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## Tracing the Urban Sprawl in the Secondary Egyptian Cities: A Comparison-Based Review for Achieving an Efficient Urban Development

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### Abstract

Urban sprawl is an observed remarkable phenomenon within a city's structure. It translates its behavior of urban growth through creating newly developed areas to fulfill the increasing urban demands of its inhabitants. Although urban sprawl happens in all rural and urban settlements, it is essential to trace this phenomenon in the secondary cities as they consider transitional zones for various activities between the rural settlements and primate cities. Therefore, the research attempts to trace this phenomenon inside the secondary Egyptian cities through a deductive approach to locally state this phenomenon and deal with it according to the intermediate role of these cities. Firstly, the research defines the phenomenon of urban sprawl and its reasons by detecting a group of pillars that generally affect its occurrence. Subsequently, it moves to secondary Egyptian cities and compares, globally and locally, the appearance of these pillars. Finally, the research frames features of concurrence and conflict between the global and local appearance of reasons for urban sprawl in the secondary Egyptian cities. Subsequently, it figures the learned lessons from its comparison-based review for the reasons for urban sprawl by proposing a road map that can help in mitigating this phenomenon within the secondary Egyptian cities.

**Keywords:** Secondary Cities, Urban Sprawl, Urban Development.

### 1. Introduction

Urban sprawl is an urban phenomenon relating to the city's urban growth on natural lands to meet the increased urban demands that the city can't fulfill, like housing and job opportunities, due to the increase in population growth (Harvey & Clark, 1965). It happens through a haphazard urban pattern characterized by low-density land use (Bruegmann, 2005), ribbon shape of urban lots (Ewing, 2008), and leapfrogged growth from the city's peripheries (Razin & Rosentraub, 2000). Moreover, It is also characterized by car dependence for transportation and commuting (Club, 1999) and reliance on existing services and facilities in the city (Robert W. Burchell, et al., 1997). Besides, Urban sprawl is generally characterized by following an ordered urban planning model in developed countries, while it presents a model of slums growth in developing countries, *Figure1*.

Urban sprawl has been considered a particular case within the urbanism of cities since the early eras as it appeared in many old towns such as the city of Babylon, Ur, and ancient Rome. It did not manifest obviously inside cities because of the balance

between their population and the growth of urbanization (Bruegmann, 2005). Over time, urban sprawl today has become a prominent feature of the city's layout, as the town has occupied more area than it did in the past.

Furthermore, the city has transformed into a center of many opportunities for work and services, attracting many people to live inside it. So, the city's sprawling upon natural lands becomes a standard method to meet the increasing demand for housing and services for its residents (Tachieva, 2009) regardless of its negative effect due to the decrease of natural lands. This urbanization process has become a big problem that threatens the existence of arable lands on the earth. Globally, it is expected that by 2030 the world will lose 1.8% - 2.4% of its croplands because of the rapid urbanization and sprawl of cities (d'Amour, Reitsma, Baiocchi, & Barth, 2017). Locally, Egypt loses annually 10- 35 thousand acres of arable lands because of urban sprawl. (United Nations Development Programme- UNDP, and General Organization of Physical Planning- GOPP, 2014). Therefore, the world should rethink the effects of cities' extensions upon the arable lands and develop new ways of cities' growth, which can help

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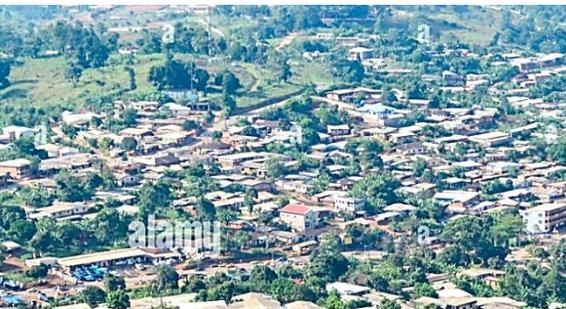
mitigate the sprawl of urbanism and protect the natural lands.

