these zones from enterprises operate in the rest of the economy is the incentives the country offers to SEZ enterprises. These distinct incentives classify into two types: the tax incentives and non-tax incentives. The tax incentive is a significant instrument to attract investors in the zone as it eliminates the investors tax liabilities (OECD, 2017). These incentives can be categorized into the following (Owens, 2005):

1. Tax incentives

2. Subsidies

3. Administrative incentives and other facilities

The Tax incentives such as

- Tax holiday (this is an exemption from paying corporate tax income or other possible taxes for a certain period of time).

- Custom duties exemption (this is an exemption from paying import and/or export taxes that is collected by the customs authorities on raw materials, components and capital goods).

- Value-added tax (VAT) refunds (this consumption tax can be claimed back by the tax payer at any stage later, and most of the country that has a duty-free tax has an exemption from import VAT).

- Property tax exemption / reduction (this reduction or exemption applies on the real estate property).

- Personal income tax and social security reductions (this reduction used sometimes to encourage investments in regions with high unemployment rates).

While the Subsidies could be indirect subsidies like the special grants for training or direct subsidies like providing water or electricity supply at low prices than the market rates.

The administrative and other facilities or the non-tax incentive is an important inducement as well to attract investments in the zones; nevertheless, its impact may differ according to the circumstances and the types of the tax incentives offered. This type of incentive includes various services that enhance streamlined administrative procedures, the provision of infrastructure, and the simplified legal and regulatory requirements such as: the fast track customs services, the simplified licenses procedures, the export promotion services, and the one stop shop for governmental services (Farole, 2011).

2.1.2. Impact of different SEZs types on the Country economic prosperity

Some scholars discussed the failure of SEZs to promote the development in host countries. As a result, there are several forms of SEZs with different objectives have emerged throughout the years to match with the country economic situations (Aggarwal, 2012). Export processing zone (EPZ) is considered to be the traditional SEZs that is widely spread across the developing world in the past four decades, and it was one of the successful models that flourished in several countries such as: China, Taiwan, Vietnam, Korea, Bangladesh, Mauritius, Dominican Republic, El-Salvador (Zeng, 2015). EPZ established mainly to attract foreign direct investments and increase exports, and this accordingly promotes the economic growth through opening new international markets to the domestic industries and increasing the foreign currency which reduces the pressure over the country to balance payments (Quaicoe, Aboagye, & Bokpin, 2017).

As mentioned previously, number of EPZ has grown rapidly after the Irish performance in the Shannon that has exploded the idea of developing economic zones in Europe. After then, East Asia and Latin America have established these economic zones to attract international investment towards the high labor-intensive industries (FIAS, 2008). While after the modernization of the economy of the host country, SEZs have become a mechanism for integrated local markets to stimulate a balanced economic development. For this reason, hybrid EPZ emerged and has become the most preferable model among some European and Latin American countries because hybrid EPZ attempts to encourage the backward linkage with the domestic market on a small scale (FIAS, 2008). By 1980, large-scale of special economic zones have established in China, and they started to gain popularity due to globalization and trade

liberalization. Subsequently, most of special economic zones or industrial parks become linked to the liberal economy and this become a new SEZs feature to cope with global economic changes (Zeng, 2015). Subsequently, special economic zone has become a cornerstone on the new policies that enhance the global market integration through an export-led growth policy instead of the old policies that rely on import substitution (FIAS, 2008). Lately, many countries started to move toward the modern SEZs which have more linkage with the local economy and less reliance on incentives (Zeng, 2015). Across all these transformations, the characteristics of SEZs have evolved throughout the last two decades based on major development trends that driven to fit the economic conditions of the country.

Aggarwal (2012) has defined several dimensions that examine the evolution of SEZs in terms of the following:

- The zone development objectives.
- Zone ownership.
- Policy packages in the zone.
- The services provided in this area.
- The economic activity compositions.
- The geographical spread.
- The linkages of zone with the rest of the economy.

The location and ownership of the zone, for instance, is one of the things that has changed the traditional concept of the free zone. In the past, the location of the zone was constrained to relatively remote areas that developed and managed by the government bodies. Instead the government started to expand the development on the country level and assign private groups to govern the zone. This change happened due to the failure of the government to operate many of their zones. Perhaps the most notable way to assess the success of these economic zones in the host country is through assessing the extent to which these zones have achieved their development objectives. These development objectives in general includes two major types of benefits that host country can gain, as showed in table 1, the direct benefits (static/ quantitative benefits), and the indirect benefits (dynamic/ qualitative benefits). The direct benefits are the benefits that the host country gain directly from establishing these economic zones. It includes the following: enhancing FDI, increasing employment opportunities, increasing the governmental revenues, and boost the exports. While the dynamic benefits encompass: economic diversification, skills upgrading, technological transfer, productivity enhancement of the local business, and green growth.

Table 1:The Potential Benefits of a Successful SEZ Strategy

Direct Benefit (Static)	Indirect Benefit (Dynamic)
Enhancing the Foreign direct investment (FDI)	Technological transfer and skills upgrading
Job creation	Export diversification
Government revenues	Improve the trade of the local market
Entice exports	Testing field for extensive economic reform (policy experimentation)
Foreign exchange earnings	The country green growth

Source: Reproduced from White,2011; Zeng 2016

2.1.3. SEZ categories

As previously mentioned, there are numerous types of zones that subsumed under the SEZs terminology. This section will cover the main types of zones that are emerged lately in detail. There is no single universally accepted classification of SEZs. However, the most common way followed to group zone typologies is the one that classified SEZs based on zone development objectives (OECD, 2017). Accordingly, FIAS (2008), divided special economic zone into six types as shown in table 2: Free Trade Zones, Export Processing Zone, Enterprise Zones, Free Port, Single Factory EPZ, and Specialized Zones.

- **Free trade Zone (FTZ)**

Free trade zone (FTZ) is showed up as one of famous special economic zone programs, and it is well-known as the commercial free zone. This zone type is a fenced zone that has its warehousing, distribution facilities for trade and transshipment, providing duty-free services.

- **Export Processing Zone (EPZ)**

Export Processing Zone (EPZ) is an industrial area that is oriented for the foreign markets as goods enters for processing to be exported. Meanwhile, there is a hybrid EPZ type that is subdivided into: the separate zones that encourage exports-oriented activities and the general zones that opened to all industries.

- **Enterprise zones**

Enterprise zones are directed towards the revitalization of poor urban and rural areas through offering a tax incentive and financial grants.

- **Free Port**

Free Port is a large area that provide incentives to serve all types of activities such as tourism and retail sale.

- **Single Factory EPZ**

Single Factory EPZ intended to provide incentives to entrepreneurs regardless their location. This is means that these enterprises do not have to developed inside the designated areas to receive incentives and benefits.

- **Specialized zone**

Specialized zone includes the technology /science parks, petrochemical zones, financial services, logistic parks, ICT zone and airport-based zone (FIAS, 2008; Goyal, 2016).

However, all these SEZs typologies are not an exhaustive list. Some studies (OECD, 2017) did not cover industrial and technological parks under the SEZs general classifications whereas others scholars have considered them as a special economic zone. One of these scholars is Zeng (2016) who stated three more forms of the SEZs as follow:

- **The comprehensive special economic zone** which is considered to be a large size zone and, in some cases, it could include a whole city such as Shenzhen city in China. These zones have a multi functionals towards industrial, service activities and urban amenity operations.

- **The industrial parks or zones**, this is a large manufacturing sites that is similar to the comprehensive special economic zone, but at a smaller scale.

- **Eco-industrial parks (EIP),** this zone type focuses on improving the environmental performance of the firm that locates inside these zones using green technologies to achieve energy and resource efficiency.

Table 2: Main SEZs Types

Type of zone	Objective	Market	Activities
Free Trade Zone (Commercial Free Zone)	Support trade	Domestic and re-export	Trade related activities
EPZ (Hybrid/ Traditional)	Export manufacturing	Hybrid EPZ (exports and domestic). Traditional EPZ (mostly export).	Manufacturing and processing
Freeports	Integrated development	Domestic and export	Multi-use
Enterprise Zone	Urban revitalization	Domestic	Multi-use
Single Factory EPZ	Export manufacturing	Export market	Manufacturing and process
Specialized Zone	Promote trade and manufacturing depending on the type of the zone	Domestic and export	Multi-use

Source: Reprinted from FIAS, 2008

Academically, most attention in previous academic papers were focused on three special economic zones' types that established to entice exports, attract investments and increase the job opportunities (Farole, 2011).

- **Commercial Free Zone or Free trade Zone** that concentrates only on transit, logistic and commercial activities. This zone type existed for centuries on the international trade routes to enhance what is so-called "entrepôt trade" that acts as a city-wide zone that permits storage, exhibition, classification, selection and repackaging free of duty (Farole, 2011; Aggarwal, 2012). Thereby, this type of zone was not able to affect tax rates and trade classification.
- **Export Processing Zone** that focuses on manufacturing to increase exports and enhance the efficiency of trade.
- **Large-Scale Special Economic Zone** that combines between the commercial activities and multi industrial uses (Farole, 2011).

Thus, special economic zones are various and it is difficult to categories them under certain categories since these zones do not have unified specifications that are applied throughout the world. This is actually caused due to the zone development objectives evolution based on the situation of the country. However, the only thing that distinguish these pre-defined zone territories is that they have a special regulatory framework and incentive regime that is differ from the rest of the economy (OECD, 2017).

2.1.4. SEZs Evolution

Notably, previous analysis presented indicated that there is a wide variety of SEZs types; that have different zone configurations in terms of the zone ownership, management, size, economic and industrial activity, location, development objectives, and preferential policy (Meng, 2005). In this context, Zeng (2016) and other scholars (Kechichian and Jeong, 2016) portrayed the evolution of the economic zone types in to three shapes. These three shapes described how SEZs evolved over time from being an enclave zone to an eco-friendly zone that addresses various environmental sustainability issues. This is remarkably important during this period of time whereby global climate change issues are accelerating. Therefore, Zeng (2016) presented the evolution of SEZs or industrial parks as follows:

Zones 1.0

This is the early stage of SEZs that is called the first generation SEZs (Aggarwal, 2012). This zone was developed mainly by low costs and labor-intensive industries to entice exports and encourage FDI and employment, but it accomplished limited success. However, this zone type

was considered as enclaves since most of these zones failed to have much linkage with the domestic economy. After then, many countries moved to the contemporary model (zone 2.0) of the SEZs due to the global macroeconomic changes.

Zones 2.0

This type of zone is the second generation of SEZs. It is a multifunctional zone that is emerged in countries with relatively high developed economies (Aggarwal, 2012). It has less dependency on incentives, and this type is connected more with the domestic markets. Some countries used this type of zones to test their transition to the market-oriented economy which played an important role in accelerating the country economic growth in most of the East Asian and Latin American countries.

Zones 3.0

This type of zone has integrated the experience of the zone 1.0 and 2.0. It aims to enhance the environmental sustainability based on high technology intensives. This zone type could have different names such as: low carbon zones or parks; green zones; sustainable industrial areas; eco-towns; and circular economy zone. All of these zones are sharing the same vision toward achieving resource and energy efficiency for holistic development in the countries (Kechichian and Jeong, 2016). Eco-industrial parks (EIP) is the most renowned name globally. It is considered to be a significant model that can support sustainable development or what is called green growth. Recently, china and japan boosted their efforts to promote the expansion of the EIPs model through national policies in order to increase the countries' global competitiveness as they have become a contemporary approach that reinforce industrial activities throughout the world (Kechichian and Jeong, 2016).

2.2. Theoretical Perspectives behind Establishing SEZs

2.2.1. Economic and Social theories

Host countries bear several costs to establish SEZs in order to gain more benefits (Aggarwal, 2012); hence, several theoretical studies have expanded their empirical and analytical work to estimate the benefit gained by establishing SEZs. Madani (1999), stated three effective methodologies to evaluate the contribution of SEZs to host country. These three main methods are:

1. The neo-classical theory
2. The cost-benefit analysis
3. The growth theory

- **Neo-classical theory**

The neo-classical theory was originated from Heckscher-Ohlin trade model (2 goods 2 factors - labor and capital- and 2 country framework) and assessed by the Rybczynski effect model, claiming that EPZs have a negative impact on the welfare of the country (Hamada, 1974). Most theoretical contributions till 1990s that aimed to analyze the circumstances in which SEZs can influence the country national income and change its productivity patterns were based on Heckscher-Ohlin trade model (Quaicoe, Aboagye & Bokpin, 2017). Heckscher-Ohlin trade model is supporting the enrichment of international trade and global benefits where country exports products that use intensively the resources which are relatively abundant in the country, while it imports the goods that use intensively the resources which are scarce in the mentioned country (Madani, 1999). Earlier, Hamada (1974) presents a pioneering framework to analyze the welfare impact of these economic zones using the effect of the Rybczynski model with the findings of Heckscher-Ohlin trade model. He argued that EPZs have a negative impact on the country welfare as establishing free zone in a full employment country with a labor abundance means that these economic zones will not affect the country productivity if it failed to attract foreign investment. And if it succeeds to attract FDI, this will have an adverse welfare affect toward capital-intensive production that will work against the country comparative advantage as predicated by Rybczynski. Moreover, he claimed that increasing the foreign direct investment (FDI) in these zones means that the country withdraws its labors from local industries to operate foreign capital. This practice ends by decreasing the labor-intensity who working in the domestic market, distorting the productivity of the local goods from its comparative efficiency (Madani, 1999; Quaicoe, Aboagye & Bokpin, 2017). In 1995, Devereux expanded Hamada's study, adding the volume of trade to measure the trade effect, finding that exports processing zones can increase the welfare of the country under different spectrum of conditions much wider than previously thought (Quaicoe, Aboagye & Bokpin, 2017). However, Warr (1987) dismissed the neo-classical theory that is based on the Heckscher-Ohlin model of production, arguing that EPZ is not necessarily has an adverse welfare impact on the countries. Similarly, Madani (1999) criticized the theory, stating that most of goods produced by the EPZs are intermediate products whereas Heckscher-Ohlin model is depending on final goods (Quaicoe, Aboagye & Bokpin, 2017).

- **Cost-benefit approach**

The cost-benefit approach is considered to be the second instrument that is commonly used to evaluate the impact of the special economic zone through assessing all the costs and benefits related to establishing SEZs (Warr, 1987; Madani, 1999; Quaicoe, Aboagye & Bokpin, 2017). Warr, (1987) supported the efficiency of using the cost–benefit methodology to evaluate the performance of EPZs, finding that EPZ is a development instrument. However, in his study 1989, he considered EPZs as a good tool for development but it has a limited impact on promoting exports (Warr, 1989). Later, Madani, (1999), claimed that this process bedeviled with various problems due to the lack of information required for the analysis and the incorrect assumptions related to the rate of return to capital. Thus, he recommended using the net present values of all the revenues and costs when employing the cost benefit approach (Quaicoe, Aboagye & Bokpin, 2017).

- **New Growth Theory**

Obviously, the new growth theory was developed to tackle the drawbacks of the neo-classical approach (Madani, 1999; Quaicoe, Aboagye & Bokpin, 2017) that aimed to analysis EPZ based on the FDI spillover on local economies. This model attempts to spot the light on the indirect effects of FDI, confirming that EPZ has affected the host country positively. Johansson (1994), affirmed that local industries have limited internal and external resources that can be provided by FDI as domestic firms lack its access to international distribution channels. All these obstacles were hindering the expansion of domestic industries internationally. Therefore, EPZ addressed these challenges through opening channels for collaboration with domestic exporters, claiming that EPZ in such framework may become more beneficial than before. This suggest that the new growth theory attempted to expand the impact of EPZ to enhance the country economic growth (Johansson, 1994; Quaicoe, Aboagye & Bokpin, 2017).

Further, new growth theory highlighted the significant impact of FDI on the quality of the human capital that enhance productivity through improving health, acquiring knowledge and development skills which means higher output, higher income per capita and wellbeing (Ranis, Stewart and Ramirez 2000). In this regard, Sharma & Gani (2007) pointed to the key role of FDI in promoting such attributes which accordingly make a critical contribution to economic growth.

- **Another theory for SEZs investments**

The theoretical debates continue, and more stream of literatures have generated focusing on modeling place-based subsidies on investments, employment, and wages at the firm level (see among Lynch & Zax, 2011; Criscuolo, Martin, Overman, & Reenen, 2012), arguing that place-

based incentives reduce the firms cost of capital and encourage investments that would not be allowed otherwise. accordingly, these investments will have an impact on output, productivity and employment (Zheng, et. al, 2016). Noting that Manamba Epaphra, (2016) affirmed also that investment affect the economic growth by two ways. Firstly, increasing the demand on the investment will increase goods and this accordingly will affect the economic growth, providing that this demand should not be satisfied by import. Secondly, these investments increase factories and equipment that have high technologies to promote the productivity and faster the economic growth of the country.

- **Theories for Employment in SEZs**

Special economic zones displayed as an instrument for promoting employment. Aggarwal has concluded that the benefits of SEZs can be evaluated in terms of some macroeconomic parameters that include employment (Aggarwal, 2012). And in 2007, Aggarwal claimed that employment in SEZs improves the workers' quality of life and their productivity, mentioning three employment effects in SEZs. Firstly, SEZS are generating direct employment for skilled and unskilled workers. In developing countries most of SEZs attract investments for labor-intensive activities creating job opportunities to unskilled labors whereas by growing the value-added activities in other SEZs, it generated job opportunities for skilled labors as well. Secondly, SEZs are generating indirect employment in other sectors of economy as a result of their operation with SEZs. Pointed that these effects a line with the Okun's law which investigated statistically the relationship between economic growth and unemployment, explaining that the country output is depending on the number of workers used in this production process. This means that increasing the output requires employment to be increased (Aggarwal, 2007). Lastly, SEZs are generating employment for women. Since most of the employers in these zones preferred to hire females than males, believing that female workers have greater discipline and patience that make them more suitable for unskilled and semi-skilled activities that carried out in most of SEZs.

2.2.2. Environmental Quality

- **EKC Hypothesis**

Theoretically, Environmental Kuznets Curve Hypothesis (EKC) is the most notable theory that attempted to find a relationship between economic growth and its impact on the environment, suggesting that this relationship is not linear as it is a U shape curve. This means that increasing economic growth will increase its environmental impacts until it reaches to a point at which the environmental impacts will stabilize and start to decrease while economic growth will continue

(Almeida et.al., 2017). The first one observed this issue was Grossman and Krueger (1991) during investigating the North American free trade agreement (NAFTA), reporting that environmental degradation increases with economic growth while after a point of time the correlation changes. This theory was based on an original principle developed by kuznet (1955) who attempts to find a relationship between economic growth and income inequality, then it proliferated among scholars, attempting to confirm or reject the EKC hypothesis. It can be concluded that most of literatures have failed to find a monotonic relationship between income or GDP and various pollutants. Some studies agreed with the EKC hypothesis only on the long run (Ahmeda and Long, 2012) whereas others like Zhao et al. (2013); get an opposite conclusion. Moreover, some reported an N-shape pattern not a U shape curve (Egli and Steger, 2007; Babu and Datta, 2013).

Traditionally, economic growth was seen as a it is an alternative for the environmental sustainability. Beckerman (1992), stated that there is a clear evidence that at the beginning of the economic growth, it is accompanied by an environmental degradation and probably the only way to improve environmental degradation in most countries is to become a rich. Thus, some scholars used a single environmental pollutants variable such as: industrial waste, deforestation, farmland conversion and energy consumption in many empirical studies to measure the impact of economic growth on the ecological system. While others used different set of pollutants indices as they are criticizing the use of a single environmental index, claiming that it explains few aspects of environmental pollution without explaining the whole environmental pollution level. Instead, they recommend the use of variable that can capture the influence of several environmental dimensions such as: The Composite Index of Environmental Performance (CIEP), Environmental Pollution Index (EPI), Environmental Quality Index (EQI), Environmental Degradation Index (EDI), Multiple Indicators Multiple Causes (MIMIC), Environmental Pollution Index (EPI) (Brajer et al., 2011; Xiaoyu et al., 2011; Babu and Datta, 2013; Buehn and Farzanegan, 2013; Abou-Ali and Abdelfat-tah, 2013; Almeida et.al., 2017). In general, most of these environmental composite indices that used to assess the EKC hypothesis, utilized income (Raunikar and Buongiorno, 2008) and GDP growth rate as proxy for economic growth. This is to measure the economic growth impacts on the ecosystem; however, most of the results on the EKC hypothesis are still inconsistent (Almeida et.al., 2017), and the majority of scholars that used environmental composite indices, focusing on air have found various conclusions. In the Chinese context, Brajer et al., (2011) used a new index depending on the health impacts of the pollutants to display an evidence for EKC hypothesis in 139 Chinese cities, observing an inverted U-shaped relationship between income and other pollutants. Moreover, Xiaoyu et al.,

(2011), used EPI to test the overall pollution level in 30 Chinese provinces, finding an inverted U-shaped relationship. Similarly, in the international context, Buehn and Farzanegan, (2013) &AbouAli and Abdelfattah, (2013) have investigated relationship between the economic growth and environmental quality, reporting an inverted U-shaped relation. In contrary in the developing countries, Babu and Datta, (2013) have reported an inverted N-shaped pollution-income relation which indicates that pollution eventually increases with income. Further, using a single environmental index also failed to define the impacts of the economic growth on the environment, showing unclear results. Giles and Mosk (2003), using the methane emissions in New Zealand, finding an M-shaped EKC pattern which implies that at the peak of pollution, pollution will start to decline. Kaika & Zervas, (2013) stated that large part of studies that used CO_2 emissions to measure the impact of economic growth in the ecological system such as Schmalensee et al.,1998; Galeotti and Lanza,1999; Panayotou et al.,2000; Cole, 2004; Jalil and Mahmud, 2009; Narayan and Narayan, 2010 reported that economic growth is not decreasing emissions as it is related to the energy consumed to achieve such economic development.