On the other hand, Secondary cities affect urban development for developed and developing countries, as they functionally facilitate the transition from the rural environment, which includes sources of production and raw materials like agriculture, to the primate cities that contain centers of power, Trade, administration, and industry (Roberts & Hohmann, 2014). Furthermore, secondary cities physically occupy an essential role in global urbanism. They are infill elements within any urban system, from primate cities to rural settlements. On the worldwide level, secondary cities formulate 49.46 % of the global urban population when stating their limit to be less than one million people (United Cities and Local Governments-UCLG, 2017). While on the local level,



Egypt Census- 2017 states that 42.9% of the population live in urban areas, and 54.1% of the urban population live in secondary cities, while 45.9% concentrate in Cairo, Giza, and Alexandria (The Central Agency for Public Mobilization and Statistics- CAPMASS, 2017). So, the maximization of secondary cities' role within the urban system will promote achieving urban development, which can not attain without enabling the secondary cities to overcome their problems and determine the reasons for these problems, like urban sprawl. Accordingly, this research attempts to trace the reasons for urban sprawl inside secondary Egyptian cities and determine the different reasons between Egyptian cities and the other ones to enhance an efficient achievement for urban development in Egypt.

(A)- Planned suburbs in Oregon, USA. A model of planned urban sprawl in the developed countries, source: <https://bit.ly/3M0s8z0>



(B)- Chaotic urban growth in Bamenda City, Cameroon. A model of unplanned urban sprawl in the developing countries, source: <https://bit.ly/3yDTcAj>

## 2. Research Problem and Methodology

Urban sprawl negatively affects achieving integrated development within cities. Environmentally, it inefficiently consumes the energy and natural resources of the environment (Newman & Kenworthy, 1998) as it gobbles up forests, farmlands, wetlands, and woodland (Bagheri & Tousi, 2018). Economically, urban sprawl decreases land productivity due to land consumption in urban

### **Figure 1.** Models of Urban Sprawl.

development more than agriculture (Rafferty, 2009). Socially, It reduces the quality of life by encouraging social segregation (Duany, Plater-Syberk, & Speck, 2010) and makes the sprawled areas characterized by a lack of sense of urban history and identity (Kunstler, 1998). Accordingly, this phenomenon needs to be understood to mitigate its effect on urbanism, which can achieve by comprehending the urban sprawl's reasons within cities, including the secondary ones. As each zone has its properties and influential dynamics differing from one to another, the causes of urban sprawl also vary from place to place, and this fact should be considered when we seek to have a correct understanding of this phenomenon and deal appropriately with it.

Accordingly, the research follows a deductive approach for tracing the causes of urban sprawl in the secondary Egyptian cities, which benefits understanding this phenomenon and mitigates it for achieving efficient urban development. Firstly, the research adopts a descriptive method to determine the general causes of urban sprawl and how they differ in developed and developing countries. Subsequently, it adopts an analytical comparison-based approach to trace the reasons for urban sprawl in the secondary Egyptian cities and how they differ from global trends. Finally, the research elicits learned lessons from investigating causes of urban sprawl in secondary Egyptian cities and argues how to benefit from their tracing in developing these cities by reinforcing their roles within the surrounded urban system.

## 3. Discussing the Causes of Urban Sprawl

Discussing the phenomenon of urban sprawl and its causes has been a common topic among urbanists since the second half of the twentieth century. Accordingly, many studies have discussed these phenomena, stating the concept of urban sprawl

spans multiple dimensions and driving forces that affect how urban built-up land cover adds up throughout outskirts landscapes (Yasin, Yusoff, Abdullah, Noor, & Noor, 2021). Taking a sample of these studies for the last twenty-five years, some refer to the increase in population as one of the essential causes of urban sprawl. (Pendall, 1999) stated that exceeding the urban population in the USA causes the “bad urban growth,” which is the same as discussed by (Sudhira, Ramachandra, & Jagdish, 2003) in India; (Salvia, Serra, Zambon, Cecchini, & Salvati, 2018) in some Mediterranean regions, (Aurambout, Barranco, & Lavalle, 2018) in some urban zones in Europe, and (Hosseini & Hajilou, 2018) in the Iranian cities.

Furthermore, some studies have focused on other dynamics that help attain urban sprawl. For example, (Downs, 1999), (Fang & Pal, 2016), and (Omurakunova, et al., 2020) have discussed the role of migration in this phenomenon. While the effect of the economic forces in making the cities sprawled have been argued by (Downs, 1999), (Guangdong & Feng, 2019), and (Guan, He, He, Cheng, & Qu, 2020).

The role of urban facilities in affecting the urban sprawl was stated by (Peiser, 2001) and (Salvia, Serra, Zambon, Cecchini, & Salvati, 2018), besides, (Bhatta, 2010) clarified how the efficiency of housing for various socioeconomic groups played an essential role in this phenomenon. Finally, and moving to the institutional dynamics, the role of policies and strategies in urban sprawl is discussed by (Dowling, 2001) and (M.Viana, Oliveira, Oliveira, & Rocha, 2019). Also, the effect of legislation on urban sprawl is argued by (Sellers, 2002) and (Bart, 2010).

Based on this review, the research determines five pillars of achieving urban sprawl, and it will discuss their relationship, globally and nationally, to this phenomenon. These pillars are:

- The Increase in Population.
- Migration.
- Economic Forces.
- The Inefficiency of Urban Facilities and Housing.
- Policies and Legislations.

## 4. Part (I): Causes of Urban Sprawl

### 4.1. The Increase in Population

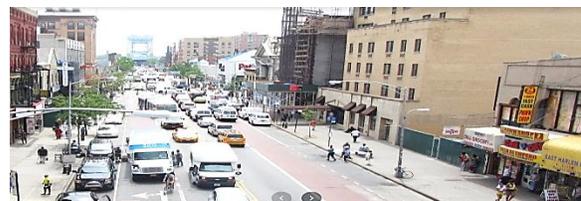
Urban sprawl results from the natural growth of population, which is associated with the increase of urbanization and the urban demands of the city's inhabitants. Generally, cities attract all increases in population and affect the ratio of settlements over time. For example, 34% of the global population

existed in towns in 1964 (World Health Organization- WHO, 2020), while by 2050, it is expected that 68% of worldwide people will be in cities (The United Nations, Department of Economic and Social Affairs- UNDESA, 2018). It is estimated that the developing world and secondary cities will occupy an essential role in increasing population in the future. By 2030, the world will have 43 megacities with more than 10 million inhabitants, where developing regions include most of these cities. Furthermore, some of the fastest-growing urban agglomerations are cities with fewer than 1 million inhabitants, many of them located in Asia and Africa. While one in eight people live in 33 megacities worldwide, close to half of the world's urban dwellers reside in much smaller settlements with fewer than 500,000 inhabitants (The United Nations, Department of Economic and Social Affairs- UNDESA, 2019).

## 4.2. Migration

Migration also helps achieve urban sprawl, and its effect differs between developed and developing countries. In developing countries, urban sprawl occurs mainly because of *rural-to-urban* migration. Cities in developing countries include available job opportunities and economic conditions better than rural areas, encouraging migration because of poverty, unemployment, and less care for rural productivity. Consequently, the pattern of urban sprawl usually belongs to the slums pattern due to the low economic conditions that they have lived in these cities (Food and Agriculture Organization of the United Nations- FAO, 2017).

In developed countries, the situation differs as rural to urban migration is less due to the balance between agriculture and other economic activities. Accordingly, migration is minimal, and most population movements are now inter-urban or intra-urban (Angel, Sheppard, & Civco, 2005). Moreover, many cities in developed countries, such as the U.S. (Yu, 2002); and Germany (Siedentop & Fina, 2010), have decreased populations resulting of migration. The type of urban sprawl that occurs belongs to the pattern of planned suburbs and exurbs, designed mainly for the upper classes that escaped from the congested city to find welfare, privacy, and social comfort in the outskirts. In contrast, the lower classes are settled in the old places of the



upper ones to be more close to services and workplaces (Bruegmann, 2005), *Figure 2*.