- **Pollution Haven Hypothesis and Pollution Halo Hypothesis**

Importantly, the classical economic theory has affirmed the key role that FDI plays in developing countries in terms of enhancing the quality of environment in host countries. This is though supporting technological advancement and satisfying capital gap as FDI is a complex of networks that includes capital, technologies, organization, and marketing, and it requires a high fixed cost. Thus, enterprises used FDI mainly to shorten the capital gap, resulting in promoting horizontal spillover within the industry and vertically among industries in the domestic market of host countries. This accordingly will enhance the productivity and economic growth which may attached by deteriorating ecological system (Yang Zhou, 2018). For this reason, pollution haven hypothesis (PHH) stated that foreign direct investment in China leads the industrial advancement that assisted in polluting the local environment and generating what is called a "pollution paradise". PHH or the Pollution Shelter Hypothesis was proposed by Copeland and Tylor in 1994, arguing that pollutant industries after trade liberalization and globalization will be moved from rich countries (developed countries) to poor countries (developing countries) that have less regulated environmental policies (Aliyu, 2005). However, as per the pollution halo hypothesis, FDI may have favorable impact on the environment of the host country through promoting clean technologies that support the environmental management system (Jorgenson et al., 2007; Atici, 2012; Zhu et al., 2016).

2.3. Empirical Literature

2.3.1. Economic and social impacts of the SEZs

ADB claimed that there are three different special economic zones with three different purposes. The first type is-the most common one-the enclaves that helped in creating employment and increased the foreign exchange revenues, and this type was found in Cambodia. The second type of zone is the one that linked these economic zones with the domestic economy and it enhanced exports diversity like zones in Malaysia and Thailand. The third zone type is the one that fostered the productivity through domestic markets linkage with SEZs, skill development, enhancing high technologies, knowledge-based economy and innovation, and this happened through certain reforms in the service sector and the labor market. This zone type found largely in China and Korea. (ADB, 2015). Thus, most of the empirical studies evaluated the performance of SEZs and EPZ in regards to generating employment, attracting FDI, transferring technology, enhancing economic growth, and boosting the backward and forward linkage (Graham 2004; Arunachalam, 2009; Das, 2009; Palit & Bhattacharjee. 2009; Aggarwal 2012; Zheng, et. al, 2016).

This started with Wong & Chu, 1984, who assessed the role of several EPZs and SEZs in reinforcing regional development, attracting FDI, generating employment, transferring technologies, increasing exports, as well as enhancing foreign exchange earnings, and backwards and forward linkage. Though, lack of data was the main reason that hindered this comprehensive empirical analysis, affirming that SEZs in some countries encountered several problems such as the inefficiency of the governmental management, insufficiency of the provision of infrastructure, the vulnerability of SEZs to the changing conditions in the international economy, the exploitation of the indigenous and female labor force. Thus, Wong & Chu, (1984) asserted that there is an interest to continue establishing SEZs that attract new technologies and it still requires more empirical research to assess the definite role of such zones. Recently, Graham (2004) examined the role of EPZ in attracting FDI to China, finding that EPZ has a successful impact in attracting FDI in China. Similarly, Olson et al., (2014) who studied the effect of EPZs on the economic growth of the country through steering the country's exports, asserting that SEZs is an effective engine for economic growth. And it ends up by Zheng, et. al who find out that economic zones played a vital role in promoting industrial development in high industrialized areas like Guangdong, as a result it had slightly positive impact on the economic performance of the host cities relative to the less industrialized areas (Zheng, et. al, 2016).

In 1980, SEZs in Asia were used as a tool to enhance the growth of many countries. China for instance opened its hand to the world trade, establishing its SEZs to serve as a transition for implementing capitalization and enhancing the economy liberalization. Moreover, most of the successful performance that china experienced throughout the past years is often attributed to the success of the SEZs. As shown in the literature, China was not the first to utilize SEZs and EPZs as a strategy for enhancing the growth of the country. India for instance used SEZs as a development tool to enhance export, but their performance was considerably low as it reduced the Indian share in the world trade from 2% in 1950 to 0.5 % in 1980. This is because India this time was not possess sufficient trade liberalization policies to support the success of SEZs. This agreed with Leong's (2013) results that showed that the existence of the SEZs in China and India increased the regional economic growth depending on the economy liberalization policies rather than an increase in the number of SEZs in the country. As statistical results showed, increasing the number of special economic zones in both China and India has no significant effect on the country's growth and the only thing that matters to faster the economic growth is the degree of economy liberalization in these countries (Leong, 2013).

As a result of the inconsistency of the SEZs performances among countries, various scholars started to study the impacts of SEZs in some countries on the economic growth using quantitative parameters such as FDI, exports, investments and employment. One of those researchers is Leong (2013) who attempted to understand the role of SEZs on fostering economic growth in China and India, using log GDP as a regressor on log FDI, dummy variable of trade liberalization, number of SEZs or EPZs in each country, and log exports. As a result, he concluded that exports and FDI have a significant positive effect on the economic growth in both countries (Leong, 2013). Similarly, ADB (2015) who stated that SEZs in Asian economies have affected the performance of the exports and the volume of the foreign direct investment positively. Meanwhile, ADB (2015), reported that increasing the number of the SEZs among Asian economies, increases the manufactured exports by 1.1% on average. This complies with ADB's literature (2015) that SEZs exports have significantly affected the national exports in many Asian countries. For instance, SEZs' exports have increased the national exports by 67 percent in Sri Lanka in 2007; 49 percent in Philippines in 2011; 44 percent in china in 2012; and 17 percent in Bangladesh in 2013. However, many analytical and empirical approaches had a mixed result when they used to assess the impact of the SEZs on the exports' magnitude and diversity (The World Bank, 2017). Meanwhile, the literature of several studies (Klemm and Parys 2012; ADB, 2015; The World Bank, 2017), demonstrated the role that SEZs played in attract more FDI to the country, and how these foreign direct investments promote economic

growth through encouraging the growth of the domestic economies and enhancing technological and knowledge transfer. Klemm and Parys (2012), stated that increasing FDI in Latin America and the Caribbean but not in Africa, was driven by the SEZ policies that support the tax incentives in these zones. This means that longer tax holidays and lower corporate income tax rate applied in these countries were an effective tool for attracting more foreign direct investment that promotes the country growth in return (The world bank, 2017). Furthermore, Wang (2013) concluded that in Chinese municipalities that are located near to SEZs have increased its FDI per capital by 58 percent on average which means that SEZs have a strong positive influence on the per capita FDI. Likewise, Centre for Development and Enterprise (CDE) (2012) has affirmed that 32 percent of the FDI in 2004 invested in SEZs and 41 percent of the world's exports come from SEZs. Therefore, all these studies confirm the significant impact of SEZs on enhancing mainly FDI and promoting economic growth. In term of employment generation, most of the literatures clustered in Asia and America, demonstrated that SEZs do play a significant impact in employment creation (FIAS, 2008; Agrawal 2012; ADB, 2015). Per the ADB (2015) in the most recent count, the special economic zones have increased from around 500 zones in 1995 to be almost 4300 zone in 130 countries that employed over 68 million workers.

- **FDI and Employment Literature**

Specifically, in terms of the impact of investment and employment on economic growth, some scholars investigated the impact of investment in general on economic growth (Sampath, 1999; Kira, 2013; Manamba Epaphra, 2016) whereas other studies (Hu, 2007; Zheng, et. al, 2016: Quaicoe, Aboagye & Bokpin, 2017) examined the impact of the SEZs investments and employment in SEZs on the economic growth. First is Zheng, et. al (2016) who attempts to examine the impact of development zones investments and employments on the economic growth of the host region using all the development zones on the national level and the all the development zones in Guangdong Province. As a result, he concluded that SEZs investment and employment in SEZs have a positive impact on the GDP of local economies. Similarly, Hu, (2007) reported that FDI in economic and technological zones have a positive impact on the local economies. Furthermore, Ranis, Stewart and Ramirez (2000), concluded that there is a strong relationship between economic growth and human development. As improving the human capital improves the economic growth; meanwhile, economic development provides human capital with the resources required for sustaining the human development. In this context, Sharma & Gani (2007) found that FDI has a significant impact on the human development as a result of the positive effect of FDI on the economic growth in the host countries. On the other

hand, Quaicoe, Aboagye & Bokpin, (2017), stated that EPZs investments has significant negative impact on the economic growth in Ghana. While generally, investment has affirmed to have an impact on the economic growth especially in Asia (Manamba Epaphra, 2016). However, Kira, (2013) found that investments in Tanzania has not a significant influence on the economy.

2.3.2. Environmental impacts of SEZs

Industry is a manmade activity that could generate waste and/or pollution, and Special economic zone globally is dominated by industrial activities. This accordingly make these zones far from achieving environmental sustainability because of two issues. The first issue is the high amount of hazardous waste that is generated from different industrial activities (Aivalioti, Cossu, & Gidarakos, 2014; Zhang & Chen, 2018). Traditionally, industrial waste defined as the unwanted material that is produced by industrial activities such as mining, manufacturing, and emission treatment processes (Aivalioti, Cossu, & Gidarakos, 2014). This spectrum of substances is treated as a waste not a resource that can be used later. This makes industrial waste a problem, influencing surrounding environment and human well-being (Zhang & Chen, 2018). The second issue is the amount of energy required either for production or for the disposal of waste. This is asserted by the European Environment Agency (EEA) (2013) & Eurostat (2017), who reported that industrial sector is one of the most energy consuming sectors throughout the world (Zhang & Chen, 2018). Furthermore, throughout the past period, industrial societies dealt with waste/pollution using controls and regulations. However, this is no longer sufficient to achieve the sustainability in zone. China for instance, is one of the largest industrial country in the world, in 2010, it has generated 2409.4 million tons of industrial solid waste. In 2014, this amount increased to be 3256.2 million tons of industrial solid waste. Today, Chinese government is attempting to find an effective way to address the industrial impacts on the environment (Zhang & Chen, 2018); thus, the question here how this could happen? In this regards, two new practices have defined in response to the question of how industrial park can operate in a sustainable manner? The first clue is the cleaner production (CP) concept which announced for the first time in 1989 by the United Nation Environment Program (UNEP) in order to find a way for industries to operate in a sustainable way. Moreover, Haggar (2007) reported that CP is "continuous application of an integrated, preventative environmental strategy to processes products and services to increase eco-efficiency and reduce risks to humans and the environment" (UNEP,1997). Hence, CP is a preventive approach that react with the economic growth unless it is sustainable. This new concept encourages efficient utilization of the resources in order to reduce the environmental pollutions and improve health and security. This means that this

concept integrates between the economic profitability, environmental protection, and industrial efficiency through redesigning for processes, products, and services that complies with the sustainable development aspects. The second clue to sustain development in industrial parks is through the industrial symbiosis (IS) concept practices. IS is a collaborative strategy that aims to connect between separated industries to achieve competitive advantage through the physical exchange of materials, energy, water and by-products. Hence, this practice will reduce the amount of resources required to extract, result in less depletion for the environmental services (Chertow, 2000; Costa, Massard & Agarwal, 2010). Kalundborg is one of the well-known cities among most of the industrial ecologists, that established in 1961. This small city that is located in island of Seeland, 75 miles west of Copenhagen has succeed to innovate the first recycle network among four industries. These industries are feeding on each other through transforming their wastes into useful inputs or a by-product to other industry (Haggar, 2007).

- **FDI and carbon emission**

Supporting the pollution halo hypothesis, Atici (2012) has concluded that FDI has contribute to reducing the pollution in Asian. Furthermore, Jorgenson et al. (2007) used data for 39 countries from 1975 to 2000 to examine the relationship between the FDI and carbon emissions, finding that FDI has a significant negative impact on the carbon emission in host countries. Similarly, Zhu et al. (2016) attempted to use panel data for Malaysia, India, the Philippines, Thailand, and Singapore for period 1981–2011, revealing that the FDI's effects on carbon emissions was negative in countries with medium and high carbon emissions. In contrary, Yang Zhou, (2018) examined the impacts of different economic elements including FDI on the carbon emissions in China, reporting that FDI has increased the carbon emission in the Chinese cities as a result of the implicit trade carbon. As per the heterogeneous corporate trade theory, companies with high amount of FDI bear higher fixed costs in order to increase the productivity of the companies. Thus, most of the traditional scholars argued that FDI worsen the environment.

2.4. Sustainable development in SEZs

Indeed, after economic-social marginalization and environmental deterioration that accelerated globally, it was clear that current strategies that confront challenges caused by the unsustainable development has to be amended. And it was clear that sustainable development concept was no longer an option, but it is a must. Question a rise in this context, what is sustainable development? The World Commission on Environment and Development (WECD) that was established in 1986, defined sustainable development as the development that is

required today to meet people's demands without compromising the capability of the next generations to fulfill their own needs. This means that enhancing the sustainable development in a country required common commitments towards achieving a steady socio-economic growth while preserving limited ecological resources. Therefore, sustainable development aims to accomplish three main objectives (Essays, UK, 2018):

•   The economic sustainability which aims to maintain the capital which generates economic prosperity.

•   The social sustainability which refers to the capability of the society to enhance the social cohesion and integration.

•   The environmental sustainability refers to the capacity of the ecological system to continue into the future.

Still, there is a misconception that protecting the environment should affect inevitability the economic development of the countries as people still assumes that environmental protection is an expensive activity and it is a burden for investments and developments. However, this is not true as sustainable development is the development that take into consideration economic, social and environmental factors (Pandian, 2013). And one of the sustainable development goals is to improve the economic development without polluting the environment (Haggar, 2007). Thus, a new SEZs type has emerged aiming to enhance the economic development without affecting the social and environmental sustainability, called Eco-industrial parks (EIP). EIP is a form of industrial community that attempts to operate in regards to the industrial ecology as mentioned before in the SEZs typologies section. Inside these parks, all wastes and emission are either reused or retreated to assure the environmental sustainability of the zone. Per Haggar, (2007), EIP is the most efficient way to achieve economic, social, environmental and governmental benefits. Economically, EIP could reduce several costs (raw material and energy costs, treatment costs, and waste management costs), increase competitiveness in the global markets and improve the image of the companies operates in these zones. Socially, EIP could generate new job opportunities through enhancing local utilization and management of natural resources, increasing the collaboration among different industries. Environmentally, EIP could reduce waste and emission, make finite resources renewable. Institutionally, it can reduce environmental degradation costs, eliminate the demand on natural resources which will reduce the demand on municipal infrastructure and increase governmental revenues. Therefore, EIP is the zone that has the capability to make the environment, the economic and social development sustainable. "Sino-Singapore Suzhou Industrial Park (SIP) is a Garden-like, Modern Industrial Town" is this how Zeng (2016) describe SEZ in Singapore. Globally, EIP

succeed to reduce the operational costs as well as the greenhouse gas emission to drive multiple benefits for all through using cleaner production technologies that avoid pollutions that is caused by most of the traditional zones. In Chittagong Export Processing Zone (CEPZ), Bangladesh was able to eliminate the GHG emission by 244 ton on a yearly basis and avoid consuming 331 megawatts of energy by installing 785 electric poles working with solar power to provide lighting in this zone (Zeng, 2016). In south Vietnam, they encouraged an environmental leadership that assisted shoe factory that will produce Nike trainers later to consume 18% less electricity and 53% less water. This suggests that sustainable development promotes economic growth as long as this development will not deplete the environmental resources or cause a social damage.

3. Special Economic Zones: The Egyptian Context

Geographically, Suez Canal plays an important role through linking two oceans (Atlantic, Indian ocean) and two seas (Mediterranean and Red sea), figuring Egypt a regional center that facilitates the international trade. It is the shortest link between the west and the east that has the lowest maritime cost (Dar Group, 2015). Despite the significant location of the Suez Canal region in the world trade route, Egypt was not be able to tackle various socio-economic issues that hinders the development in the country. Every year, Egypt has over 800 thousand unemployed people enter the labor market (USAID, 2018) because there is a mismatch between the number of job applicants and the actual vacancies available in Egypt, resulting in increasing the unemployment rate in Egypt continuously over the past 10 years from 9.3 percent in 2006 to 11.8 percent in 2011 and 13.3 percent in 2014. In regards to the net foreign direct investment, after the Arab spring revolution in 2011, it decreased dramatically from 5.9 percent in 2006 to 0.9 percent in 2011 and 1.5 percent in 2014. Meanwhile, the export of goods and services has decreased between 2006, 2014, from around 30 percent to almost 14 percent (The world bank, 2018). On the other hand, most of the internal migration for work purposes was absorbed by the Suez Canal governorates. Since the highest inflow of migration in Egypt in the previous years are among Port said, Suez, Ismailia by 36.5 percent, 35.75 percent, and 17.4 percent, respectively (Herrera & Badr, 2012). This means that without sustaining the development in the Suez Canal region, Egypt will risk losing the competitive advantage of this area. However, the government still insisting that SEZs are the proper solution for these issues. In this context, it is important to present past governmental initiatives and future development vision that supported the establishment of SEZs in order to tackle several socio-economic issues. In this part, the mentioned aspects will demonstrate, and for achieving this purpose, this chapter has divided into two sections. The first section will illustrate how Egyptian economic zones emerged throughout the past years passing through mega economic events. Moreover, it will display different zone types in Egypt, focusing on the special economic zones in the Suez Canal governorates. The second section will show Egypt's vision towards achieving the sustainable development in the country, demonstrating future initiatives and governmental plans that were declared to the public in regards developing the SCZone.

3.1. Special Economic Zones in Egypt

Most of the national studies claimed that the concept of SEZs or free trade zones has introduced in the second half of the twelfth century in Egypt[4] where Alexandria was a commercial hub in the trade route between Europe and Asia, and the first Egyptian free trade zone was established in 1902[5] (Adly, 2015) after the agreement held between the Egyptian government and the Suez Canal company to expand trade in Port Said port. Based on this agreement the companies were exempted from the customs duties on their imports in that region, and in 1920, they limited the free zone to these areas. Officially, the concept of free zone in Egypt has evolved by issuing law no. 306 in 1952 that regulates free zones work in the country. This law aimed to reduce restrictions on the foreign trade and encourage transit trade. After 1966, new law issued to regulates free zone in Port Said, but after the war in 1969, this zone stopped working. In inception 1970, Egypt attempted to apply the economic openness policy to attract investments and enhance the country's economic development. Thereby, the Egyptian government has issued the following laws: law no. 65 in 1971, law no.43 in 1974, law no. 230 in 1989, law no.8 in 1997, and law no.13 in 2004 to enhance the international trade (Al-Jeddawi, 2004; Adly, 2015). Meanwhile, various trade agreements between Egypt and some economic clusters such as Common Market for Eastern and Southern Africa in 1998 (COMESA), General Agreement on Tariffs and Trade (GATT) in 1970 and Qualified industrial zones agreement in 2004 (QIZ) have signed to adopt the open-door policy, enhance economic liberalization and thereby fosters economic growth (Alexbank & SRM, 2016). According to Adly, (2015), these trade agreements have influenced free zones establishment and the trade movement in Egypt to some without stating whether this impact is positive or negative.

Academically, special economic zone, as mentioned before in the literature, is a generic word that used globally to refer to different types of economic zones that are exempted from paying any kind of customs or tolls on their imports, and their products are treated as an export product when it enters the country (Al-Jeddawi, 2004; Adly, 2015; Abed Mahmoud Gad, nd). Hence, the name of the Egyptian economic zone varied and this illustrates why scholars categorized the Egyptian economic zones differently in their studies.

FIAS (2008) was one of the studies that attempted to analyze the evolution that happened to special economic zones and the economic impacts of these zones over the past 30 years throughout the world. They used the free trade zones terminology as if it is Export Processing

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[4]Arabic studies are the only references stating that SEZs exist in Egypt since the second half of the twelfth century without mentioning that in any of the international sources.

[5] This is even before the establishment of the first modern zone in Brooklyn 1937.

Zone (FIAS, 2008). In the national context, Fattah (2016) used the term special economic zones to refer to all types of economic zones while some scholars utilized the term free zones to refer to these zones: the public free zones, private free zones and special economic zones (Al-Jeddawi, 2004; Abed Mahmoud Gad, nd). However, the rest (Mostafa, 2007; Adly, 2015; Dar Group, 2015) categorized economic zones into two types: the free zones (including the private and the public free zones) and the special economic zone. Per the international literature, Egypt established their economic zone program for the first time in 1974, just after the country's trials to liberalize the economy, with 53 public free zones. These zones targeted markets in the Middle East and Europe, and most of these zones were varied between free trade zone, free port, industrial parks, and qualified industrial zones (QIZ) that based their activities on the apparels and the petrochemicals industries. During1960s and 1970s, free trade zones in Egypt and Jordan were the only zones in the Middle East that were based on manufacturing activities rather than trading activities (FIAS, 2008). They argued that the inefficient performance of these economic zones is caused by two issues. First, the regulatory restrictions that limited the freedom of associations inside these zones is one of the negative issues that has affected the performance of economic zones that was established in Egypt. Second, they claimed that Egyptian free zones in this period prevented the existence of the private sector in developing these areas by law. The government at this period of time was the only one who was responsible for developing, financing, regulating and operating these zones through employing around 4000 workers which is considered to be another matter that negatively affected the performance of these zones in the past (FIAS, 2008).

In Egypt and Suez Canal region, there are three different types of zone: the industrial zones (free zones and non-free zones), the free zones, and the special economic zone (Dar Group, 2015). Each zone has its own system/ incentives, but they have almost the same objectives. As shown in table 3, the income tax percentage deducted in special economic zones is 10 percent of profit among all the activities while the income tax deducted in free zone is only 1 percent for any activity. In traditional industrial zone, it has 20 percent standard tax while land cultivation, poultry, animal, and fish production have 10 years exemption from the income tax. Free zones and special economic zone have the same import duties and export taxes whereas the traditional industrial zone has an export duty that range between 5 to 25 percent of the sales value and an import duty that range between 2 to 32 percent depending on the product. Meanwhile, traditional industrial zone and the free zone have the same payroll tax that is around 10 to 20 percent of the salary level, whereas in the special economic zone, payroll tax is 5% for all the salary level. Moreover, free zone should export about 50 to 80 percent of its

productivity whereas special economic zone has no minimum amount of exports and the whole decision depending on the zone's board of director. This is because goods in SEZ have a full access to the local market only if relevant taxes and duties of product are paid (Dar Group, 2015).

Table 3: Zone Regimes in Egypt

	Traditional Industrial Zone	Free Zone Law No. 8, 1997	Special Economic Zone Law no. 83 of 2002	
			Decree No. 1625/2002	Decree No. 330/2015
Income Tax	Standard rate 20%. Oil and gas 40.55%. 10 years exemption form land cultivation Poultry, animal, and fish production.	For the industrial activities, it is 1% of the value added on the produced good. For the services products, it is 1% of the profit. For the storage purposes, it is 1% of the aggregate value of the ongoing goods.	For all the activities, 10% of profit.	
Export Duties / Sales Tax	Range between 5% - 25% of the sales.	Duty free when exported outside Egypt. when sold in Egypt, duty free on domestic components and 10% on the non-domestic components.	Duty free when exported outside Egypt. when sold in Egypt, duty free on domestic components and 10% on the non-domestic components.	
Payroll Tax	Depending on the salary level: range between 10% - 20%.	Depending on the salary level: range between 10% - 20%.	5% of all the salary levels.	
Import Duties	Range between 2-32%, depending on the product.	Duty free	Duty free	
Export minimum	There is no minimum.	Range between 50% -80% depending on	Depending on the board of the zone.	