(A)- Harlem district in New York City, occupied by the lower classes after the transition of upper classes to the outer suburbs, source: <https://bit.ly/3FpLv1U>

(B)- Staten Island Suburb, New York City. One of NYC's outer suburbs where the upper classes move to, source: <https://bit.ly/3P6WxNJ>

**Figure 2.** An Example of the Migration Causing Urban Sprawl in the Developed Countries.

### 4.3. Economic Forces



In developed countries, urban sprawl happens because of improving economic conditions. Accordingly, this improvement encourages the upper classes to transit to new low-density urbanized zones at the edges of the city, like suburbs and exurbs, where they can find more luxurious and comfortable houses with various open spaces better than the existing ones inside the city (Wassmer, 2002). For example, 50% of the U.S. suburbanization between 1950 and 1980 happened because of the Americans' increasing incomes (Margo, 1992).

In contrast, urban sprawl happens in developing countries due to the weakness of economic forces making the cities dominate the financial powers, while the rural areas suffer from the deficiency of agriculture and productivity. Therefore, as explained in the former section, this dominance generates a gap in incomes between rural and urban and leads to rural-to-urban migration. Moreover, the migrants to the city resettle in slums area as they can not find affordable housing and services (Olotuah, 2012). So, urban sprawl in developing countries combines the planned model in the suburbs and gated communities for the rich and the unplanned model in slums and favelas for the poor.

### 4.4. The Inefficiency of Urban Facilities and Housing.

The non-quality of the urban system, with its two components: urban facilities and housing, plays a vital role in occurring urban sprawl. Starting with urban facilities, in developed countries, the relationship between urban sprawl and the inefficiency of urban facilities appears through the optionality-based desire to choose another luxurious urban facility that does not exist in the city center. Consequently, the city sprawls outwards to provide new urban facilities that mainly serve the upper classes (Bruegmann, 2005). The situation differs in developing countries as the poverty rates are higher and the demand for urban facilities, which suffer



already from lacking, is more massive. Consequently, urban sprawl in developing countries is more related to the insufficiency of basic urban facilities than the optional desire to choose another service (United Cities and Local Governments-UCLG, 2017).

Moving to the housing process, the relationship between sprawl and housing in the developed countries appears through moving to the outer suburbs by the upper classes for luxurious homes, and the poor are resettled upper classes houses' instead because of their near workplaces and services (Bruegmann, 2005). On the other side, the situation differs in developing countries. Urban sprawl is usually demonstrated through the pattern of slums where the housing units are scanty and suffer from many problems (Olotuah, 2012), *Figure 3*.

(A)- Gated Community in Ampthill City, U.K., source: <https://bit.ly/3932DOB>



(B)- Gated Communities and Slums Areas in Guarujá City, Brazil, source: <https://bit.ly/3KVxRER>

**Figure 3.** The Relationship between Urban Sprawl and the Inefficiency of Urban Facilities & Housing in Developed and Developing Countries.

#### 4.5. Policies and Legislations

Policies and legislation are also assistive drivers for urban sprawl. In developed countries, policies and legislations have been considered contributors to achieving urban sprawl by supporting the activities of urban sprawl and giving them credibility and validity. In the U.S., for example, policies and procedures that encourage loans are responsible for prompting settling in the suburbs. Moreover, the low revenues from lands and property taxes have also heartened the inhabitants to own more real estate and increased the urban sprawl (Brueckner & Kim, 2003).

In developing countries, the situation differs from the developed countries. Concerning policies, there is no adoption for the ones that encourage urban sprawl. Also, there is no adopted policy for mitigating it, as the informal chaotic patterns of urbanization upon their arable lands are always in progress refers to its implementation without any authorized policy to protect these lands. Moving to legislation, one of the most problematic issues in developing countries is the conflict and discrepancy between the organizational laws. Laws in developing countries are generally issued to deal with specific issues at a particular time and rarely consider coordinating between other related laws or between the former and latter laws. Consequently, the supervised domains by these laws will be inconsistent and disordered, including urbanism.