		GAFI or the zone board.	
Percentage of Egyptian labor[6]	10 % is the maximum percentage of the foreign labor inside this zone.	The percentage of Egyptian labor should not be less than 75%.	10 % is the maximum percentage of the foreign labor inside this zone. However, this percentage may change, depending on the board of the zone.

Source: Reproduced from Al-Jeddawi, 2004; Dar Group, 2015

3.1.1. Industrial zones

These are the conventional industrial areas that enhance the industrial clustering in one area to have the same access to utility infrastructure, and the same environmental conditions (Dar Group, 2015). These Industrial zones have a tax exemption 5 years on all industries, 10 years for industries that established to enhance urban development in remote areas, and 20 years for industries that will established outside the old delta (Al-Jeddawi, 2004). Within this zone group, there is the Qualified industrial zones (QIZ). This type of zone have a special export incentives and have a duty free entry to the United state market. Products in this zone should have a least 11.7 percent of the products from Israel origin and at least 35 percent from Egyptian origin (Mostafa, 2007; Adly, 2015). In QIZ, there is no quotes on exported products, no restrictions on the type of goods that may have a free access, and the enterprise has freedom to choose to export or not. Under the QIZ programs, there are three zones in Egypt: the greater Cairo zone, the Alexandria, and the Suez canal zone. The greater Cairo zone and the Suez canal zone were expanded in 2005, and the fourth zone has designed in the central delta region (Dar Group, 2015).

3.1.2. Free zones

There is no unified definition for free zones. Some scholars have defined free zones using an inclusive definition while others defined it from commercial perspective or legal perspective. Some researchers focused on the regulations that organized the work inside the zones, others focused on defining the relationship between the free zone and the international trade, and others concentrated their studies to illustrate the impact of these zones on the economy of the host country. However, the general authority of investments and free zones (GAFI) has defined it from the commercial perspective as areas inside the country boundaries with a special

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[6] Information regarding the percentage of the Egyptian labor that should exist in SEZs was mentioned by Al-Jeddawi, 2004

customs and taxes regulations that support commercial business, exports and imports which enhance the international trade (Mostafa, 2007; Adly, 2015). Inside these areas, activities are carried out as they operating outside the customs jurisdiction that is free of duties and have minimal restrictions on imports. These areas are free to operate any activity but it still needs GAFI's approval (Dar Group, 2015). Lately, national scholars (Jeddawi, 2004; Adly, 2015) stated that free zones in Egypt have classified mainly into public free zones and private free zones. In Egypt, there are 21 public free zone and 243 projects that are operated by the private free zones. Both have the same management framework, customs system and incentives. However, private free zones established to handle the following issues:

- If the location of the project plays a key role for its economies

- If this project will contribute to a new urban development

- If the public free zone does not have enough space for the project

Egyptian free zones have passed by three phases. The first phase, from the late 1970s to the mid-1980s, which has seen a turnout towards establishing storage and shipping projects beside some industrial projects. These storage projects were mainly directed to the local market in order to provide the country with the essential products that were needed at this time. The second phase, from the mid-1980s to mid-1990s, in this period the government started to eliminate the storage projects, and pursue assembly and manufacturing projects to export some of their production outside Egypt. These projects were in engineering, food, chemical and pharmaceutical industries. The third phase, from mid-1990s to now where the government continued their policies to downsize the storage projects that did not encourage the exporting practices, and enhancing the industrial activities that aim to export. For this reason, many of the storage projects have changed their activities to the industrial sector (Al-Jeddawi, 2004).

3.1.3. Special Economic zones

In regards to the governmental efforts to attract more new investors, enhance competitive advantages, and cope with global changes and technological advancements, it was essential to find a new shape that keep up with this tremendous scientific and technological progress. In this context, Egypt proposed an amendment to the special economic zone law No. 83 in 2002 to eliminate the drawback of the old law which hindered the establishment of businesses in this zone (Dar Group, 2015; Fattah, 2016; Mostafa, 2007). In 2003, the government established the public authority for economic zone in North West Gulf of Suez to be the first special economic zone in egypt (Al-Jeddawi, 2004). The first phase of Egypt Suez Canal economic and trade cooperation zone was established in sector 3. This was 120 Km far from Cairo beside the

southern entrance of the Suez Canal. In this time, it was supposed to develop the basic infrastructure over around 600 hectares with a total cost that range between US$ 200 million and US$ 280 million. The first project established in this area was Egypt TEDA Investment Company which is a joint venture between Tianjin Economic-Technological Development Area (TEDA), Investment Holdings, Egyptian interests, and the China-Africa Development Fund. Later, a number of companies have settled more project in Sector 3. In 2007, the North West Gulf of Suez is considered as a special economic zone[7]. TEDA established its second project (tender MOFCOM) in the same area based on clustering model that grouped four sectors. These sectors are: textile and garments, automobile assembly, petroleum equipment, and electrical equipment (Farole, Akinci, 2011; DeborahBräutigam, 2014). Enterprises inside these economic zones obtain other advantages such as: 1) an Egyptian certificate of origin for products that produce inside the zone; 2) a separate customs department that has a special system for customs administration inside the zone; 3) the zone includes center for the settlement of tax, customs disputes, labor disputes, social insurance disputes and disputes related to the execution of contracts (Al-Jeddawi, 2004; Adly 2015).

3.2. SEZs on the Suez Canal Region

Studying the impact of SEZs in the Suez Canal region is important to evaluate the performance of SEZs in Egypt. As per Al-Jeddawi, (2004) projects established in all the Egyptian free zones reached 732 projects in 2004 whereas GAFI (2018), declared that projects established only in the Suez Canal region reached 318 projects over the period of 2002 -2004, and in 2018 it reached 1290 projects. This means that the Suez Canal region encompasses high number of projects that operates under the laws of SEZs.

In the Suez Canal area there are 29 industrial zones (10 in Portsaid, 10 in Suez, 6 in ismailia, and 3 in North Sinai). In Suez governorates there are number of different industrial zone types but the most notable zones are: Ataka, Suez, Alarbain, Sez. There are different industrial zone types in Suez governorates but the most notable zones are: Ataka, Suez, Alarbain, Sez. Ataka is the largest zone and it hosts a wide range of activities. North West Gulf of Suez Special Economic Zone (Sez) is the only zone that was established under the special economic zone law no. 83/2002 that focused on the following industries (Dar Group, 2015):

1. Biotechnology and pharmaceutical
2. Textile and readymade garments
3. Automotive Assembly

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[7] Table 21 in the appendix summarized all SEZs types in Egypt listed historically.

4. Agribusiness and Food processing
5. Home appliances and Electronics;
6. Chemicals and Petrochemicals;
7. Construction and building materials
8. Logistics sand warehousing.

Meanwhile, Suez public zone focus on maritime related activities, petroleum and petro-chemical products. As depicted in table 4, electrical and electronic engineering, chemicals and food, beverage and tobacco (FBT) are the main industries hosted by zones in Suez. However, in Ismailia and port Said zones, textile and FBT are the most proliferated industries in these zones. In North Sinai, there are three zones, one in the center of Sinai. The second one in Massaeed for handicraft activities. The third zone for medium scale industries in Ba'er al-Abd.

Table 4: Main Industries in the Suez Canal Zones

	Suez	**Ismailia**	**Port Said**
Industries and the percentage of each industry relative to the overall industrial activity in the zone	EEE (23%) Chemicals (22.3%) FBT (18.2%) Building materials (15.4%) Textile (6.3%) Wood (4.9%) Paper/ print (7%) Crude (1.4%) Mines (1.4%) Metals (6.3%)	FBT (26%) Textile (20.77%) Chemicals (20.77%) EEE (19.5%) Building materials (6.5%) Wood (2.3%) Paper/ print (2.5%) Minerals (2.3%)	FBT (23.3%) Textile (23.3%) EEE*(18.44%) Chemical (16.5%) Wood (9.7%) Paper/ print (1.9%) Building materials (3.8%) Minerals (1.4%)

Source: Reproduced from Dar Group, 2015

3.3. Egypt vision 2030

In 1992 the UN Conference on Environment and Development (UNCED) adopted sustainable development strategies as a participatory tool that aims to ensure a socially responsible economic development that guarantees the environmental resources for future generations (OECD, 2001). The principal guidance for this strategy is based upon the following: 1) participatory approach that engages all the countries in developing their strategies. 2) making sure that marginalized groups and the future generation are receiving sustained beneficial impacts. 3) building on current strategies rather than start from scratch. 4) integrating social, economic and environmental objectives through shared supportive policies. 5) making sure that all strategy has realistic targets with a clear budget priority (OECD, 2001).

Moving towards sustainable development is considered a genuine challenge since it requires significant structural changes. However, it was important that all countries take these decisions and implement these hard choices. Sustainable development strategies are all about implementing these choices in an accurate, effective and durable manner. Past experiences showed that successful strategies are depending on establishing a long-term vision that aims to promote coordination among different planning stakeholders, setting priorities, and enhancing ownership and appropriate participation. Thus, the sustainable development strategy 2030 (SDS) is a set of principles which encompass an effective convergence between different planning perspectives. Hence, SDS abides to a high level of participation, high level of commitment and a continuously improving process to integrate the economic, social and environmental objectives. Even if this integration is difficult, it is essential to seek tradeoffs to balance between the three sustainable development pillars. Practically, this means that effective strategy for sustainable development should combine the aspiration and abilities of the government, private sector and the civil society to contribute to its vision (OECD, 2001). Therefore, Egypt has declared in the Egyptian economic development conference, their plans for a number of mega projects in the Suez Canal region to support the Egyptian sustainable development strategy that promotes the sustainable development goals (SDGs) in Egypt. These mega projects include the following:

1) large industrial zone in the Northwest Gulf of Suez that includes an industrial park of 176.5 Km2 which designed to attract foreign investments.
2) Maritime-related activities and logistics services in East port said.
3) Special ports for complementary activities in Port Said West Port; Sokhna Port; Adabiya Port; and Al-Tur Port.
4) Technological valley in Ismailia which will establish on 16.5 thousand acres, aiming to develop high technological projects such as; software, electronics, biomedicals, complex materials and polymers, renewable energy and ICT.

Most of these projects attempting to foster the industrial cluster, increase the private investment, generate more job opportunities, and enhance the exports and value-added potentials. Therefore, Egypt's vision for achieving these goals founded on establishing a special economic zone that supports industrial exports. Besides, the government worked on attracting private investors within the Suez Canal corridor to leverage the flow of international trade and promote the exports of oriented manufacturing activities. Thereby, the government declared the one stop shop technique to attract investors, and it started to review the incentives and the streamlined tax offered to the investors, and these incentives were developed to support specific

industries. Moreover, there is a massive Micro, Small & Medium Enterprises (MSME) ecosystem initiatives that are ongoing, aims to stimulate financial accessibility and the technical support, and increase the streamlined procedures. Further, the Central bank of Egypt was working on a national strategy that boost financial inclusion to assist the private sector and the public sector. The private sector represents the financial service providers side while the public sector acts as the regulators in promoting the access and utilization of the MSMEs into formal financial services. Furthermore, the social fund for development and industrial modernization center is prepared for a better-oriented support for the Small & Medium Enterprises (SMEs) (The Government of Egypt, 2015).

3.4. Review Master Plan of The SCZone Project

One of the research objectives in this study is to outline future plans towards developing the Suez Canal region after the declaration of the SCZone Decree in 2015 whereby under this decree SEZ expanded to include all adjacent areas of Suez Canal. This section is important in the study as it presents governmental vision for future development in this critical region. This is through identifying the priority sectors that catalyst the delivery of the SCZone project in early phase. This plan is developed by Dar Al-Handasah, and in March 2015, it is presented to the global audience at Egypt Economic Development Conference (EEDC). The aim of this plan as mentioned by the authors of this report, is to outlining elements required for the SCZone development to be a guideline for the authorities to attract investments in the Suez Canal region. Conceptually, they stated that their spatial plan is based on four main purposes:

- Exploit of the Suez Canal geographical advantage.
- Enhance clustering.
- Improve connectivity and boost economic and urban growth.
- Conserve the natural resources.

The spatial concept is based on the city region concept that is integrates to high extent with the current development in the SCZone. This concept emphasized on enhancing the potential economic and urban strengths in the main three city regions in order to increase the economic efficiency, improve the urban governance, and boost sustainable spatial development. Noted that the three main city regions are Port Said, Ismailia and Suez and the two small city regions include Al Arish and Al Tur. Such cities in the region will provide shared economic activities and geographic and transportation connections.

The development in this region is proposed to be done over two phases. The first phase should be finished by 2030 while after 2030, the study proposed two alternative development

strategies. The consolidated corridor strategy has a development emphasis toward the east side of the Suez Canal whereas the regional integrator strategy will expand the development to the western side of the canal.

SCZone is designed to be an integrated project that will be based on ports and economic zones development. Accordingly, developers of this plan conducted a benchmarks analysis to better understand the strategies and framework under which economic zones were developed. This resulted in a long list with the potential categories, and from this list, a set of preferable comparable sites were selected based on quantitative and qualitative discussions. Identifying the benchmark development projects were based on the strategic site of the economic zones along an important maritime route, the global importance, the extent to which the ports' development in these sites and the ports' potentials to develop SEZs.

This resulted in selecting Singapore, Jebel Ali Port and Free Zone in Dubai, Tanger-Me, Shenzhen, Colon Free Trade Zone and the Panama Canal Zone to be the main benchmarks of the SCZone project. Singapore for instance was an important selection as it will provide benchmarking for ports development. In comparison, the Panama Canal and the Colon Free Trade Zone were good examples for industrial zones that are connected with maritime route. Lastly, Jebel Ali, Tanger-Med and Shenzhen provided more regional strategy that aims to enhance ports with free zones or industrial zones. SCZone is characterized by a strategic site along key maritime route that support potential regional development. Tanger-Med as mentioned in this study is the closest one to the SCZone project since they share the same regional and culture characteristics. Both economic zones entered the market recently. They are lying on the same trade route and the same markets, both develop economic zones for a regional and national development purpose, and both are facing the same institutional and financial constrain. Tanger- Med is followed by Panama where it has the same canal orientation, a close population density, and waterway dominated with a geopolitical history.

3.4.1. Background of Dar el Handesah's Plan

Theoretically, this plan aimed to determine the SCZone strategy based on an economic viable standard to enhance the development throughout the Suez Canal region. As shown in figure 1, this plan built up on seven pillars that are well-structured to demonstrate the whole development plan for SCZone. Overall, this plan highlights the SCZone regional development strategy, focusing on promoting regional economic growth through catalyze industrial clustering with high economic benefit in the region and mentioning necessary prerequisites to attract more investments and meet the strategic economic objectives. Moreover, it specified

three locations that are selected by the authorities for spatial development, focusing on key development plans for improving existing ports in the Suez Canal area including: East Port Said Port, Sokhna Port, Al-Arish Port, West Port Said Port, Adabiya Port and Al-Tor Port. This is to ensure of the capabilities of existing ports to meet potential demands from now until 2050. Ultimately, this plan attempts to enhance investments through a promotion strategy that reinforces the competitive investments environment. Meanwhile, the marketing and communication plan (MCP) worked on raising awareness for the potential opportunities investing in the Suez Canal region. In order to ensure of the sustainability of the SCZone, this plan stated encouraging the sustainable development through defining the environmental and social risks and proposing frameworks that address these risks using conventional environmental regulation where they are not taking the environmental issues seriously. Instead, SCZone requires sustainable solutions that are based on industrial symbiosis to maximize the economic benefits and reduce industrial waste and pollutions to zero. This way SCZone can enhance economic growth, improve human wellbeing health and protect the entire environment.

Figure 1: Master Plan of the SCZone Project
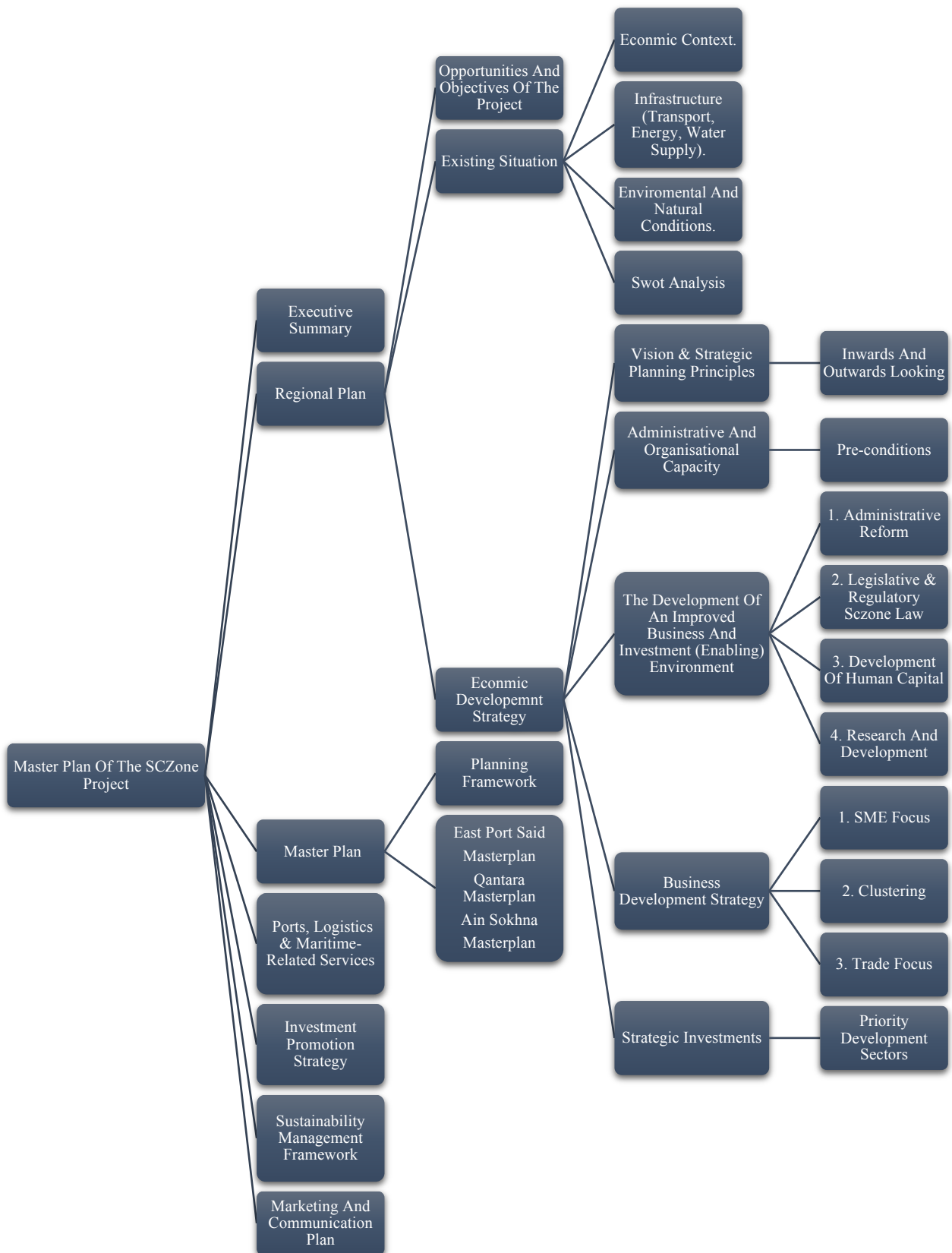
Source: Reproduced from Dar Group, 2015

3.4.2. The SCZone Regional plan

Suez Canal Authority (SCA) has defined a number of sites across the Suez Canal to support the SCZone vision as they considered to be an area of a core influence. These selected development nodes align with the regional strategy and have capabilities for accelerating the growth in the region. Consultants evaluated these sites using multi-criteria analysis (MCA) that assess each area based on six different measurements. These measurements are:

- The financial feasibility and profitability.
- The socio-economic impact.
- The project readiness and the ease implementation degree.
- The environmental importance and impact.
- key planning determinants.
- The public and political support.

Each site scored from 1 to 5, and then the sites with the highest score that has potentials to steer the economic development in the SCZone will be included in the projects. Afterwards, this study proposed development in three major city-region (Port Said, Ismailia, Suez) and two small towns (Al Arish and Al Tur) to achieve a transformational development in the Suez Canal region. Major industrial development in the Suez Canal region is important. The study proposed more industrial activity in East Port Said (non-port area), SCA Qantara, and Ain Sokhna. The ports which were selected for this master plan are SCA West Port Said Port; SCA East Port Said Port; SCA Adabiya Port; SCA Ain Sokhna Port; SCA Al Arish Port; and SCA Al Tur Port.

3.4.2.1. *Vision and the strategic planning*

Per the economic strategy of the El Dar group, this development strategy was created after reviewing all the current national and regional plans and economy. In this regard, their vision for the SCZone was as following, "To transform the Suez Canal zone into a world-class, global logistics hub and industrial processing center that provides gateways to both European and Asian markets" (El Dar group, 2015). In addition to that, they mentioned that trade in the SCZone was supposed to have inward-looking and outward looking focuses. The outward-looking emphasis is on the transformation of the Suez Canal region to attract FDI in order to place the Suez Canal region among the global supply chain and become one of the logistics hubs that can compete globally and regionally. The inward-looking focus is on setting standards and key indicators that ensure the following: ease doing business, the efficiency of

the operations, the development of SMEs, a proper management of the control systems, the insurance of the social and environmental safeguards, and human resource development. This also requires significant improvements in the partnership needed at different levels; between business, community, and the educational sector, general authorities and communities. Further, manufacturing is considered to be one of the key sectors to be pursued in achieving the Sustainable Development Strategy 2030 as it aims to increase the direct job opportunities and diversify economic activities. Accordingly, SCZone will be able to integrate globally, and SCZone could has an important role in creating a good job quality that fosters high standards of living and builds a capable platform for SMEs to develop opportunities that reinforce planned investments.

3.4.2.2.   Administrative and Organization capacity

The study claimed that there are four conditions that should exist before implementing the project to tackle the potential challenges and seize potential opportunities successfully. Additionally, they stated that failure to achieve one of these preconditions will be sufficient to hinder the project achievement. The first condition is the **commitment and confidence** which means that Egypt should enhance their rank among the most 50 countries ease of doing business to be able to compete internationally. Moreover, the government should declare its long-term commitments towards achieving their agreements and should be confident with its new economic strategy and present the strategy as a real world-class opportunity. The second condition is the **concentration**, which means that the development strategy in this region should be consistent, concentrated on the short- and long-term investments and initiatives by the public-private and other organizations. This means that the success of the strategy will be depend on one element to avoid insularity and fragmentation. The third condition is the **collaboration and partnership** as development SCZone requires the collaboration of different mindset and capabilities through strong partnership framework that are based on linking, aligning and leveraging assets to be able to compete globally. The fourth condition is **cohesion**, as concentration and collaboration inevitably cannot be accomplished without cohesion plan that takes into consideration the sustainability of the plan legally, strategically, institutionally, environmentally and socially.

3.4.2.3.   Enabling environment

The authors of this report reported that bureaucratic process, delay and inefficiency are the main pitfalls of the current Egyptian framework that can hamper having a good investment environment in Egypt. Thus, it is important to be solved immediately. These problems

encompass the lack of administrative capabilities that guarantees efficiency practices, concerns related with enforcement of the contracts, the poor insolvency law that results in losing the investors all their assets due to the prolonged settlement process, and lastly the lack of the skilled labors that can suit the market labor demand. For this reason, they suggested tools to enhance the environment of the investment through the following:

3.4.2.3.1.   Administrative Reform

Globally, there is a tendency towards decentralization of the power, and this transformation is one of the important steps to reinforce the investment environment. Narrowing down the governance scale means that entities are ones responsible for making decisions. Since these entities know more about the regional demands, they will be the best ones to set the programs and policies that address these demands. Moreover, the designation of the zone as a special economic zone will allow the zone's authority to immediately tackle enormous issues that can affect the general business environment inside this area. Having sub-national entities in these zones will act as de-facto mini-states that have their powers and authorities unless it does not affect the defense and security and foreign affaire matters. The general authorities of these zones will have an administrative, executive and legislative powers in implementing development plans in the region. They will report directly to the cabinet of ministers, providing the infrastructure that is required for the development of the industrial zone, and exercising all the legal and administrative practices that is necessary for accomplishing the objectives of the zone such as business registration, conduct environmental regulation, and given the permission of land use. Thus, this allows the general authorities to share responsibility with the national ministers. All these practices will be similar to the general authorities in well-known entities like JAFZA in Dubai and ASEZA in Aqaba. Furthermore, transparency is one of the important elements that strengthen the success of the zone. These improvements can be done through publishing the fees in one stop shop, publishing the time frame required for decision approval attached with the acceptance criteria. These changes will address the trust issue that weakened the business climate in the past in Egypt.

3.4.2.3.2.   Legislative & Regulatory SCZone Law

In the framework of SEZ Law amendments for years 2002, 2007, and 2010 to encourage the investment of the private sectors in infrastructure, public services and facilities, it created the public-private partnership (PPP) center in the ministry of finance to coordinate between the government and the private sector, and supervise different PPP related activities. However, there should be more legislation changes that protect the investors and ensure the contract

enforcement. For instance, insolvency law is an area that required various reforms as it is one of the significant factors that hamper investments. The two main issues with the law are the jail sentence and the prolonged settlements that may force the entrepreneur to lose some opportunity for restructuring.

3.4.2.3.3. Development of Human Capital

For meeting the economic demand of this century, they recommended a considerable transformation in the education system particularly among the high education and training programs. For this reason, it is essential to connect between the employers and educators, improving the vocational training system in order to match between the educational services provided and the field work. Hence, this study is planning for three programs to improve the educational standards and developed the skills that the workers needs to cope with the global challenges and the new required skills: TVET Reform, Industrial modernization center (IMC) program and University Support program.

3.4.2.3.4. Research and Development

This plan proposed an R&D strategy that supports development in the long term. This strategy will have two main goals. The first goal is to encourage creativity among the private sector. The second goal is to support the universities and research institutions to improve and transfer technologies to the industrial sector. This strategy should be pragmatic with a clear priority assessment in order to attract the European Union and other entities to support the establishment of the ICT, research and development infrastructure in the Suez Canal zone. Furthermore, the economic development strategy is designed to connect between the universities and the business in different fields to promote small enterprises. For this reason, the initiative of the Technological Valley in Ismailia has emerged. As the proper usage of the university research to increase the educational and innovation capability requires much more proactive role. Hence, the Suez Canal project could be a new impetus power to meet the EDS needs.

3.4.3. Business Development Strategy

3.4.3.1. SME Focus

This plan stated that small enterprises in Egypt are facing enormous challenges that can hamper their upgrading into medium size enterprises, and one of these challenges is the legal issues like the insolvency law that is mentioned before. Hence, the economic development strategy in this study induces the growth of SMEs through increasing the development of start-ups in the country generally and it supports the existing companies that reinforce international trade, creativity and innovation, set apriority to encourage growth- oriented enterprise that increase

exports. Further, there should be an initiative to integrate entrepreneurship programs into community, among the youth by establishing incubator facilities in universities funded by the social fund for development. Moreover, it suggested to encourage institutions that focus on funding SMEs and build strategic partnership model among SMEs, foreign direct investors, national companies, universities, and donors. This fosters the technological transfer and value chain extension. Last but not least, increasing the availability of services that improve the business development in general not only inside the zone is vital to reinforce training and market information sharing.

3.4.3.2. Clustering policy

Clustering is not a new concept in Egypt; however, it requires more coordination to achieve better results. They mentioned that this policy is not only about the agglomeration of the similar activities, it is more about clustering integrated activities to encourage innovation and value-added products that can establish an interlinkage. In respect to that, the general authority of the zone will aim to support SMEs inside the zone to accomplish the main purpose of the clustering policy. Thus, to support SMEs, the SCA will use tax holiday for the large enterprises that integrate with SMEs in their value chain. Moreover, this study planned to review the current incentives that are offered in the SCZone based on strategic criteria like the backwards and forwards linkage, and the technological transfer.

3.4.3.3. Trade focus

Firmly, companies that operate successfully in the international markets have more chances to be more innovative and productive, and this accordingly will create more employment and R&D. Most of the Egyptian capabilities currently are focusing on the domestic markets and avoid the export risk, and this results in the incapability of the Egyptian firm to compete in the international markets. Hence, it is important to maximize the utilization of the SCZone location by embracing trade and the utilization of the existing trade agreement in order to increase the number of firms that export. Therefore, trade in any field in the SCZone, will have a huge potential growth regionally and globally.

3.4.4. Strategic investments

The plan claimed that the investments in the SCZone at the early stage will require continuous support to the flagship projects that ensure the government commitments towards the development in the SCZone. Consequently, this will build trust between business and the investors. The investments selection criteria in this zone will be based on the readiness of the

project, potential for clustering, the community support, diversity of the project sources of funds, and the impact of the project to meet the development needs of this area.

3.4.4.1. Strategic Action Plan

The economic development strategy is based mainly on the competitive advantage of the economic zone. Partnership between leaders and partner is not enough for the plan to succeed as this viable partnership should be attached to a viable strategic action plan to know the economic opportunities that accomplish the best returns. Accordingly, this action plan includes a set of investments priorities that demonstrate the competitive advantage of these new opportunities.

3.4.4.2. Priority Development Sectors

As mentioned previously, the proposed economic development strategy should focus on competitive advantage to assist the zone to compete globally. However, this required a more balanced approach that aims to accomplish this objective, and this done using the winnowing process. Under this process, the strategy evolves continuously to adapt with a particular region with different economic and institutional landscape based on the process of identifying, evaluating and winnowing of the opportunities in each region. Later, the study used some analysis tools such as the occupational cluster analysis and the industry cluster analysis to select the priority development sectors based on sectors that have a potential for generating wealth in the economy. After this analysis six categories were defined. The first category is the dominants category which dominate more than 80% of the regional employment among existing industries. Development in these sectors will have a significant impact on the regional economy. The second category is the emergent or "untapped sector" that represents a relatively small number of emerging sectors at the current time but have a high potential towards growth globally and regionally. The third category is the demand drivers which have multiple effects. The fourth category is the enablers that can tackle challenges which limit the productivity in the region like the availability of energy required, lack of route connectivity, and technological limitation. The fifth category is the value adders which assists some industries to transform from the conventional economy to the knowledge-based economy. The last category is the sector that has national alignment and could be integrated into the SCZone development plan. Thus, based on these criteria, the study selected 5 sectors that can affect the welfare of the country or the economic welfare of the region. These sectors are: energy, ICT, transport and logistics, manufacturing, and maritime related services. However, other economic activities will be presented including agriculture, tourism, government, mining and quarrying, but the

five core sectors mentioned above are the main sectors with the highest potential for development in the Suez Canal region.

3.4.4.3. Critical infrastructure

In this section the study covers three main critical infrastructure that should provide in this area which are transport, energy, and water supply infrastructure. In regards to the transport infrastructure, the eastern side of the Suez Canal has a weak connectivity and unreliable sources of energy. Therefore, it was important to have transport links that connect goods and passengers throughout different areas in the Suez Canal region. Moreover, logistic services in this area need good connections between ports, industrial parks and Cairo to be a trade-oriented hub. Meanwhile, energy provision is considered to be an essential issue in Suez Canal region, but it has a huge opportunity to enhance generating energy using renewable power. For this reason, this study aims to develop strategy for generating energy using solar power, wind power and energy from waste. Furthermore, it is vital to ensure that there is a sufficient water supply infrastructure to reinforce the development in this region in addition to wastewater infrastructure for water recycling.

3.4.4.4. The Spatial Strategy

The plan provides a strategic framework for the land requirements throughout the whole plan to 2050. This spatial strategy was developed to address weak points that hampered the SCZone growth. Meanwhile, this strategy seeks to benefit from the huge opportunities that are in the Suez Canal region despite the numerous challenges that limited the development such as lack of route connectivity in some areas, inadequate power supply, and insufficient expansion for water supply. However, SCZone offers massive opportunities for the development of the nation such as expansion opportunities in major international ports and lands that are suitable for industrial and urban development. There will be a number of new well-developed cities such as East Port said and East Ismailia. These new cities will have excellent transport links with some existent cities that have a good educational base for ICT beside the potential of agribusiness and renewable energy growth. This spatial strategy aims to develop a sustainable future and reinforce a balanced economic and population growth. Hence, to implement this strategy it is important to integrate the economy, land use, infrastructure, and environmental opportunities in a sustainable plan. Thus, this study concentrated its spatial strategy on four main strategic principles that include: enhancing the economic agglomeration, exploiting the advantages of the SCZone, improving connectivity, and protecting the natural resources. Accordingly, this spatial strategy defined economic clustering opportunity in the North West Gulf of Suez followed by an important hub at East Port Said and Al Arish. The main logistic cluster will be

in East Port Said with a massive potential for more logistic areas along the canal between Port Said and Ain Sokhana. The agriculture agglomeration will be spread throughout the Suez Canal region. Tourism clustering will be located in the Gulf of Suez, West Port Said and along the northern coast of Sinai. Meanwhile, the energy clustering will be found in Ismailia, Gulf of Suez and in North Sinai.

Figure 2: The Spatial Location of Employment
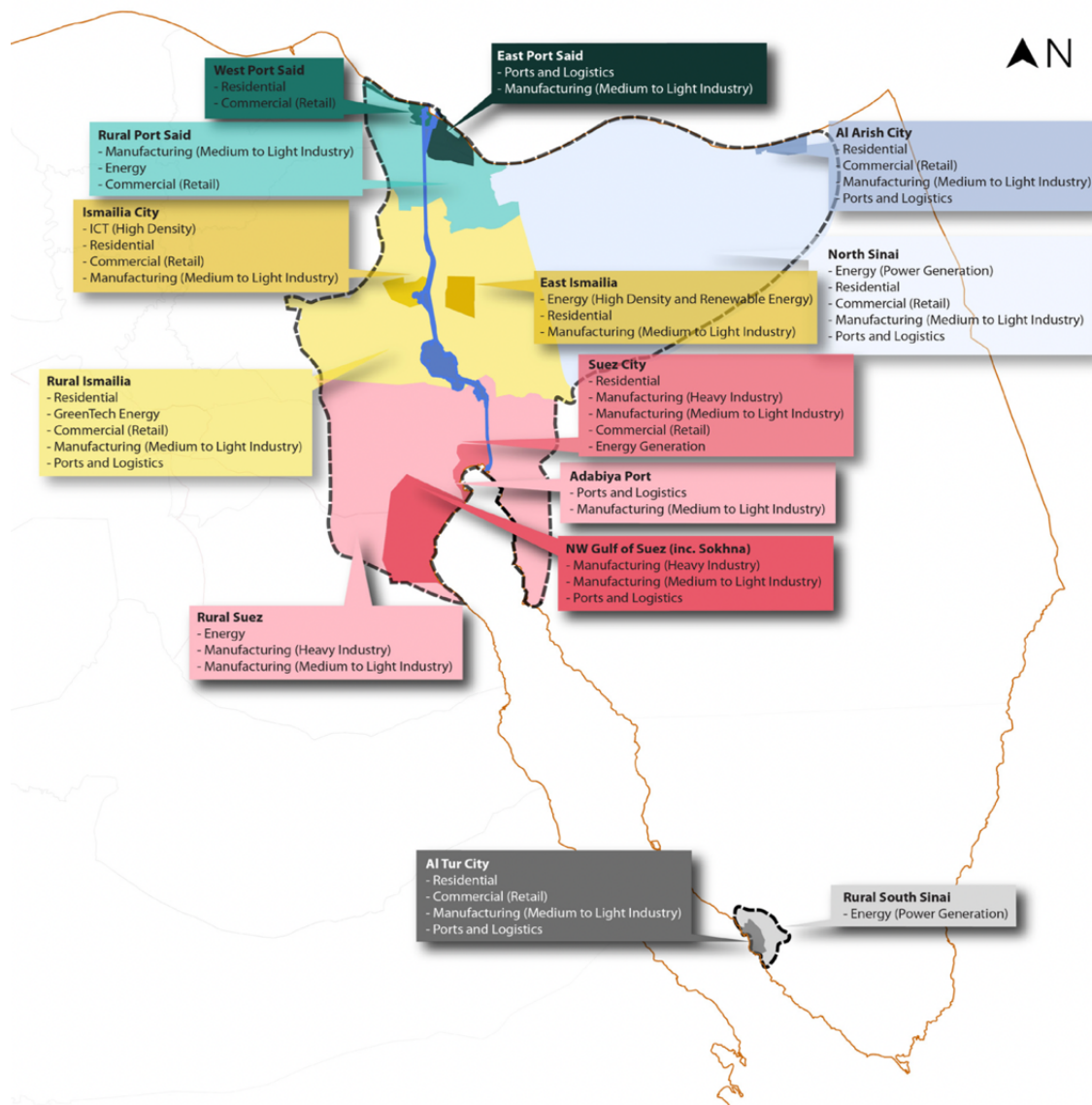
Source: Reprinted from Dar Group, 2015

As shown in the figure 2, spatial location of employment was developed to distribute the employment in the SCZone into sub-zones with an overall area measured to be 22,000 square kilometers. This is equal to the whole lands in the SCZone project that is required for employment use, residential use, and public utilities and infrastructure. In this spatial plan,

manufacturing and logistics are key sectors that will play an important role in the SCZone economy. For strengthening these sectors, it is essential to support the manufacturing clusters in Port Said and Suez through an integrated supply chain and continuous upskilling of the workforce. The growth of the logistics sectors requires massive efforts to upgrade the existing ports' capabilities and the other related infrastructure that increase transport connectivity. For this reason, the study gives high priority to some activities throughout the three city regions in SCZone that enhance development. In East Port Said city region for instance there will be a proliferation in the automotive, pharmaceutical, textile and clothing, home appliances and consumer electronics manufacturing, general manufacturing, and ports and logistics. In Ismailia City region, there is a plan to increase the agribusiness activity, general manufacturing, textiles and clothing, home appliances and consumer electronics manufacturing, ICT and energy. And in Suez city region, the priority of investments will be directed to port and logistics, automotive, building materials, oil refining and petrochemicals, and energy components manufacturing.

3.4.5. Development phasing

Figure 3: Development Phasing of The SCZone Project
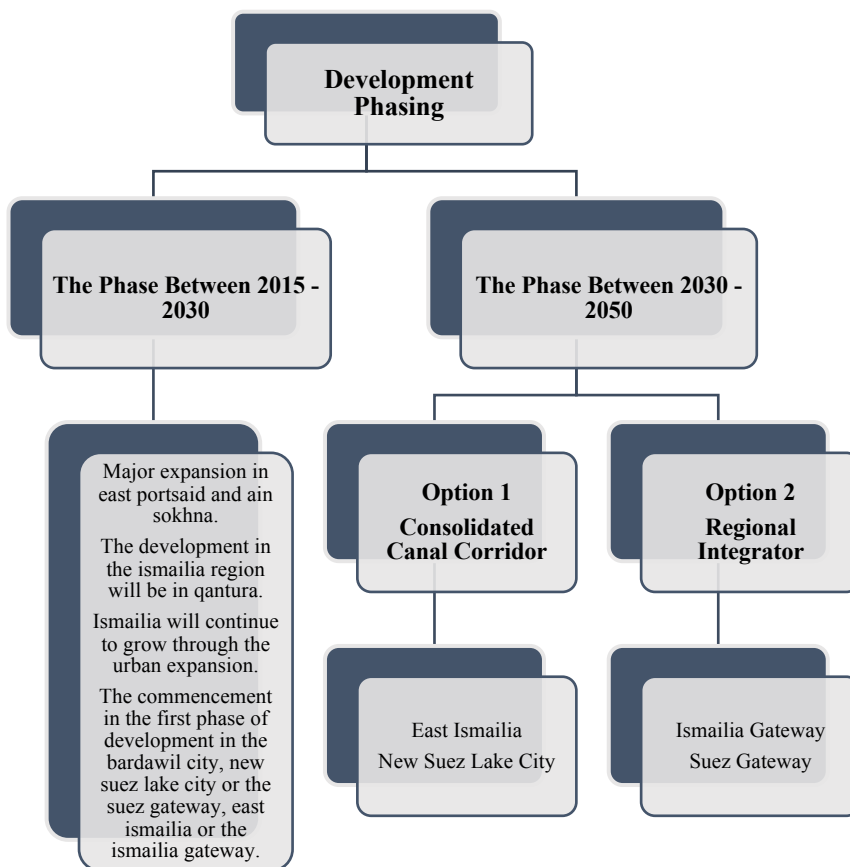
Source: Reproduced from Dar Group, 2015

3.4.5.1. *Phasing of Development 2015- 2030*

The whole project in this study breaks down the development into two phases. Phase 1 is between 2015 until 2030. This period will witness a massive expansion in the Suez Canal region among the three regional cities (Port Said, Ismailia, Suez) which is defined to implement critical upgrading in the infrastructure that is required for attracting investments. This improvement will include a significant change in the transportation infrastructure. As in this stage, there is a commitment to develop new tunnels crossing the canal, new railway to connects Port Said with the dry port in 10th of Ramadan City. Moreover, the new highway that links East Port Said and 10th of Ramadan City will extended to Ain Sokhana, and this accordingly will connect the port in East Port Said with Ain Sokhana.

In Port Said city region, there will be a gradual transfer to east Port Said; meanwhile, there will be a considerable urban development in East Port Said to absorb the employees who work in the new port and the industrial parks in Bardawil City since the development in this city should be started by this phase. Further, there will be more development in West Port Said to improve its ports and industrial facilities. Hence, Port Said city region is supposed to experience a significant growth during this phase through the expansion of the city to the eastern side. On the other side, the major urban development in Ismailia city region will consolidate in the Qantara. However, there should be a viable development in one or all of the new cities that is proposed to be developed in Ismailia regional city. This will happen through the redevelopment of the underdeveloped areas and the urban expansion in Ismailia Gateway, new Ismailia and East Ismailia. On the south side of the Suez Canal, the development in the Suez regional city will be concentrated mainly in Ain Sokhana which will be a key port, residential city and industrial area that will meet the population increases estimated in the future. During this phase, the development will start in one or more of the new cities in this city region such as new Suez Gateway and new Suez City (lake cities). Al Arish City will continue its development through establishing new local centers that occupy small and low density. This is after finishing Al Salam fresh water canal, that will enhance the agriculture between East Port Said and the Al Arish.

3.4.5.2. *Phasing of Development 2030-2050*

Between 2015 and 2030, most of the growth will be accommodated in the existing cities that will be accompanied by a significant expansion in East Portsaid and Ain Sokhana and a minor expansion in Qantara. Meanwhile, after 2030 the scale of development will require a major urban expansion; therefore, new cities have to be developed, and this development will differ

based on which scenario will be chosen to continue the development in Suez Canal region after 2030. According to the consolidated corridor scenario, port Said will be the region with the largest population, whereas in the regional integrator scenario, Ismailia would be the city region with the highest population density. Continuing the scale of development based on the consolidated corridor option, the growth in Ismailia will be in east Ismailia, whereas in the regional integrator option, the urban expansion will be in Ismilia Gateway. After 2030 the expansion in Suez city region will continue in Ain Sokhna beyond the potential development in either new Suez lake city (Consolidated Corridor option) or Suez Gateway (Regional Integrator option). On the other hand, there will be a steady growth in both Al Arish and Al Tur that will be based on the amount of investments.

Port Said City Region Development

The vision for the development of Port Said is represented in creating a major contribution among the trade and economic activities in the north side of Egypt and the Mediterranean. Port Said is planned to act as a major economic center with a focal focus on industry, logistics and ports related activities. The priority will be for the growth of East Port Said which will be considered an economic hub that encourages investments in the port area and the industrial zone. This development scale is estimated to finish by 2030. Afterwards, it is expected that most of the new development will be in the city region. Once the development of East Port Said is finished, the area will have to be fully serviced. Furthermore, it is estimated that existing development in West Port Said will gradually transfer to East Port Said. This is why the Bardwail city will be created to meet the potential urban density. After 2030, East Port Said and Bardawil city will play a vital role by increasing the capacity of the residential areas and diversifying the economic sectors in the city region. In this area most of the land will be used in manufacturing (medium to light industry), ports and logistics, and residential uses that will increase the forecasted employment in Port Said city region to be 494,600 in 2030 and above 1,150, 000 in 2050 at the worst scenario. This is due to the considerable population increase that is anticipated to reach over the million by 2030 and around 2,370,000 (consolidated corridor) – 3,547,700 (regional integrator) in 2050.