### 5. Part (II): Tracing the Urban Sprawl in the Secondary Egyptian Cities

As mentioned formerly, the secondary Egyptian cities are widely and remarkably spread along with the Egyptian urbanism, occupying nearly half of the urban population, *Figure 4*. Accordingly, In this part, the research discusses the phenomenon of urban sprawl in secondary Egyptian cities based on its formerly mentioned five pillars to understand this phenomenon and achieve balanced development for these cities

#### 5.1. In terms of the Increase in Population

The increase in population affects the urban growth of secondary Egyptian cities in two cases. The first case is the increase in the city's area due to the newly added plots that have been combined with the city to meet the increasing demand for services. The second case is the change of the settlement's rank due to its transformation from a rural settlement to an urbanized one, and it has contributed to adding new cities to Egyptian urbanism, *Table 1*. This transformation occurs because of two reasons:

- The village population has become bigger than the common size of rural settlements. Accordingly, the village is classified to be an urban area.
- The importance of the village for providing services for the surrounding urban system, consequently, the village was upgraded to transform into a city.

In the secondary cities in Egypt, dealing with the increase of population that causes the urban sprawl requires redistributing the people in the other non-densely populated cities, which will reduce the effect of the increased population in the dense cities. It can be achieved through the level of spatial planning, which is interested in the relationship between the components of the system of cities. Besides, It needs to find new incentives for growth that will attract the increased population in dense cities and encourage the people economically, socially, and physically to resettle in these non-dense cities (Abel-Salam, 1989).

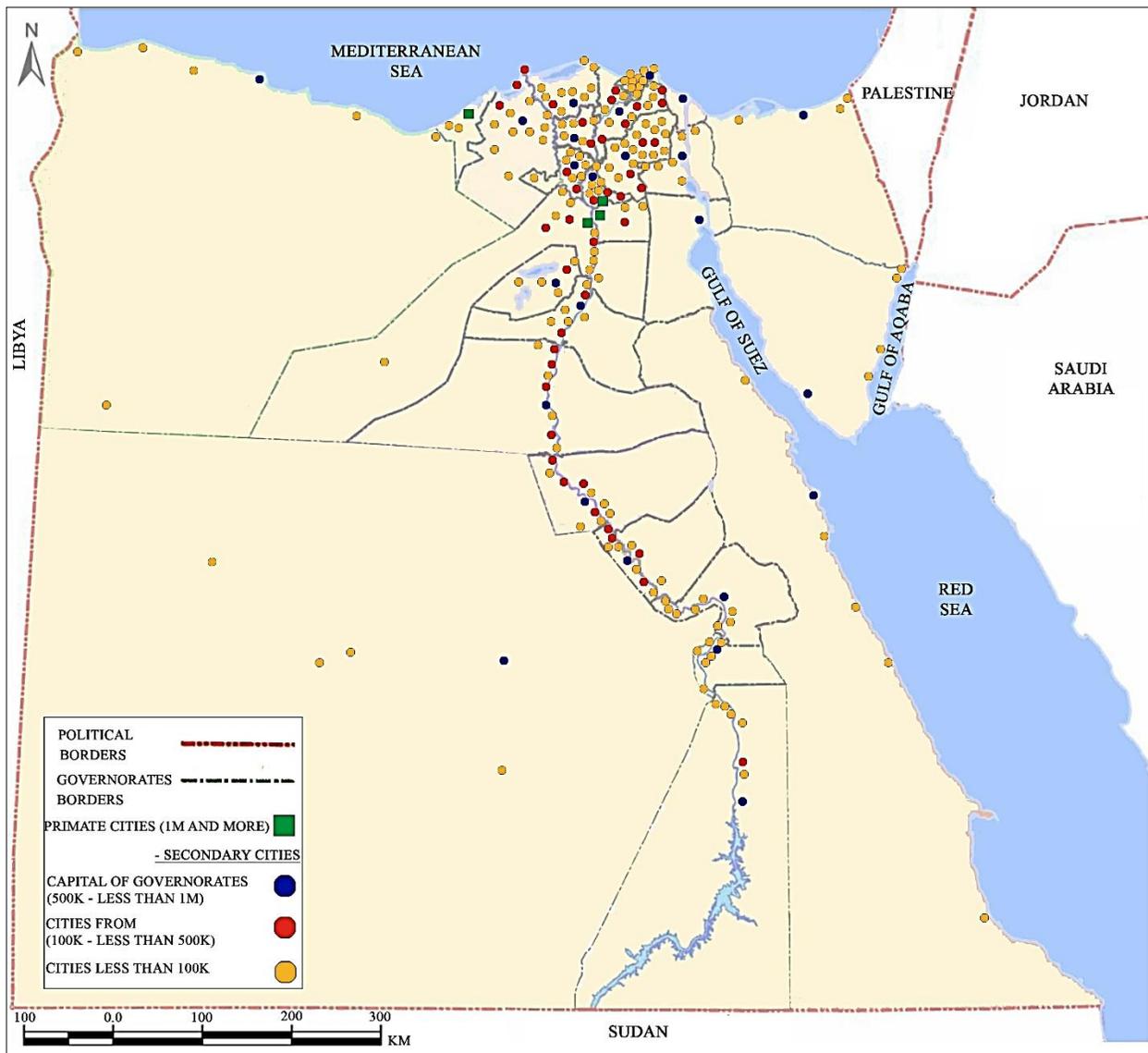
City Classification		Number of Cities				% of Urban Population			
		1976	1986	1996	2006	1976	1986	1996	2006
Primate (1,000,000- over)		2	3	3	4	56.67	51.38	48.80	51.92
Secondary Cities	Large Cities (500,000- 999,999)	0	1	1	1	0	3.38	3.44	4.27
	Intermediate (100,000- 499,999)	17	20	24	32	18.34	19.91	22.75	21.25
	Small Cities (20,000- 99,999)	86	104	125	147	19.86	14.19	23.77	21.84
	Smaller Settlements (< 20,000)	53	58	58	30	5.13	11.14	1.24	0.65
TOTAL		158	186	211	214	100	100	100	100