Ismailia City Region Development

Ismailia is planned to be a considerable residential, administrative and commercial city in addition to the proposed manufacturing expansion based on the light and medium industry, logistics and transportation. Further, the university in Ismailia is planned to strengthen the

development of the ICT industries, and on the east side of the canal, solar power generation will be targeted. Currently, Ismailia is a major city that includes a university and the headquarters of the Suez Canal Authority. It is considered to be a medium density with a high-quality environment. Thus, this plan aimed only to capitalize on the existing assets in Ismailia city beside enhancing the development in Qantara, East Ismailia, and other rural parts. Firstly, in Qantara, the government placed a large plan for the development of the new city at Qantara. Secondly, East Ismailia which is proposed to be a center of renewable energy additionally to the new residential community that will serve the workers in the city of Ismailia and East Port Said. Thirdly, rural Ismailia, for the development in this area after 2050 there are two proposals: 1) the consolidated corridor option that reinforces the development in the eastern side of the canal; 2) the regional integrator option that proposes a new city at Ismailia Gateway between the city of Ismailia and Cairo. Both options will increase the population forecasts in Ismailia City Region to be 1,928,000 in 2030 and in 2050 to be 3,248,800 at the corridor scenario and 4,208,100 at the integrator scenario. Moreover, it is anticipated that employment opportunities will reach 561,100 jobs in 2030 whereas in 2050 to be either 1,184,900 jobs or 1,095,900 jobs, and this depends on which development option will be pursued after 2030.

Suez City Region Development

The Suez City Region covers three main areas: Suez city, Adabiya Port, and Ain Sokhana Port. This area has varied economic bases such as light and medium industry, ports and logistics activities, heavy industries, and residential areas. Suez city is a regional center. This plan is supposed to continue until 2030 after which this urban expansion will reach its limits, and the urban development will be expanded in Ain Sokhana. Ain Sokhana will be developed to be a significant regional and industrial center that is enhanced by new cities with large residential opportunities. After 2030, there will be two development options. First is through developing new Suez city and the lake city that will be connected with Suez and Ain Sokhana by road rail and passenger railway services. The second is the development of the Suez Gateway that can connect between the city of Suez and Cairo through the new planned expressway that links between East Port Said and Ain Sokhana. By 2030, this area is anticipated to increase the employment opportunities from 176,600 in 2015 to 1.3 million in 2050, and there will be a considerable population growth that may reached 2 million in 2050 compared to the 108,000 in 2015. All this population growth will require a significant increase of the residential areas that can meet the demand of the population expansion. These residential development areas are projected to be in Ain Sokhana, existing Suez City and the new Suez City.

Al Arish City Region Development

Al Arish City Region will have an economic role in the reinforcement of education, governmental services, wholesale and retail. Transport and logistics are an essential factor that enforce the opportunities in Al Arish ports. Thus, all this will strengthen the role of Al Arish as an administrative capital of the region. Agriculture in North Sinai is the sector with the highest employment growth followed by manufacturing. By 2050, these two sectors are estimated to increase the employment opportunities to over 24,000 jobs and over 11,000 jobs, respectively. Additionally, Al Arish is experiencing a high employment rate in the wholesale and retail sector, and by 2050 it is estimated that this sector will add 13,000 additional jobs while the transportation will add around 9,000. Therefore, the development plan in this area will use the land for generating power using solar energy in the rural North Sinai, enhancing the commercial activities, and developing residential areas. This is estimated to increase the overall population of north Sinai to 930,000. However, the employment growth in this area will be moderate compared with other city regions in the Suez Canal zone.

Al Tur City Region Development

This area is located in the south side of the Suez Canal zone, and it includes Al Tur city and its port. Despite the small scale of the city and the port, they play an important role in providing a wide range of services as this area includes a number of a vital mining sources, government services, manufacturing, transport and logistics which are the main sectors that attract the employment in this region. Consultants estimate that this region will generate between 2000 to 5000 additional jobs by 2050 among government services, manufacturing, transport and logistics. Thus, most of the land will be used for manufacturing purposes, development of residential areas, and solar power generation in rural areas in south Sinai.

3.4.5.3. The Consolidation Canal Corridor Option

The development in this option focused generally along the eastern side of the Suez Canal, which strengthen the importance of the three main Suez Canal cities and the development of new urban areas near the canal based on the priority sectors that were defined in the economic development strategy. This expansion case will emphasis the development in East Port Said and Ain sokhana. As a result, Ismailia and East Ismailia have become an important residential center that serve East Port Said. For this reason, it is planned for a new tunnel across the canal that connects East Ismailia and East Port Said. This option reinforces the connectivity between East

Port Said and Ismailia, in addition to utilizing the potential opportunities that are presented in East Port Said development plan. This choice is based on three sub regions: i) Port Said which includes West and East Port Said that focus on maritime related activities; ii) Ismailia that includes Ismailia city, Qantara, and East Ismailia, and it will focus its economy on ICT and green technologies; iii) Suez that includes Suez city, Adabiya Port, and

Figure 4:The Development Framework under the Consolidated Corridor Option

Source: Reprinted from Dar Group, 2015

Ain Sokhana which will focus on port activities, heavy industries and residential services.
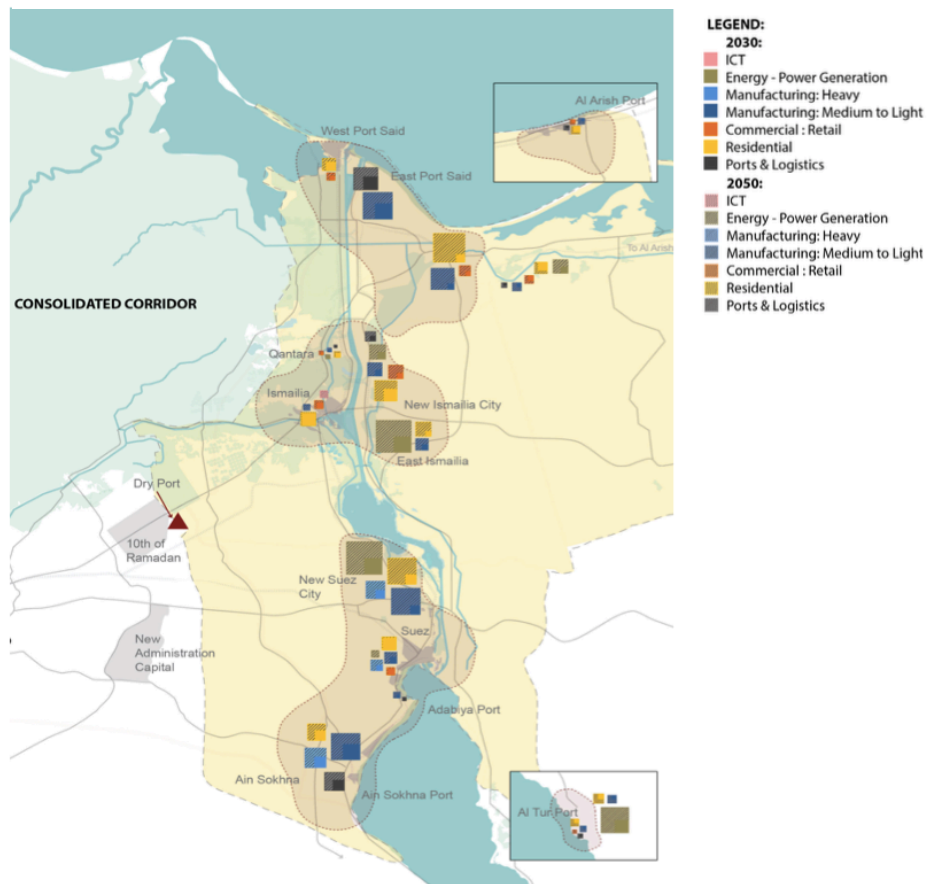
The urban development will cluster throughout the Suez Canal around the existing settlements (West Port Said, Ismailia City, Suez City. Al Arish City, Al Tur City) and emerging settlements (East Port Said, Ain Sokhna, Qantara, East Ismailia). Until 2030, the population growth will mainly increase in the existing settlements. After 2030 there will be a residential expansion opportunity in East Port Said, Ain Sokhna, Qantara, East Ismailia, and Bardawil city. Development of the ports in East Port Said and Ain Sokhna is important for urban expansion and establishments of strong linkage between ports and urban areas. The industrial development will focus on the Suez and Ain Sokhna, while the logistic activities will be focused in East Port Said. In Ismailia the economy will place emphasis on educational institutions, as they will work as the main hub for ICT development. Further, East Ismailia will be developed merely to be a center for renewable energy. After 2030, the urban expansion will move towards East Ismailia because expansion around Ismailia could be difficult as most of the city is surrounded by agriculture areas that limits its urban growth. This urban expansion will attach with road and rail to transport residential clusters between East Port Said, East Ismailia,

Al Arish and Al Tur. As shown in figure 4, the land distribution plan until 2050 presents that most of the land usage in East Port Said and Ain Sokhna will be dominated by manufacturing, logistics and ports while the residential areas will be located at the existing cities along the Suez Canal corridor then expand in new towns such as Bardawil City, New East Ismailia, and Suez Lakes City.

3.4.5.4.   The Regional Integrator Option

This option seeks to integrate the Suez Canal economy with the greater Cairo metropolitan economy through developing new regional and non-regional settlements between Cairo and Suez Canal. This development aims to establish settlements along the Suez Canal until 2030. Post 2030, there will be a transformational change towards the west. These changes include the establishment of Ismailia Gateway and new Suez city that will be located along the expressway that links East Port Said and Ain Sokhana. Such new places will act as an initiative for economic development. Until 2030, residential areas will be located in the West Port Said, Ismailia City and Suez City, and will expand after 2030 to new cities of Ismailia Gateway, Suez Gateway and Bardawil City. The industrial development will be focused in the Suez city-region that includes Suez City, Adabeya, Ain Sokhna and New Suez while the logistics services will be located in Port Said city-region which include East Port Said, West Port Said. After 2030 the expansion will include Qantara. The ICT and

Figure 5:The Development Framework under Regional Integrator Option
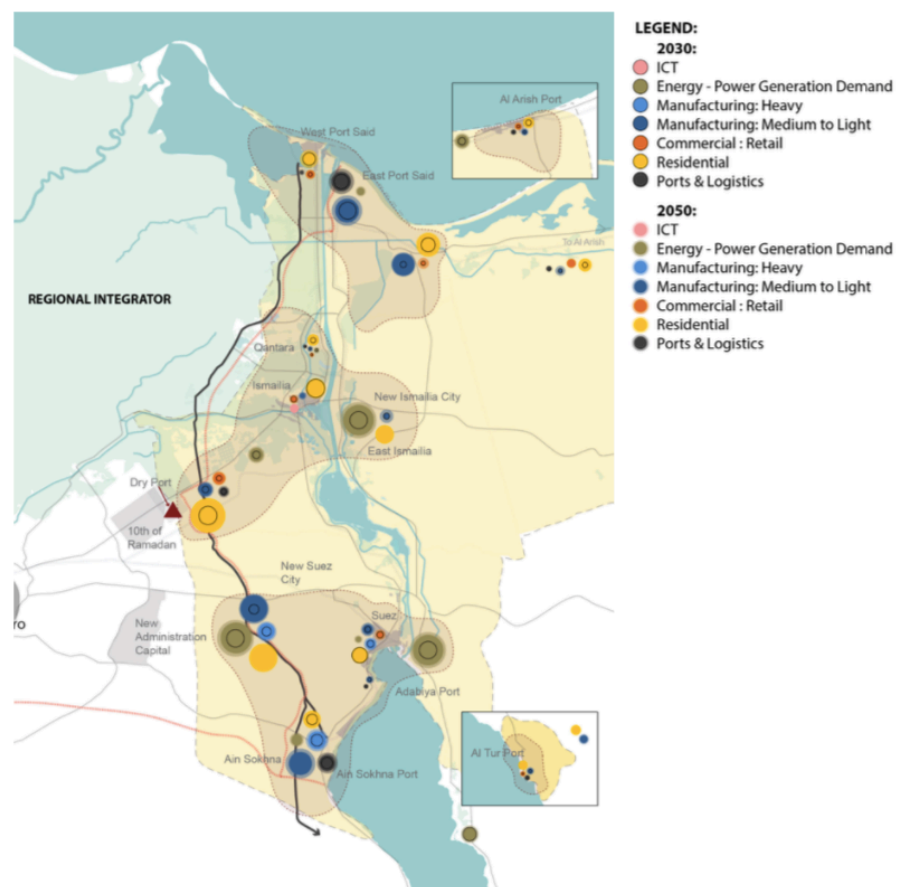
Source: Reprinted from Dar Group, 2015

renewable energy will be located in Ismailia City, East Ismailia, and Ismailia Gateway that will

connect Ain Sokhana, East Port Said, Ismailia with the dry ports in 10th of Ramadan and at 6th of October. Furthermore, Al Arish and Al Tur will be a regional center. In this scenario for the 2050 plan, most of the transportation will occur along the East Port Said and Ain Sokhna expressway, which is the new planned route as most of the new routes aim to connect main development catalysts. Moreover, there is an attempt to move the freight and passenger traffic away from the Suez Canal corridor to a less environmentally sensitive areas. Per this option, most of the land will be used in manufacturing, ports and logistics services that will be located in East Port Said, and Ain Sokhna, as shown in figure 5, while the planned new towns at Bardawil City, Ismailia Gateway and Suez Gateway will be residential areas.

4. Testing for the Economic, Social, and Environmental Sustainability of SEZs in Egypt

4.1. Data Description

Data has been gathered from various sources as mentioned before in the research methodology part, using data for the period between 2002-2018.This period of time was chosen because all the special economic zones types that exist in Egypt were operated in this duration in the Suez Canal region. Hence, this was easier to assess the performance of each zone both separately. Data used can be classified into three groups. The first group includes all the data that is related to zones' characteristics in the three Suez Canal governorates. This data includes: the job opportunities generated per project, the capital invested per project, number of companies established every year, the zone main economic activities, the types of zones, and the governorates that host these zones. The second group includes various indicators on the country level. These indicators gathered from the economic, social and environmental dimensions for Egypt at the country level, using: GDP, HDI and the annual per capita carbon dioxide (CO_2) emissions. The third group includes variables that obtained on the city level for meso level analysis, including: GDP per Suez Canal governorates, HDI per Suez Canal governorates, and the annual average concentration of smoke per Suez Canal governorates.

4.1.1. Summary of the SEZs Data in the Suez Canal region

As regard tables below on the Suez Canal zones data between 2002 and 2018 showed that industrial zones and public free zones are the ones with the highest number of companies, followed by the North West Gulf of Suez economic zone (Sez) and the private free zones (Table 5) where most of these zones are targeting the industrial sector followed by the service sector (table 6). Port Said is the governorate that have the highest number of companies (table 7) followed by Suez governorate. In terms of the capital invested, North west Gulf of Suez economic zone (Sez) is the one that attracts the highest investments relative to other types of zones, followed by private free zones then the public free zone and the industrial zones (table 8). Accordingly, Suez governorate is the one that has the highest amount of investments (table 9). Moreover, as shown in table 10, the highest investments are among the industrial, service and financial sector, respectively. Typically, the highest investments were in 2009, 2006, 2007, and 2015, respectively, where there was an economic stability in the country[8].

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[8] The highest investments in SEZs throughout years are presented in figure number 14 in the appendix

Correspondingly, the highest job opportunities generated in SEZs is in Port Said (table 11). Meanwhile, most of these jobs created was in the industrial sector (table12). In addition, public free zone creates the highest job opportunities among other types (table 13). This suggests that industrial sector is the most important sector that attracts high investments and generates high job opportunities. In terms of the zone type, North West Gulf of Suez economic zone (Sez) is the most important type of zone as it attracts high investments, whereas public free zone generates high job opportunities. Within the Suez Canal governorates, zones in PortSaid generated the highest employment whereas Suez attracted the largest amounts of investments.[9]

Table 5: Number of Companies per Type of Zones

Zone Type	Number of Companies
Public Free Zones	447
Private Free Zones	69
North West Gulf of Suez Special Economic Zone	157
Industrial Zone	618

Table 6: Number of Companies per the Economic Sector

Sectors	Number of Companies
Industrial	1007
Service	239
Agriculture	9
ICT	9
Constructional	19
Finance	8

Table 7: Number of Companies per Governorate

Governorates	Number of Companies
Suez	393
Ismailia	305
Port Said	593

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[9] For more descriptive data, there are more graphs and tables attached in the appendix for further illustration.

Zone types	Total investments in million Egyptian pounds (2002-2018)
Public Free Zones	7089.48
Private Free Zones	8386.22
North West Gulf of Suez Special Economic Zone	9488.69
Industrial Zone	950.48

Governorates	Total investments in million Egyptian pounds (2002-2018)
Suez	17817.5
Ismailia	4197.18
Port Said	3900.15

Sectors	Total investment in million Egyptian pounds (2002-2018)
Industrial	19606.5
Service	3275.31
Agriculture	63.86
ICT	46.19
Constructional	83.34
Finance	2839.69

Governorates	Job opportunity 2002-2018
Suez	80742
Ismailia	27035
Port Said	101398

Table 12: Employment in Zone Per Economic Activity

Sectors	Job Opportunity 2002-2018
Industrial	165979
Service	21809
Agriculture	10318
ICT	587
Constructional	10271
Finance	211

Table 13: Employment per Type of Zone

Zone types	Employment Opportunity 2002-2018
Public Free Zones	87149
Private Free Zones	44700
North West Gulf of Suez Special Economic Zone	37227
Industrial Zone	40099

4.1.2. Descriptive statistics

In this part most of the statistical measurements are summarized to better understand the nature of the data that is used in the econometric models. Below tables summarize important descriptive statistics of the main variables used in assessing the performance of SEZs, showing that the average investments injected in SEZs between 2002 and 2018 is 122.8193 million Egyptian pounds and the average job opportunities generated in these zones is 921.4758 jobs (table 14).

Table 14: Statistics of Main Variables

Variable	Mean	Standard dev	Min	Max	Obs.
Total Investments[10]	122.82	349.18	-187.5[11]	2903.79	211
Job Opportunities[12]	921.46	1627.55	0	10480	227
Number of Companies[13]	5.69	8.08	1	85	227

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[10] Total investments in the Suez Canal SEZs in million Egyptian pounds
[11] Total investments include the inflow and outflow of the capital each year. Hence, the negative sign related to the outflow of capital.
[12] Total job opportunities generated in SEZs per company in the Suez Canal governorates from. 2002 to 2018
[13] Number of companies established in Suez Canal SEZs every year from 2002 to 2018

GDP Growth[14] Rate	4.44	1.79	1.9	7.2	227
Log GDP per Governorates[15]	9.03	0.28	0.28	9.50	54
Egypt HDI[16]	0.65	0.025	0.62	0.69	216
HDI per Governorates[17]	0.70	0.026	0.66	0.76	216
Per capita CO_2 Emission[18]	2.27	0.235	1.78	2.57	182
Log Smoke Concentrations per Governorates[19]	2.73	0.412	1.61	3.43	151

Statistically, all of the regression models used in this study satisfied the seven classical Ordinary Least Squares (OLS) assumptions, and to ensure trustworthy regression results, the researcher test for the correlation coefficients between the main independent variables used in most of the models. Finding that the correlation coefficient between the Egyptian GDP growth rate and the number of job opportunities created in SEZs accounts for 0.3241, which is a moderate positive relationship, and it is slightly lower than the correlation between the Egyptian GDP growth rate and the total amount of investments in SEZs, that constitutes 0.3897. Similarly, it is showed that the correlation between the number of job opportunities created in SEZs and the total amount of investments in SEZs is a moderate positive relationship (0.4245)[20]. Notably, all these correlations demonstrated visually in figure 6 and 7. Figure 6 shows a linear direct correlation between the Egyptian GDP growth rate and the amount of investments in SEZs. Moreover, figure 7 confirm the linear correlation between Egyptian GDP growth rate and the number of job opportunities created. However, within different types of zones, it is shown that the correlation between the Egyptian GDP growth rate and the amount of investments in SEZs is stronger in the public free zones, and it is the lowest in industrial zones, and this correlation presented visually in figure 8.

[14] GDP growth rate in Egypt between 2002 and 2018
[15] GDP per Suez Canal governorate for 2002 2004 and 2006
[16] Egypt HDI for the period between 2002 and 2017
[17] HDI per governorates for the period between 2002 and 2017
[18] Per capita CO_2 emission in Egypt for the period (2002- 2014)
[19] Annual average smoke concentration in the Suez Canal governorates Micrograms / m3
[20] All the Correlation among other variables are attached in the appendix, tables no. 27.28, 29, 30, 31, 32

Figure 6: Correlation between the GDP Growth Rate and Total Amount of Investments
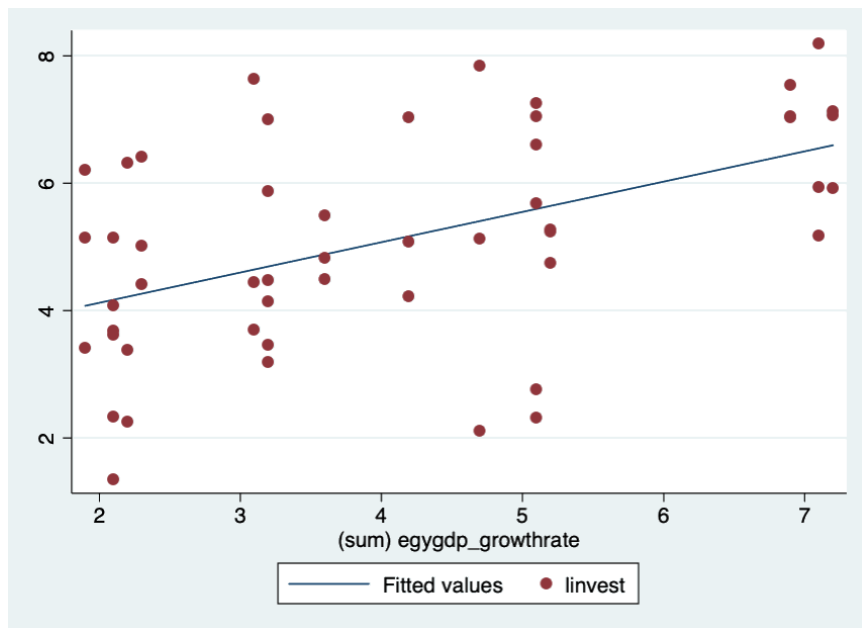
Figure 7: The Correlation between Egyptian GDP Growth Rate and the Number of Job Opportunities Created
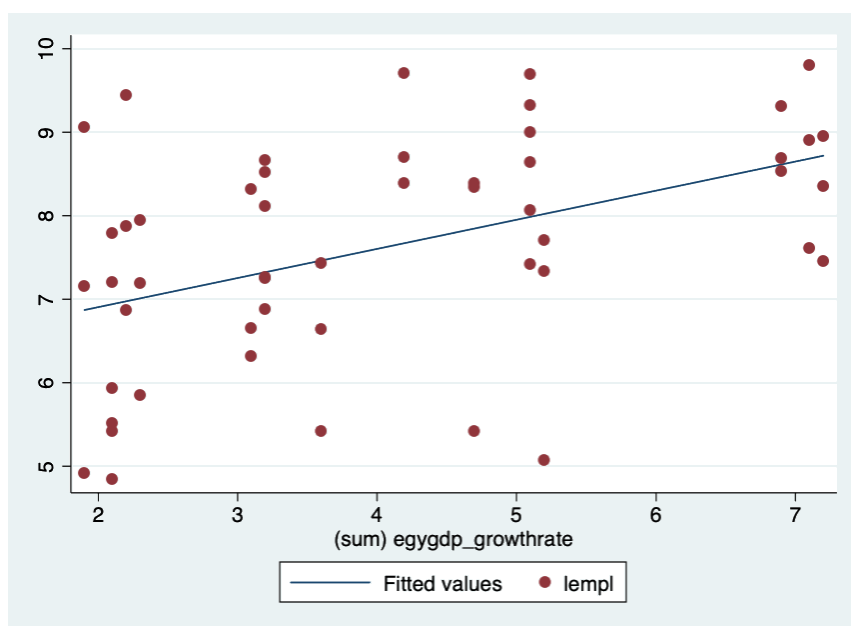
Figure 8: Correlation between the Egyptian GDP growth rate and the total amount of investments in SEZs per types of zones
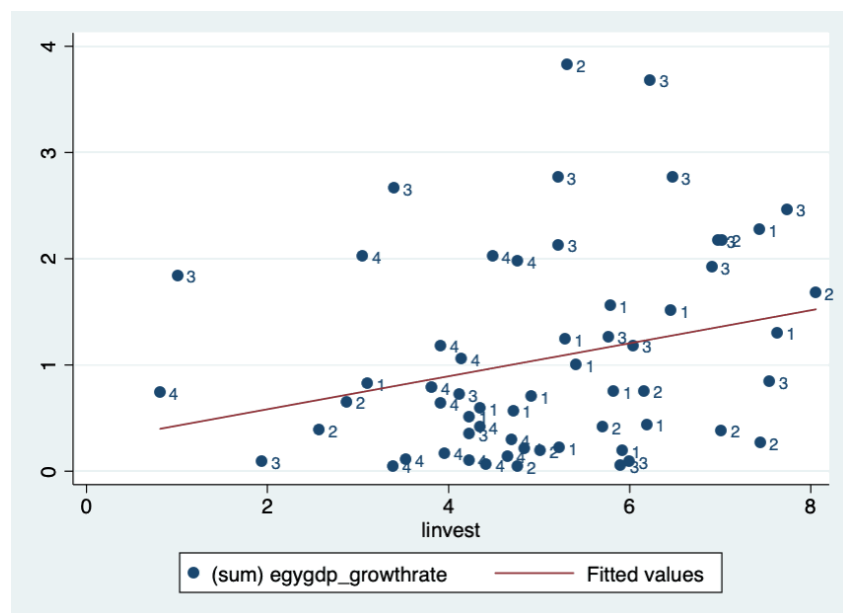
4.2. Econometric Analysis for the economic, social and environmental impacts of SEZs in Egypt and Suez Canal Governorates

The econometric models are developed to quantify the role of the current SEZs on achieving the economic, social and environmental sustainability in Egypt and in the Suez Canal governorates using Ordinary Least Squares (OLS) regression. Based on the literature, scholars used macroeconomic parameters to assess the performance of SEZs. Statistically, this study estimated that testing the effect of the special economic zone on the macro level analysis only could give misleading results as the effect SEZs may vary from the macro level analysis to the meso-level analysis. Hence, the regression will run two times. One at the macro level and another on the meso-level for each of the three pillars of sustainable development.

a) Dependent Variables at the Macro level analysis:

The macro level analysis reflect interaction over a large population unit such as nation, society or global. In this study the researcher tests for the Economic, Social, and Environmental Sustainability of SEZs at the country level, utilizing the Egyptian GDP growth rate in the economic model; in the social model, HDI used as a proxy for the social sustainability in Egypt; and for measuring the impact of these zones on the environment, the researcher used the

Egyptian per capita CO_2 emissions. In Table 23 all independent variables that used in the macro level analysis were listed with their descriptions[21].

b) Dependent Variables at Meso level analysis:

The meso level analysis reflects a population size that falls between the macro level and the micro level, tracing the outcomes of meso level unit of analysis such as village, town, community, or city. In this study the meso level refers to the city level, using log GDP per governorates as a proxy for the economic growth per governorates. In terms of social sustainability model, the researcher used HDI per governorates. For measuring the impact of these zones on the environment, the researcher used the annual average concentration of smoke in Suez Canal governorates. Noted that in Table 24 all dependent variables that used in the meso level analysis were listed with their descriptions[22].

4.2.1. Economic Sustainability Models
4.2.1.1. Economic Models Specification and variables justification

Economic indicator is a part of the economic data that is used to assess the overall health of any economy through interpreting the current and future investments potentials in the country. In this study the GDP (Gross domestic product) is the economic indicators that is used in the economic models at the macro and the meso level. Admittedly, GDP is a significant tool to define the economic priorities that can drive the national policy since it measures the earnings from the country's productivity. Furthermore, it is used to assess the status and the wealth of a nation (Pandian et al., 2013), and most scholars confirmed its efficiency as a parameter to measure the performance of the economy in the presence of the economic zones while holding other economic output factors constant (Madani, 1999).

Model 1.1: Economic Model at the Macro level analysis:

egygdp_growthrate = β_0 + β_1*minvest + β_2*he11 + β_3*he22 + β_4*he77 + β_5*eztype + β_6*gov + β_7*dsector_zone + ε_i

As shown in economic model 1.1, this study at the macro level, used GDP growth rate as it is the country economic growth which reflects the welfare of the nation. The independent variables[23] are all related to SEZs in the Suez Canal region, and these independent variables include the following:

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[21] All the dependent and independent variables used in the macro level models listed in table 23 in the appendix
[22] All the dependent and independent variables used in the meso level models listed in table 24 in the appendix
[23] The researcher used these explanatory variables based on Zheng, et. al, (2016) model.

1. Total inflow and outflow of the capital in SEZs per billion Egyptian pounds
2. Cumulative employment opportunities per 100 workers in each economic activity[24]
3. SEZs type
4. Governorates that host the SEZs
5. Economic activity of the SEZs

Table 15: Variables in the Economic Model 1.1[25]

Variables	Variable Description	coefficient	p-value	t-value
Dependent variable				
egygdp_growthrate	The growth rate of the Egyptian Gross Domestic Product.			
Independent variables				
Constant		**3.469695**	**0.000**	**12.04**
minvest	It presents the inflow and outflow of capital invested in each zone	**0.4864327**	**0.058**	**1.91**
he11	It represents the number of employees per 100 workers in the industrial sector.	**0.0120959**	**0.000**	**5.75**
he22	It represents the number of employees per 100 workers in the service sector.	**0.0562124**	**0.001**	**3.44**
he77	It represents the number of employees per 100 workers in other sectors. These sectors include the following: • Agriculture • ICT • Constructional • Finance	**0.0161087**	**0.317**	**1.00**
eztype$_i$	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**0.3057993**	**0.433**	**0.79**
	North West Gulf of Suez Special Economic Zones	**-0.3998392**	**0.361**	**-0.92**
	Industrial Zone	**-0.0898569**	**0.775**	**-0.29**

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[24] The cumulative employment per economic activity represents three independent variables: he11(for the total employment in the industrial sector), he22 (for the total employment in the service sector), and he77 (including all the employments in other sectors such as agriculture, ICT, constructional and finance).

[25] Table 15 summarize all variables used in economic model at the macro level analysis.

Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
	Suez	**Reference group**		
	Ismailia	**0.1632794**	**0.609**	**0.51**
	Port said	**-0.0676104**	**0.844**	**-0.20**
dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
	Industrial	**Reference group**		
	Service	**0.2259242**	**0.527**	**0.63**
	Agriculture	**0.3794002**	**0.599**	**0.53**
	ICT	**-0.3651083**	**0.408**	**-0.83**
	Constructional	**1.489386**	**0.043**	**2.03**
	Finance	**3.245731**	**0.000**	**9.63**

4.2.1.2.   Interpretation of the Results of the Economic Model 1.1

The results indicate that investing in SEZs have a significant positive impact on enhancing GDP growth rate in Egypt. Since increasing investments in SEZs by one billion Egyptian pounds will increase the GDP growth rate by around 0.49 percent, on average, while holding other variables constant. This result contradicts with Quaicoe, Aboagye & Bokpin, (2017), who found that SEZs investments has a significant negative impact on the country GDP in Ghana. In regards to the effect of the SEZs on the job generation, it differed from sector to another as increasing employment by 100 workers in industrial based zones increase the GDP growth rate by 0.012 percent on average, ceteris paribus, whereas increasing employment in services-based zones by 100 workers, increase the GDP growth rate in Egypt by around 0.06 percent, on average, ceteris paribus. Meanwhile increasing the employment in other economic sectors (agriculture, ICT, constructional, and finance) have an insignificant impact on the Egyptian GDP growth rate. Regarding the type of the SEZs, being in any SEZs type have no difference. Moreover, there is no difference being in Suez, Ismailia, or Port Said. Finally, SEZs that focus on the constructional and financial economic activity are more likely to have an influence on the Egyptian GDP growth rate relative to industrial-based zones. To conclude, this means that increasing SEZs capital and employment in Suez Canal SEZs have a significant economic impact on promoting economic growth in Egypt. This is accordingly agreed with the literature advocating the benefits gained from SEZs investment and employment on the economic growth (Zheng, et. al, 2016). Noted that this economic model developed at 90% confidence level, with a coefficient of determinations equals 0.2515, which means that 25% of the variation in the GDP growth rate is due to the variation in the regressors.

Model 1.2: Economic Model at the Meso level analysis:

logGDP_gov = β0 + β1*logtotal_invest_zones + β2*logempl_zone +β3*eztype + β4*gov + β5*dsector_zone + εᵢ

As shown in the meso-level analysis model 1.2, GDP per governorates is used. Noted that the observation number in the meso level analysis will be less than the macro level analysis due to unavailability of all the data per governorates. The regressors are all related to SEZs characteristics in the Suez Canal governorates. These independent variables include the following:

1. Total inflow and outflow of the foreign capital in SEZs per million Egyptian pounds (Egyptian capital, Arab capital, Non-Arab capital)
2. The Zone Total job opportunity per each company
3. SEZs type
4. Governorates that host the SEZs
5. Economic activity of the SEZs

Table 16: Variables in the Economic Model 1.2[26]

The Variables	Variables Description	coefficient	p-value	t-value
Dependent variable				
logGDP_gov	The logarithm of GDP for the three Suez Canal governorates and it is a proxy for economic growth in each governorate.			
Independent variables				
Constant		**8.821797**	**0.000**	**59.27**
logtotal_invest_zones	It presents the inflow and outflow of capital invested in each zone in millions.	**-0.0654849**	**0.011**	**-2.68**
logempl_zone	The logarithm of job opportunities generated per each project.	**0.0525331**	**0.040**	**2.13**
eztypeᵢ	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**0.0875096**	**0.378**	**0.89**
	North West Gulf of Suez Special Economic Zones	**0.1255147**	**0.354**	**0.94**
	Industrial Zone	**-0.1105247**	**0.203**	**-1.29**

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[26] Table 6 summarize all the variables used in the economic model at the meso level analysis

Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
	Suez	**Reference group**		
	Ismailia	**-0.0553787**	**0.626**	**-0.49**
	Port said	**-0.0600205**	**0.564**	**-0.58**
dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
	Industrial	**Reference group**		
	Service	**0.464398**	**0.000**	**5.88**
	Agriculture			
	ICT			
	Constructional			
	Finance			

4.2.1.3.   Interpretation of the Results of the Economic Model 1.2

Conversely, in the meso level analysis; zones' investments have an adverse impact on achieving the economic growth inside Suez Canal governorates. As based on the results of the model, increasing the total investments in SEZs by one million Egyptian pounds, decreased the GDP growth rate of the Suez Canal governorates by 0.065 Egyptian pounds on average, ceteris paribus. Thus, it seems that increasing the investments in these zones has an adverse impact on the GDP per the three Suez Canal governorates when running the model in the meso level. This could as a result of the distortion impact of FDI on the local competitiveness advantage. According to Hamada., (1974) increasing the foreign direct investment in economic zones means that the country withdraws its labors from local industries to operate foreign capital, and this practice decreases the labor-intensity who work in the domestic market and distorting the local goods production from its comparative efficiency. However, this result disagrees with Zheng et al. (2016), whose meso level analysis has asserted that economic zones played a vital role in promoting industrial development in high industrialized areas like Guangdong, as a result it had slightly positive impact on the economic performance of the host cities relative to the less industrialized areas. While increasing employment by generating one new job opportunity in SEZs, increases the GDP per Suez Canal governorates by 0.052 Egyptian pounds on average, ceteris paribus. This finding agreed with Zheng et al. (2016) who assert that employment in these zones is positively contributing to the local output of the host city. In addition, it is found that service-based zones are more likely to enhance the GDP of the Suez Canal governorates relative to other zones promoting other economic sectors. This economic model developed at 90 % confidence level, with a coefficient of determinations equals 0.4636, which means that 46% of

the variation in the GDP growth rate is due to the variation in the regressors. It follows that the economic impact of SEZs differed among the macro level analysis and meso level analysis and this difference could be a result of the low observations in the meso level analysis.

4.2.2. Social Sustainability Models

4.2.2.1. Model Specification and variables justification

Torjam (2000) defined the social sustainability from a social perspective, stating that it is difficult to sustain human well-being without a healthy environment and good vibrant economy. Thus, Gilbert et al. (1995), classified the social sustainability dimensions into three aspects: longevity of the human being that measured by the life expectancy at birth, knowledge that measured by a combination between the school enrollment rates and the literacy rate, decent standards of living that measured by GDP per capita. Meanwhile, Human development index (HDI) is a statistical index that combines the per capita income, education, and life expectancy indicators in one parameter. Thus, HDI was used in this study to illustrate impact of SEZs on the social sustainability standards. For social assessment in the macro and the meso level, the researcher will use the Egyptian HDI on the macro level and HDI per governorates on the meso level.

Model 2.1: Social Model at the Macro level analysis:

egyhdi = $\beta 0 + \beta 1*minvest + \beta 2*he11 + \beta 3*he22 + \beta 4*he77 + \beta 5*eztype_{it} + \beta 6*gov + \beta 7*dsector\_zone + \varepsilon_i$

As shown in social model 2.1, Egypt HDI (human development index) is used as a proxy for social sustainability in Egypt. The independent variables are all related to SEZs characteristics in the Suez Canal governorates. These independent variables include the following:

1. Total inflow and outflow of the capital in SEZs per billion Egyptian pounds
2. Employment opportunities per 100 workers in each economic activity
3. SEZs type
4. Governorates that host the SEZs
5. Economic activity of the SEZs

Table 17: Variables in the Social Model 2.1[27]

Variables	Variable Description	coefficient	p-value	t-value
Dependent variable				

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[27] Table 17 summarize all the variables used in the social model at the macro level analysis

egyhdi	Egypt HDI (human development index), is a proxy for Egypt social sustainability.			
Independent variables				
Constant		**0.6703023**	**0.000**	**134.33**
minvest	It presents the inflow and outflow of capital invested in each zone	**0.0036422**	**0.278**	**1.09**
he11	It represents the number of employees per 100 workers in the industrial sector.	**-0.0001753**	**0.000**	**-6.07**
he22	It represents the number of employees per 100 workers in the service sector.	**-0.000896**	**0.000**	**-4.17**
he77	It represents the number of employees per 100 workers in other sectors. These sectors include the following: • Agriculture • ICT • Constructional • Finance	**0.0001293**	**0.328**	**0.98**
eztype$_i$	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**-0.0081927**	**0.082**	**-1.75**
	North West Gulf of Suez Special Economic Zones	**-0.0034745**	**0.612**	**-0.51**
	Industrial Zone	**0.0004015**	**0.929**	**0.09**
Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
	Suez	**Reference group**		
	Ismailia	**-0.0001809**	**0.970**	**-0.04**
	Port said	**0.0011089**	**0.805**	**0.25**
dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
	Industrial	**Reference group**		
	Service	**-0.004213**	**0.507**	**-0.67**
	Agriculture	**-0.0216396**	**0.118**	**-1.57**
	ICT	**-0.018679**	**0.176**	**-1.36**
	Constructional	**-0.0188455**	**0.024**	**-2.27**
	Finance	**-0.0203454**	**0.000**	**-3.73**

Based on the results of the social sustainability model, increasing total capital in SEZs has no significant impact on promoting the Egyptian human development index (HDI). This is surprisingly contradicting with the results of Sharma & Gani (2007) that displayed the significant positive impact of the FDI on the HDI. However, increasing number of employees in the industrial and service sectors by 100 workers, decreases the Egyptian HDI by 0.00017, 0.0009 percent on average, ceteris paribus; whereas increasing number of workers in other economic activity such as agriculture, ICT, constructional, and finance have no significant influence on HDI. This result disagrees with Aggarwal (2007) findings, but it could be as a result of poor working conditions inside these zones in developing country as mentioned in literatures. Moreover, it is found that private free zones are less likely to have an impact on HDI relative to public free zone. While being in other zone types has no significant influence on HDI. Furthermore, there is no significant difference being in any of the three Suez Canal governorates. Besides, SEZs targeting the constructional and the financial sectors are less likely to have an impact on the Egyptian HDI relative to the industrial based zones. Further, it seems that the model is slightly fitted as the coefficient of determination from the regression at 90 % confidence level is 0.2132, which means that 21% of the variation in the Egyptian human development index is explained by regressors.

Model 2.2: Social Model at the Meso Level analysis:

hdipergovornorates = $\beta 0 + \beta 1*minvest + \beta 2*he11 + \beta 3*he22 + \beta 4*he77 + \beta 5*eztype + \beta 6*gov + \beta 7*dsector\_zone + \varepsilon_i$

As shown in social model 2.2, HDI (human development index) per governorates is used as a proxy for social sustainability in the Suez Canal governorates. The independent variables are all related to the SEZs characteristics in the Suez Canal governorates. These independent variables include the following:

1. Total inflow and outflow of the capital in SEZs per billion Egyptian pounds
2. Employment opportunities per 100 workers in each economic activity
3. SEZs type
4. Governorates that host the SEZs
5. Economic activity of the SEZs

The Variables	Variables Description	coefficient	p-value	t-value
Dependent variable				
hdipergovornorates	It is the human development index per governorates, and it is a proxy for the social sustainability in the Suez Canal governorates.			
Independent variables				
Constant		**0.7177246**	**0.000**	**186.06**
minvest	It presents the inflow and outflow of capital invested in each zone	**0.0015213**	**0.579**	**0.56**
he11	It represents the number of employees per 100 workers in the industrial sector.	**-0.0001423**	**0.000**	**-6.94**
he22	It represents the number of employees per 100 workers in the service sector.	**-0.0007607**	**0.000**	**-4.63**
he77	It represents the number of employees per 100 workers in other sectors. These sectors include the following: • Agriculture • ICT • Constructional • Finance	**6.18e-06**	**0.955**	**-4.63**
eztype$_i$	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**-0.0062391**	**0.065**	**-1.86**
	North West Gulf of Suez Special Economic Zones	**-0.0016302**	**0.759**	**-0.31**
	Industrial Zone	**-0.0002395**	**0.939**	**-0.08**
Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
	Suez	**Reference group**		
	Ismailia	**-0.0326709**	**0.000**	**-9.15**
	Port said	**0.0181828**	**0.000**	**5.55**
dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
	Industrial	**Reference group**		
	Service	**-0.0021685**	**0.647**	**-0.46**
	Agriculture	**-0.0101383**	**0.266**	**-1.11**

[28] Table 18 summarize all the variables used in the social model at the meso leve analysis.

	ICT	-0.0114825	0.223	-1.22
	Constructional	-0.0144146	0.017	-2.41
	Finance	-0.02139	0.000	-5.13

4.2.2.3. *Interpretation of the Results of the Social Model 2.2*

Similar to the macro level results, in the meso level analysis, the results of the social model showed that increasing the investments in Suez Canal SEZs do not have a significant impact on HDI in the Suez Canal governorates. Thus, this also disagreed with the results of Sharma & Gani (2007). Additionally, increasing employment in the industrial and service sectors by 100 workers, decreasing the Suez Canal HDI on average by 0.0001, 0.0008 percent, respectively, ceteris paribus. This result also disagreed with Aggarwal, (2007). Moreover, being in the private free zones have less impact on HDI per the Suez Canal governorates relative to public free zones. In addition to that, it is revealed that Ismailia is less likely to have an impact on the HDI relative to Suez whereas Port Said is more likely to have an impact on the Suez Canal HDI. Further, SEZs that targets constructional and financial sectors are less likely to have an impact on increasing Suez Canal HDI relative to the industrial sector. Further, it seems that this model is good fitted as the coefficient of determination from the regression at 90 % confidence level is 0.6539 which means that 65% of the variation in human development index per governorates is explained by regressors.

4.2.3. Environmental Sustainability Models

4.2.3.1. *Model Specification and variables justification*

Most of the econometric models assessed the environmental hypotheses used a single variable to measure the environmental degradation that is supported by a certain set of pollutants. Some used air pollutants variables such as; carbon dioxide (CO_2), sulfur dioxide (So_2), and nitrogen oxide (No_x) emissions while other used municipal waste and energy consumption. Measurements of the air pollution are the most common single pollutant variables used to measure impacts of economic growth on the ecological system (Almeida et.al., 2017). Hence, the researcher used the per capita CO_2 emissions in Egypt at the macro level analysis to assess the effect of SEZs investments on the environment. In meso level analysis, the researcher used the logarithm of the annual concentration of smoke per governorates to display the impact of the SEZs investment on the ecological system.

Model 3.1: Environmental Model at the Macro level analysis:

$Co_2emissionswb = \beta0 + \beta1*hin1 + \beta2*hin2 + \beta3*hin3 + \beta4*hin4 + \beta5*eztype_{it} + \beta6*gov + \beta7*dsector\_zone_{it} + \varepsilon_i$

As shown in the environmental model 3.1, the per capita CO_2 emissions in Egypt is used as a parameter of the environmental sustainability. The independent variables are all related to the SEZs characteristics in the Suez Canal governorates. These independent variables include the following:

1. Cumulative investments per zone type[29]
2. SEZs type
3. Governorates that host the SEZs
4. Economic activity of the SEZs

Table 19: Variables in the Environmental Model 3.1[30]

Variables	Variable Description	coefficient	p-value	t-value
Dependent variable				
Co2emissionswb	Per capita CO_2 emissions in Egypt in metric tons.			
Independent variables				
Constant		**2.301454**	**0.000**	**47.76**
hin1	It represents the cumulative investment per public free zones.	**0.000157**	**0.008**	**2.67**
hin2	It represents the cumulative investment per private free zones.	**0.000059**	**0.025**	**2.25**
hin3	It represents the cumulative investment per Sez.	**0.000164**	**0.001**	**3.36**
hin4	It represents the cumulative investment per industrial zones.	**0.0009955**	**0.206**	**1.27**
eztype	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**-0.0485247**	**0.447**	**-0.76**

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[29] The cumulative investments per zone type, encompasses four independent variables: hin1(for cumulative investments in public free zone), hin2 (for cumulative investments in the private free zone), hin3(for cumulative investments in Sez), and hin4 (for cumulative investments in the industrial zone).
[30] Table 19 summarize all the variables used in the environmental model at the macro level analysis

		North West Gulf of Suez Special Economic Zones	-0.0825098	0.260	-1.13
		Industrial Zone	0.0080239	0.884	0.15
Gov		A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
		Suez	**Reference group**		
		Ismailia	-0.0314043	0.529	-0.63
		Port said	-0.0301496	0.535	-0.62
dsector_zone		A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
		Industrial	**Reference group**		
		Service	-0.0753006	0.061	-1.89
		Agriculture	-0.1100756	0.291	-1.06
		ICT	-0.2362387	0.037	-2.11
		Constructional	0.0023752	0.975	0.03
		Finance	-0.0058674	0.936	-0.08

4.2.3.2. Interpretation of the Results of the environmental Model 3.1

This model showed that while holding other variables constant, every additional increase in the cumulative investments in public free zones, private free zones and North West Gulf of Suez special economic zone (Sez) by one million Egyptian pounds, increases the per capita co_2 emission in Egypt respectively by 0.00016, 0.00006, 0.0002 metric tons, on average, holding other variables constant. Thus, this compiles Yang Zhou, (2018) findings that supports the pollution haven hypothesis, revealing that foreign direct investments contribute to polluting the environment. Additionally, this model depicted that zones based on ICT and service sectors emit less co_2 emissions than industrial based zones. Furthermore, this environmental model developed at 90% confidence level, with a coefficient of determination equals 0.1440, which means that 14% of the variation in the per capita carbon dioxide emission in Egypt is due to the variation in regressors.

Model 3.2: Environmental Model at the Meso level analysis:

logsmokepergov = $\beta 0 + \beta*hin1 + \beta2*hin2 + \beta3*hin3 + \beta4*hin4 + \beta5*eztype_{it} + \beta6*gov + \beta7*dsector\_zone_{it} + \varepsilon_i$

As shown in the environmental model 3.2, the logarithm of the annual concentration of smoke per governorates is used as a parameter of the environmental sustainability. The independent

variables are all related to SEZs characteristics in the Suez Canal governorates. These independent variables include the following:

1. Cumulative investments per zone type
2. SEZs type
3. Governorates that host the SEZs
4. Economic activity of the SEZs

Table 20: Variables used in the environmental model 3.2[31]

The Variables	Variables Description	coefficient	p-value	t-value
Dependent variable				
logsmokepergov	The logarithm of the annual concentration of smoke per governorates in Micrograms / m3 and it is a proxy for the environmental impact of the zones on the three Suez Canal governorates.			
Independent variables				
Constant		**2.845512**	**0.000**	**53.2**
hin1	It represents the cumulative investment per public free zones.	**0.0001444**	**0.089**	**1.72**
hin2	It represents the cumulative investment per private free zones.	**0.0000141**	**0.609**	**0.51**
hin3	It represents the cumulative investment per Sez.	**-0.0001069**	**0.100**	**-1.66**
hin4	It represents the cumulative investment per industrial zones.	**-0.0012917**	**0.399**	**-0.85**
eztype	A dummy variable, representing four categorical variables.			
	Public Free Zones	**Reference group**		
	Private Free Zones	**0.0741782**	**0.242**	**1.18**
	North West Gulf of Suez Special Economic Zones	**0.1189827**	**0.083**	**1.75**
	Industrial Zone	**0.0071016**	**0.947**	**0.07**
Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said).			
	Suez	**Reference group**		
	Ismailia	**-0.5936263**	**0.000**	**-6.40**
	Port said	**0.0442785**	**0.426**	**0.80**

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[31] Table 20 summarize all the variables used in the environmental model at the meso level analysis

dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables.			
	Industrial	**Reference group**		
	Service	**-0.0684437**	**0.262**	**-1.13**
	Agriculture	**-0.1549577**	**0.364**	**-0.91**
	ICT	**0.0945914**	**0.737**	**0.34**
	Constructional	**-0.0885449**	**0.233**	**-1.20**
	Finance	**-0.0269458**	**0.861**	**-0.17**

4.2.3.3.   Interpretation of the Results of the environmental Model 3.2

This environmental model at the meso level indicate that increasing the cumulative investment in the public free zones by one million Egyptian pounds, increase annual smoke emissions in Suez Canal governorates by 0.00014 percent on average, holding other variables constant. Thus, this result likewise aligns with the environmental macro level results that supports PHH. While investments in other types of SEZs do not have a significant impact on smoke emissions in Suez Canal governorates. Moreover, North West Gulf of Suez special economic zone (Sez) generates more smoke emissions in the Suez Canal governorates relative to the public free zones. In addition, among the Suez Canal governorates, Ismailia generates less smoke relative to the Suez governorate; meanwhile, Port said do not have a significant impact on smokes emissions in Suez Canal governorates. Further, in this environmental model, the coefficient of determination at 90% confidence level is 0.4668, which means that 46% of the variation in the logarithm of the annual concentration of smoke per governorates is due to the variation in explanatory variables.

4.3. Empirical Findings

As given in the above models, economically, SEZs investments has a significant positive impact on the economic growth of the Egyptian economy whereas they have a significant negative impact on the economic growth of the Suez Canal governorates. Further, employment in SEZs have a significant positive impact on the economic growth of the country and the Suez Canal governorates. Socially, SEZs investments do not have a significant influence on the HDI of Egypt and the Suez Canal governorates. While in terms of employment, the results revealed that increasing employment in the SEZs has a significant negative impact on the HDI of Egypt and the Suez Canal governorates. Environmentally, most of SEZs investments have a significant positive impact on accelerating the environmental deterioration. This suggest that despite the positive economic impact of SEZs, the way the current government is dealing with the sustainability of SEZs socially and environmentally is negatively affect the human capital and the quality of the environment.

5. Proposed Strategy for the SCZone

Despite the richness of Dar Al Handasah's study, it was obvious from its vision that the study emphasis mainly on achieving regional economic growth that base on the following:

- Utilizing the geographical location of SCZone
- Increasing Incentives offer to the investors
- Enhancing business environment
- Improving the legal and regulatory framework

While all of these characteristics is important to attract investment in SCZone, but it is not sufficient to achieve sustainable development as such study is based their sustainability management framework on conventional actions that is depending on traditional environmental regulations and controls. Consequently, this means following the same traditional ways used in the past to protect the environment. While it has been asserted that using these environmental regulations in SEZs have a negative impact on the environment as shown in the previous section. Additionally, Dar Al Handasah's study still needs more investigations in regards to which development option we should proceeds after 2030. Thus, based on previous comments on Dar Al Handasah's study and the results of the econometric models developed by the researcher, current SEZs in Suez Canal region are playing a key role enhancing economic growth of the country. Meanwhile they indicate that the current and planned practices for sustaining SEZs environmentally and socially are still not sufficient. Therefore, in this section, the researcher proposed a sustainable development strategy underpinning inclusive green growth in SCZone by support rethinking and renovation techniques to address potential risks that can hinder the sustainable development in Egypt. Such strategy makes Egypt one of the strongest and the highest growth performers in the region and across emerging countries.

5.1. The vision

SCZone will be an eco-friendly economic zone that drives country's green growth through attracting quality investments which enhances the establishment of new industries, promotes diversified exports and ensures more linkage with the local economy within a business-friendly environment.

Policy Priority One:

For the success of SCZone, it is essential to ensure the sustainability of the zone economy through securing the economic viability of the zone, effectively attracting good investors and building a positive environment that enhances learning and innovation.

Policy Priority Two:

The SCZone should ensure that there is a balance between the socio-economic development that brings the benefit for all (government, investor, local business, Suez Canal residents and the workers) and creates integrated solutions to ensure the environmental sustainability of the zone.

Figure 9: SCZone inclusive green growth

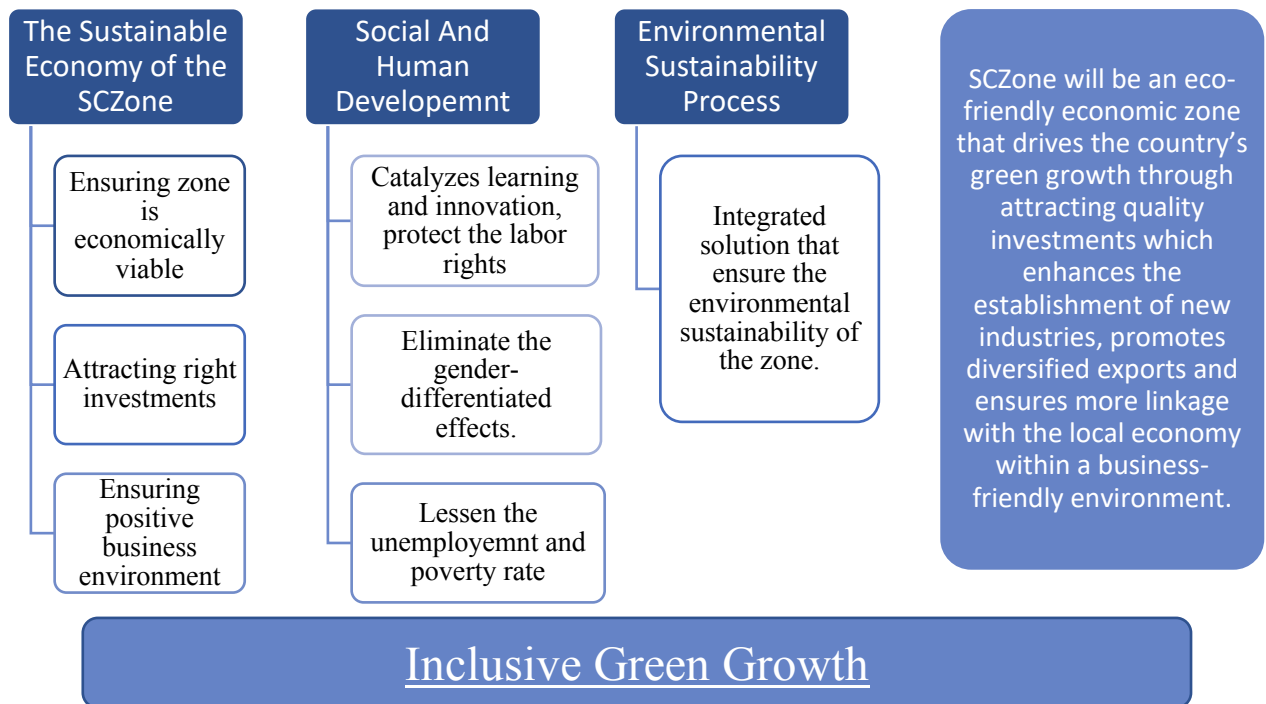| The Sustainable Economy of the SCZone	Social And Human Developemnt	Environmental Sustainability Process	SCZone will be an eco-friendly economic zone that drives the country's green growth through attracting quality investments which enhances the establishment of new industries, promotes diversified exports and ensures more linkage with the local economy within a business-friendly environment.
Ensuring zone is economically viable	Catalyzes learning and innovation, protect the labor rights	Integrated solution that ensure the environmental sustainability of the zone.	
Attracting right investments	Eliminate the gender-differentiated effects.		
Ensuring positive business environment	Lessen the unemployemnt and poverty rate		

Inclusive Green Growth

Source: The researcher

After the declaration of Egypt vision 2030, the government's development objectives have devoted for achieving high sustainable GDP growth, reducing the poverty and lessening the income inequality issues. The government seeks to accomplish all these objectives through involving the private sector in the development process besides enhancing the governmental role in the economy. Generally speaking, the government has to improve the provision of public services. In addition to that it should improve the business environment across a wide range of policies that are related to the taxation, the trade and finance. This will be a part of the Egyptian strategy that tackle the unemployment problem that increases (World Bank, 2015). Accordingly, the establishment of the Suez Canal economic zone (SCZ) is important to achieve the following objectives: 1) alleviating the unemployment 2) stimulating the Egyptian economic growth through a wider economic reform strategy 3) attracting FDI 4) diversifying the exports of the countries.

The Suez Canal economic zone designed to be a "world-class free zone and trade hub along the banks of the newly-expanded Suez Canal" (Suez Canal Economic Zone, nd). According to the Suez Canal authority's website, SCZ lies in the heart of the international trade. Strategically, it located in the world trade main route that services 80 percent of the global trade (Suez Canal Economic Zone, nd). Therefore, government should commit to assist investors through a business-friendly process to finalized businesses' registrations, licensing and obtains all permits. (Suez Canal Economic Zone, nd). Moreover, the Suez Canal economic zone authority should commit to achieve the environmental, social and economic sustainability of this zone through: applying the best sustainable practice during the establishment phase; supporting biodiversity; boosting water, energy and waste efficiency; encouraging corporate social responsibility; enhancing economic growth and job creation that ensure the resilience of productive communities. In this context, this economic zone will be a gateway towards the sustainable growth in Egypt.

5.2.   Policy Priorities

In January 2014, Egypt declared their sustainable development strategy that encourages economic growth, attracts investments and ensures social justice through developing a sustainable development strategy with a long-term vision. This strategy is based on a participatory planning during the development of the strategy, effective enforcement of the policies, and solid monitoring and evaluating systems. The main goal of this strategy aims to create open, productive and democratic entities. Suez Canal mega projects are considered to be one of the main pillars of the Egyptian sustainable development strategies. Developing the Suez Canal area as a global hub for maritime navigation, logistic services, trade and industry can strengthen the sustainable development in Egypt, stimulate the economic growth, increase exports, increase the share of service sector in GPD, and generate more job opportunities. Based on literature, the success of the economic zone lies in the ability of the host country to build its own competitive advantage that adapts to the country's conditions. Moreover, it is important to engage the zone program in to the country's long-term development strategy. This integration should not ignore the zones' growth path, commercial sustainability, infrastructure availability, skills and technological competencies and the environmental sustainability (Zeng, 2015). In this context, it is indispensable to concentrate policy maker initiatives on:

- Develop effective zones that target good quality investors.
- Make sure that these zones are viable economically, and have a positive trigger that stimulates structural transformation and the economic reforms.

- Enhance the sustainability of the SCZone by considering the institutional, economic, social and environmental manner that support establishing an Eco-industrial park (EIP) in the Suez Canal region.
- Promoting sustainability among targeted industries through enhancing practice of the industrial symbiosis and the cleaner production for a zero pollution.

As a result, Egypt will be able to accomplish part of its sustainable development strategy that support directly many of the sustainable development goals including: enhance decent work, economic growth, industry and innovation and combat climate change.

5.3. Areas of Ongoing Policy Focus and associate objectives

5.3.1. Integrating the SCZone strategy into the national development plan

 The SCZone should be an integral part of the country's development strategy and the national and regional policies to support the country's comparative advantages. This is through a full detailed strategic plan which take into consideration the commercial sustainability, growth trajectory, the availability of the infrastructure, technology innovation capabilities, target markets, business and environmental sustainability. Aiming this process could ensure the validate and long-term sustainability based on the market real demand. All the top countries that treated as a special economic zone have focused on these points. For instance, countries such as China, Singapore, Korea and Dubai are treating their special economic zone as a key instrument in their national or regional development plans (Farole, 2011; Zeng 2016). Such strategic vision is one of the main success factors which ensure the long-term commitment of the government that indicates the stability of the macro environment.

5.3.2. Create solid legal and institutional framework with a well-coordinated long-term government commitment

SCZone should have a transparent legal and regulatory framework that guarantee the clarity of roles and responsibilities among all the stakeholders. In addition, this strategic vision should deliver protection and certainty among the investors and developers. On the other hand, this framework will ensure that this zone will attract quality investment and will be developed based on high social, business and environmental standards (Zeng 2016). Thus, the Egyptian government has to ensure that all the relevant rules and policies are existing to eliminate any future fear in regard this zone. In all the countries that have successful special economic zones' experience, all the required policies and regulations were placed before the establishment of the first zone.

5.3.3. Develop a well-designed plan with an effective management in the SCZone

Egypt as a developing country can find a difficulty to fund mega projects because establishing an economic zone is very expensive. That is why it is essential to develop an accurate plan with a rigid assessment of the business environment, land and labor supplies, the supply chain, local market conditions and the demand situation. This will ensure the private sector participation through the PPP approach (FIAS, 2008; Farole, 2011; Zeng 2016). In addition to that, this act promotes the efficiency of the operation within the SCZone.

5.3.4. Set an attractive business environment with an efficient public services and good infrastructure

One of the main obstacles that can hinder the attractiveness of investment is the constraints of doing a new business. Thus, it is important to lessen all the soft and hard obstacles that impede establishing businesses in a new market (Zeng 2016), offering a business-friendly environment with a good infrastructure. As most of the successful zones throughout the world, encourage investors in these zones through providing high quality infrastructure. Instead of focusing on the fiscal incentives such as tax holiday.

5.3.5. Provision of human power and ongoing skills training

One of the indispensable factors of the success of the zone is the provision of specialized education and the continuous training process that upgrade the skills and knowledge (Zeng 2016). Thus, it is vital that the management of the SCZone recognizes the importance of having regular skill training and a customized education that matches with the industrial development demands. Therefore, the zone can have a specific incentive that enhances firms to provide the needed training to improve their employees' skills.

5.3.6. Enhance connectivity among all the stakeholders

Connectivity between all the stakeholders is an essential factor that achieves the sustainability of the zone and fosters the competitiveness to enhance the inclusive growth of the country (Zeng 2016). SCZone will need to connect all the major infrastructure facilities with sufficient logistic services through linking between the local resources and global needs which is vital for leveraging the comparative advantage of the country, engaging the domestic market in the global value chain.

5.3.7. Enhance the technological transfer, innovation and the industry learning

To promote the productivity and the sustainability of the SCZone, it is essential to keep the zone updated with the industrial and technological innovation. This will assist the zone to remain sustainable and able to cope with the changing economic requirements. Therefore,

focusing on the expansion of the research and development (R&D) is vital through boosting both the software (such as targeted incentives, solid regulatory policies and talent recruiting strategies that encourage business with high-end skills workers) and the hardware (such as pioneering parks, science and technology platforms, incubators and the innovative labs). Thus, SEZs will need more innovation to cope with the global value chain by relying more on high-end skills and more knowledge-intensive service sectors instead of focusing on the low tech and high labor-intensive sectors. Therefore, it is essential to connect universities with industrial field, attract the talents and support business incubators. This is not an easy transition, and it requires effective use of governmental support and market forces (Zeng 2016).

5.3.8. Enhance the engagement of the local economy

Connecting the domestic markets is one of the issues that should be considered by the SCZone policies. In the past, countries that have EPZ were criticized to be enclaves that attract foreign investors without having significant impacts on the local economy. Thus, contemporary zones started to base their industries on the local comparative advantage and to consider local suppliers as an integral part of the value chain. Hence, SCZone management and the government should assist local investors to reach the investors inside these zones. Accordingly, this will maximize the potential economic benefit of the zone on the host country's economy beyond the benefit of the zone itself. In China, for instance, zones encourage the zone investors to develop joint venture with local investors; while in south Korea the government stimulates inter-linkage through supporting local investors to supply the investors in the zone with the raw materials and the intermediate goods. Moreover, using the subcontracting mechanism is an effective measure that helps to generate a strong linkage between multinational firms and the domestic economy.

5.3.9. Balance between the industrial development and the social/ urban development

SCZone program will not affect the economic efficiency only but it should succeed in providing a good employment environment with high urban and social facilities. Since most of the countries that based on low wage workers, failed in achieving their potential dynamic benefits (FIAS, 2008). For this reason, SCZone program will be based on skilled workers which is one of the dynamic measures of the modern zone success, it should not be just an industrial zone but it should be a livable city to be able to attract high quality investments like in Singapore.

5.3.10. Utilization of a monitoring and evaluation systems

For achieving the targets of the SCZone, it is important to ensure that this zone has a rigorous system to monitor and evaluate the enforcement of all legislations. Since implementing these regulations properly, guarantees that this zone is operating effectively and efficiently. Development of such zones is very expensive and risky, hence, having a solid monitoring and evaluation system to assess the performance of the zone regularly is essential. This is through evaluating the zone's economic feasibility before and after the setup and before setting the incentives of the zone in order to match the performance. Recently, most of the zones are developed by the private public partnership (PPP). In this case the public sector will be responsible for developing transparent framework, providing lands and effective public services, funding the infrastructure development, and supervising the developers. In contrary, the private sector will be responsible for developing and operating the zone, providing the onsite services and infrastructures. Additionally, it is important to have a unified rule for closing zones. In South Korea, zones were developed and operated without appropriate business potentials and closing rules that regulate the closure of the zone.

5.3.11. Increase the awareness to tackle the environmental sustainability issues

SCZone should embrace strict environmental measures to lessen from the impacts of the zone on the environment in order to protect the environment and enhance the competitiveness of the zone. In china the government has started to pay billions of dollars recently to clean up the impact of the rapid industrialization in special economic zones. Therefore, most countries that establish economic zones lately reconsider the impact of these zones on the environment seriously (Kechichian and Jeong, 2016). Yet, it was follows that current SEZs in Egypt have had a negative impact that hinders the environmental sustainability. Thus, it is important while planning SCZone to drive innovative practices that enhance CP and IS to achieve green economic growth.

6. Conclusion and Recommendation

6.1. Conclusion of the study

The Suez Canal zone project is one of the mega projects that was announced by the Egyptian government to transform the Suez Canal region into a global logistics and industrial hub. This transformation aims to enhance the national economic growth, encourage global value-added activities, move the development away from the Nile Delta, reduce unemployment and support Egypt vision 2030 for sustainable development. Thus, it was indispensable to assess first the impact of the SEZs in supporting sustainable development. Consequently, estimating the extent to which expanding SEZs in the Suez Canal region has a beneficial impact on Egypt and how it can support the sustainable development in the country. Most of the previous literatures advocated the potential role of SEZs in increasing investments in the country and generating more job opportunities. Therefore, this dissertation measured the impact of SEZs on achieving the sustainable development at the country level and the city level using econometric models to quantify the impact economically, socially and environmentally. The results of these models showed that increasing the investments and the employment in these zones have a significant positive impact on promoting the country economic growth. Conversely, in the meso level analysis, the results showed that increasing investments in these SEZs have a significant negative impact on the GDP of the Suez Canal governorates. This means that the economic impacts of SEZs investments that is locating in Suez Canal region have a different effect in macro level analysis relative to the meso level analysis which could be as a result of the distortion impact of the FDI on the local goods. In terms of job creation, the economic model showed that increasing employment still have a significant positive impact on driving GDP in the country and the city level. Moreover, it is found that increasing investment in these zones do not have a significant impact on enhancing the HDI either in Egypt or in the Suez Canal governorates. Furthermore, increasing employment in SEZs has a significant negative impact on enhancing human development of Egypt and Suez Canal governorates. This result disagrees with literature that displayed the significant positive impact of the FDI and employment on enhancing human capital, and this could be as a result of the poor working conditions in these zones in developing countries. Lastly, the environmental model in the macro level analysis and the meso level analysis showed that increasing investments in some types of zones including the North West Gulf of Suez special economic zone (that is expanding recently by the government in the Suez Canal region) have a significant positive impact on deteriorating the environment. Additionally,

the meso level analysis has confirmed that North West Gulf of Suez special economic zone is responsible for generating more smoke compared to the public free zones. Overall, it can be concluded that SEZs have a significant impact on enhancing the Egyptian economic growth through increasing job opportunities and attracting more investments. While socially and environmentally, SEZs have had an adverse impact especially in the North West Gulf of Suez special economic zone. For this reason, this dissertation has proposed a sustainable development strategy that advocate SCZone to be an environmentally friendly region that can contribute to achieve the sustainable development in Egypt.

6.2. Recommendation of the study and future research

Given the above, SEZs in Egypt has evolved throughout the years. In 1970, the purpose behind establishing FTZ is to enhance trade and the economy liberalization through supporting storage and shipping projects. By mid 1980s this strategy has changed, encouraging the assembly and manufacturing projects that target exportation, and by mid 1990s, industrial activity has become the main driver behind establishing SEZs. Admittedly, all these development objectives were focusing on enhancing economic growth only. This is reflected in the results of the econometric models developed in this research which asserted that the current SEZs in the Suez Canal governorates have succeed to affect the economic growth in Egypt, but they have had an adverse impact improving the social and environmental aspect. Consequently, in the status quo Egypt has to reconsider SEZs development objectives in order to be able to accomplish the economic, social and environmental sustainability in the country. Therefore, it can be concluded that solution is in establishing Eco industrial parks that can enhance the industrial activities while improving the social and environmental sustainability of SEZs. Accordingly, further investigation still needed to portray the industries that can collaborate to achieve industrial symbiosis, benefiting the economic growth, human well-being and the environmental quality in Egypt.

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8. Appendix

Year	Type	Geographical location
1920	Free Port	Port said
1974	Free Trade Zone,	N/A
Mid-1980s To Mid-1990s	Export Processing Zone	N/A
In mid-1990s	Industrial Parks	N/A
2003	Egypt Suez Canal Economic and Trade Cooperation Zone	North West Gulf Of Suez in Sector 3
2004	Qualified Industrial Zones (QIZ)	N/A
2007	SEZs	In North West Gulf of Suez

In regards preparing the data to be run on Stata, it was essential to generate new continuous variables. These variables summarized in table 22:

Original variables	Generated variables	Purpose for the change
Total investment, total_invest_zones	minvest	To change the variable scaling from million to billion.
Number of workers per economic sector, empl_zone/ dsector_zone	he1 he2 he3 he4 he5 he6	To get the number of employees per economic sector.
	he1 he2 he7	Grouping variables of number of employees per sector in to three groups instead of six through combing the last four groups in one group called other sectors.
	he11 he22 he77	Changing the variable scale from one worker to 100 workers.
Total investment per type of zone, total_invest_zones/eztype	hin1 hin2 hin3 hin4	To get the cumulative investment per zone types.

In table 23 and 24, all variables used in the model summarized with their descriptions, and it has been classified based on the two level of analysis.

Table 23: Macro Level Variables

Variables	Variable Description
Dependent variable	
egygdp_growthrate Source: Egyptian central bank annual bulletins	The growth rate of the Egyptian Gross Domestic Product, and it is a proxy for the country economic growth.
egyhdi Source: Global Data Lab (Radboud University)	Egypt HDI (human development index), is a proxy for Egypt social spillover.
CO_2emissionswb Source: The World Bank	Per capita CO_2 emissions in Egypt in metric tons.
Independent variables	
minvest Source: General Authority of Investments and Free Zones (GAFI)	It presents the inflow and outflow of capital invested in each zone in billions. Noted that, researcher has changed the scale from millions to billions.
logtotal_forgien$_{it}$ Source: regenerated from the General Authority of Investments and Free Zones (GAFI) data	The logarithm of the total foreign capital invested in each zone. It includes the Arab and non-Arab investments.
he11 he22 he77 Source: regenerated from the General Authority of Investments and Free Zones (GAFI) data	**he11** represents the number of employees per 100 workers in the industrial sector. **he22** represents the number of employees per 100 workers in the service sector. **he77** represents the number of employees per 100 workers in other sectors. These sectors include the following: • Agriculture • ICT • Constructional • Finance
hin1 hin2 hin3 hin4 Source: regenerated from the General Authority of Investments and Free Zones (GAFI) data	**hin1** represents the cumulative investment per public free zones. **hin2** represents the cumulative investment per private free zones. **hin3** represents the cumulative investment per Sez. **hin4** represents the cumulative investment per industrial zones.

eztype$_i$ Source: General Authority of Investments and Free Zones (GAFI)	**The impact of SEZ programs could change per zone type; thus, it was important to introduce dummy variable to differentiate the effect of each zone.** A dummy variable, representing four categorical variables. And they coded as follows: Public Free Zones (PUFZ =1) Private Free Zones (PRFZ =2) Special Economic Zones (SEZ =3) Industrial zone (IZ =4)
Gov Source: General Authority of Investments and Free Zones (GAFI)	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said). Suez =1 Ismailia= 2 Port said = 3
dsector_zone Source: General Authority of Investments and Free Zones (GAFI)	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables: Industrial (ind=1) Service (serv=2) Agriculture (agri =3) ICT (ict=4) Constructional (contra =5) Finance (fin=6)

Table 24: Meso Level Variables

The Variables	Description of the Variables
Dependent variable	
logGDP_gov Source: CAPMAS (Central Agency for Public Mobilization and Statistics)	The logarithm of GDP for the three Suez Canal governorates and it is a proxy for economic growth in each governorate.
hdipergovornorates Source: Global Data Lab (Radboud University)	The human development index per governorates, and it is a proxy for the social impact of zones on the Suez Canal governorates.
logsmokepergov Source: CAPMAS (Central Agency for Public Mobilization and Statistics)	The logarithm of the annual concentration of smoke per governorates and it is a proxy for the environmental impact of the zones on the three Suez Canal governorates.
Independent variables	

logtotal_invest_zones Source: General Authority of Investments and Free Zones (GAFI)	**It** presents the inflow and outflow of capital invested in each zone in millions. The coefficient β1 measures the effect of investments in these special economic zones on the Egyptian economic growth.
logempl_zone Source: General Authority of Investments and Free Zones (GAFI)	The logarithm of job opportunities generated per each project.
logtotal_forgien Source: General Authority of Investments and Free Zones (GAFI)	The logarithm of the inflow and outflow of capital invested by the Arab and non-Arab investors.
he11 he22 he77 Source: regenerated from the General Authority of Investments and Free Zones (GAFI) data	**he11** represents the number of employees per 100 workers in the industrial sector. **he22** represents the number of employees per 100 workers in the service sector. **he77** represents the number of employees per 100 workers in other sectors. These sectors include the following: - Agriculture - ICT - Constructional - Finance
hin1 hin2 hin3 hin4 Source: regenerated from the General Authority of Investments and Free Zones (GAFI) data	**hin1** represents the cumulative investment per public free zones. **hin2** represents the cumulative investment per private free zones. **hin3** represents the cumulative investment per Sez. **hin4** represents the cumulative investment per industrial zones.
eztype$_i$ Source: General Authority of Investments and Free Zones (GAFI)	**The impact of SEZ programs could change per zone type; thus, it was important to introduce dummy variable to differentiate the effect of each zone.** A dummy variable, representing four categorical variables. And they coded as follows: Public Free Zones (PUFZ =1) Private Free Zones (PRFZ =2) Special Economic Zones (SEZ =3) Industrial zone (IZ =4)

Gov	A dummy variable, representing the three main governorates in the Suez Canal region (Suez, Ismailia, port said). Suez =1 Ismailia= 2 Port said = 3
<u>Source: General Authority of Investments and Free Zones (GAFI)</u>	
dsector_zone	A dummy variable, representing main sectors that operates in Suez Canal zones, coded into six categorial variables: Industrial (ind=1) Service (serv=2) Agriculture (agri =3) ICT (ict=4) Constructional (contra =5) Finance (fin=6)
<u>Source: General Authority of Investments and Free Zones (GAFI)</u>	

Table 25:List of the Continuous Variables Used in the Models

variables	**Variable name**
Investment inflow and outflow per zone and project in millions	total_invest_zones
Total job opportunity per zone and project each year	empl_zone
The growth rate of gross domestic product	GDP $_{\text{growth rate}}$
The growth domestic product per governates	logGDP_gov
Egypt HDI (human development index)	egyhdi
The human development index per governorates	hdipergovornorates
Per capita CO_2 emissions in Egypt	Co2emissionswb
The logarithm of the annual concentration of t smoke per governorates	logsmokepergov
The logarithm of the inflow and outflow of capital invested in each zone in millions.	logtotal_invest_zones
The logarithm of job opportunities generated per each project.	logempl_zone

Total foreign investments in millions	$logtotal\_forgien_{it}$	
The number of employees for each economic activity per 100 workers	he11 he22 he77	
The cumulative investment per zone types	hin1 hin2 hin3 hin4	

The researcher used three dummy variables to specify the types of zone, governorates that host the zone and economic activity in each zone. And they coded as follows:

Table 26: List of the Dummy Variables/ Codes

Variable	Variable Name	Classification	Codes
Zone Type	EZ type	Four categorical variables	Public Free Zones (PUFZ =1). Private Free Zones (PRFZ =2). North West Gulf of Suez Special Economic Zone (Sez =3). Free and non-free Industrial zone (IZ =4).
Governorates	GOV	Three categorical variables	Suez =1 Ismailia= 2 Port said = 3
Economic activity	D.Sector_zone	Six categorial variables	Industrial (ind=1) Service (serv=2) Agriculture (agri =3) ICT (ict=4) Constructional (contra =5) Finance (fin=6)

Descriptive Tables

Table 27: Correlation coefficient between Egyptian GDP Growth Rate, Total Employment Generated in SEZs and Total Amount of Investments in SEZs for model 1.1

Correlation Coefficient	Egyptian GDP Growth Rate	Total Employment Generated in SEZs	Total Amount of Investments in SEZs
Egyptian GDP Growth Rate	1		
Number of Job Opportunities Created	0.3241	1	
Total Amount of Investments in SEZs	0.3897	0.4245	1

Table 28: Correlation coefficient between GDP Per Suez Canal governorates, Total Employment Generated in SEZs and Total Amount of Investments in SEZs for model 1.2

Correlation Coefficient	GDP per Suez Canal Governorates	Total Employment Generated in SEZs	Total Amount of Investments in SEZs
GDP per Suez Canal Governorates	1		
Number of Job Opportunities Created	-0.0141	1	
Total Amount of Investments in SEZs	-0.0676	0.2898	1

Table 29: Correlation coefficient between HDI, SEZs investments and cumulative employment per economic activity for model 2.1

Correlation Coefficient	HDI in Egypt	Investment in billion Egyptian pounds	Cumulative employment in the industrial based zones	Cumulative employment in the service-based zones	Cumulative SEZS employment in the other sectors
HDI in Egypt	1				
Investment in billion Egyptian pounds	-0.0205	1			
Cumulative employment in the industrial based zones	-0.2503	0.1638	1		
Cumulative employment in the service-based zones	-0.2077	-0.0781	-0.2611	1	
Cumulative SEZS employment in the other sectors	0.0073	-0.0567	-0.0928	-0.0495	1

Table 30: Correlation coefficient between HDI per Suez C anal Governorates, SEZs investments and cumulative employment per economic activity for model 2.2

Correlation Coefficient	HDI per Suez Canal Governorates	Investment in billion Egyptian pounds	Cumulative employment in the industrial based zones	Cumulative employment in the service-based zones	Cumulative SEZS employment in the other sectors
HDI per Suez Canal Governorates	1				
Investment in billion Egyptian pounds	0.0002	1			
Cumulative employment in the industrial based zones	-0.1400	0.1638	1		
Cumulative employment in the service-based zones	-0.0705	-0.0781	-0.2611	1	
Cumulative SEZS employment in the other sectors	-0.0414	-0.0567	-0.0928	-0.0495	1

Table 31: Correlation coefficient between carbon emission in Egypt and total amount of investments in SEZs for model 3.1

Correlation Coefficient	Carbon Emission in Egypt	Investment in billion Egyptian pounds
Carbon Emission in Egypt	1	
Investment in billion	-0.0139	1

Table 32: Correlation coefficient between smoke emission in Suez Canal governorates and total amount of investments in SEZs for model 3.2

Correlation Coefficient	Smoke Emission in Suez Canal governorates	Investment in billion Egyptian pounds
Smoke Emission in Suez Canal governorates	1	
Investment in billion	0.0796	1

Table 33: Summary for Total Number of Labors per Zone Type (2002-2018)

Zone Type	Total Number of Labors	Total Number of Labors in service	Total Number of Labors in agriculture	Total Number of	Total Number of Labors in	Total Number of Labors in finance	Total

	in industrial			Labors in ICT	constructi onal		
Public Free Zones	287602	36393	22	397	15	321	324751
Private Free Zones	193535	26261	10100	0	0	0	229898
North West Gulf of Suez Special Economic Zone	108909	201	0	300	10221	0	119634
Industrial Zone	281401	1538	10296	230	83	0	293552
Total	871447	64393	20418	927	10319	321	967835

Table 34:Summary for Total Number of Labors per Governorate (2002-2018)

Governorate	Total Number of Labors in industrial	Total Number of Labors in service	Total Number of Labors in agriculture	Total Number of Labors in ICT	Total Number of Labors in constructio nal	Total Number of Labors in finance	Total
Suez	266206	25799	10100	530	10221	171	313028
Ismailia	257774	11569	10318	397	65	150	280275
Port said	347467	27025	0	0	33	0	374528

Table 35: Summary for Total Investments per Economic Activity (2002-2018)

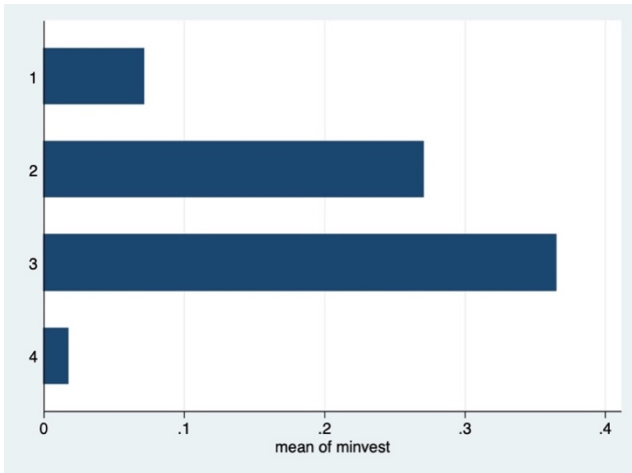| Economic Sector	Total investments in billion Egyptian pounds	Total investments in million Egyptian pounds
Industrial	19.60648	19606.5
Service	3.27531	3275.31
Agriculture	0.06386	63.86
ICT	0.04619	46.19
Constructional	0.08334	83.34
Finance	2.83969	2839.69

Descriptive Figures

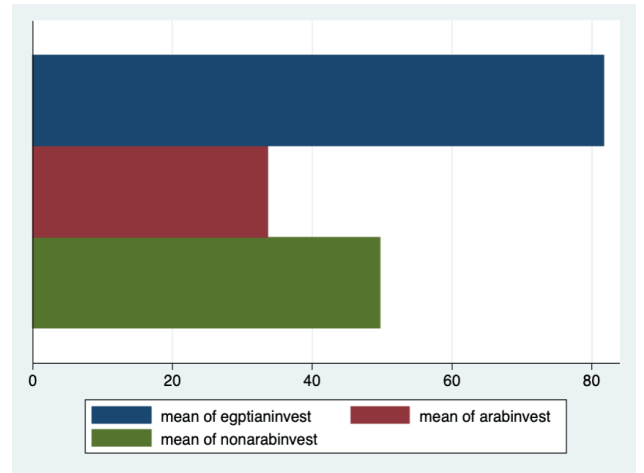*Figure 10: average total investment per zone type*

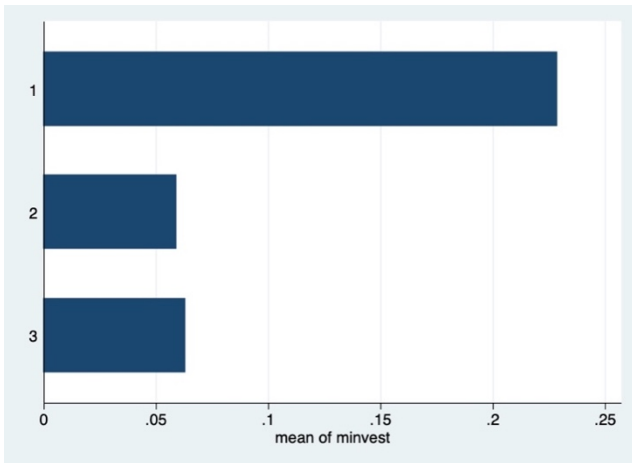*Figure 13: average investment in SEZSs per types of investments*

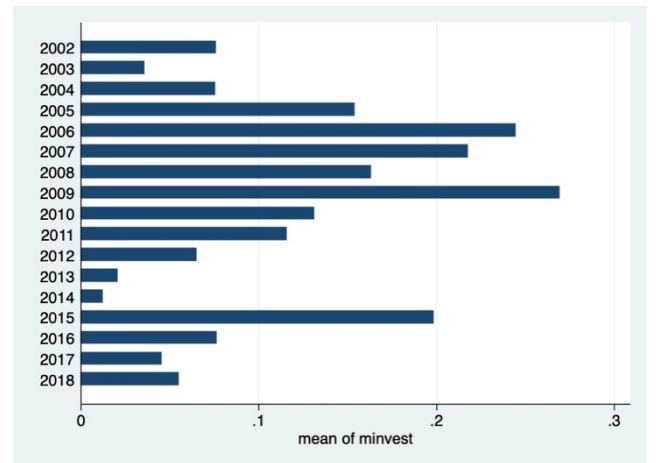*Figure 11: average investments in SEZs per governorates*

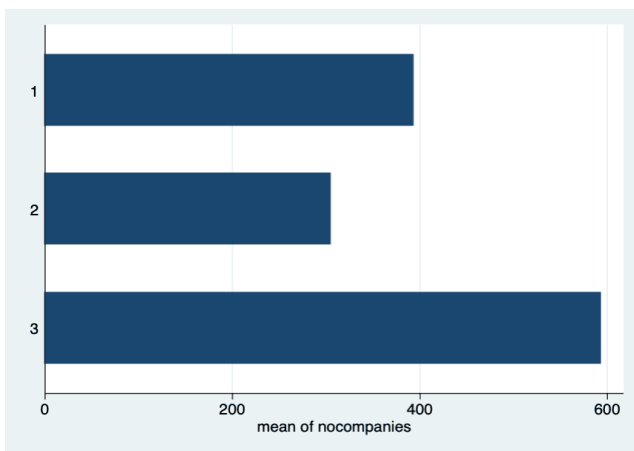*Figure 14: average investments in SEZs annually*
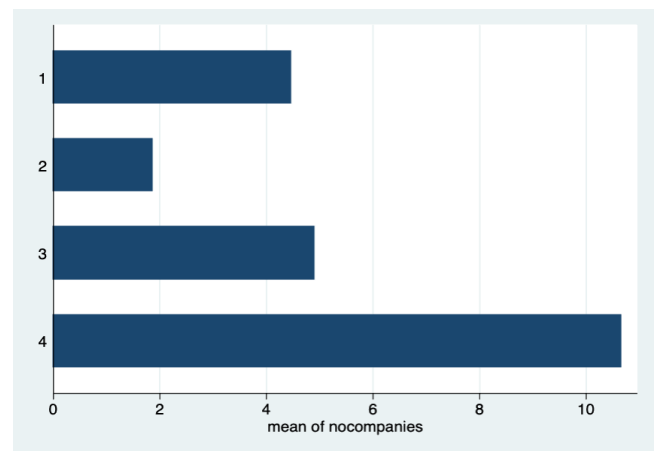

Figure 12: number of companies in SEZs per governorates

Figure 15: number of companies in SEZs per type of zone