**Table 1.** The Rank and Population of the Egyptian Cities From 1976 to 2006 (*Antar Abou Korin, 2011*).

## 5.2. In terms of Migration

Migration is one of the causes of achieving urban sprawl, and it happens in developing countries as a temporary or permanent "rural-to-urban migration." However, migration and urban sprawl in secondary Egyptian cities are different. Generally, Egypt occupies a low rate of internal migration within its urban system as it is 8% of the total population, while the international average is 15 % of the total population (Santiago Herrera, 2012). Moreover,

although Egypt's population triplicated over the last fifty years, the share of the total population for the urbanized areas in Egypt has been approximately fixed over the years compared to the other countries in the MENA region. For example, the urban population in Egypt in the 1970s was 41% of the total population and 43% in the 2010s, while in Morocco was 34% in the 1970s and 62 % in the 2010s, and in Tunisia, it was 43% in the 1970s and 69 % in the 2010s (The United Nations, Department of Economic and Social Affairs- UNDESA, 2019).



**Figure 4.** The Distribution of the Egyptian Cities through All Governorates, including the Primate Cities and the Different Sizes of the Secondary Cities. Created by the Researchers Based on the Population Data of the Egyptian Cities, available online on: <https://www.citypopulation.de/en/egypt/cities/>

This comparison shows that the increase in population within the Egyptian cities is spatially static, and it happens naturally without any new external population flows that come to them through internal migration.

Through tracing migration and urban sprawl in the secondary Egyptian cities, we will explore that many research works have found the average internal migration within these cities retreats year by year. Accordingly, migration cannot be considered an influential factor in their growth, and it does not cause urban sprawl.

Talking about some of these research works, **Faisal Abel Salam** found at the end of the 1980s when he compared the data of Egypt censuses 1976 and 1986, a start of regression in the average internal migration for the secondary Egyptian cities. He claimed that this regression would continue in the decrease due to the difference in migration's causes between the past and future (Abel-Salam, 1989). Subsequently, Faisal's claim has proven its correctness through the research work of **Anda David et al**, as they found through the dependency on *ELMPS- Egypt Label Market Panel Survey*, the average internal migration for the Egyptian cities had declined by half from the 1980s to 2018 (David, El-Mallakh, & Wahba, 2019). Other similar results were founded by **Barry McCormick and Jackeline Wahba** when they applied the analytical tools *LFSS- Labor Forces Sample Survey* and *ELMS- Egyptian Labor Market Survey*. The researchers found that the internal migration within the secondary Egyptian cities decreased when comparing its averages between 1988 and 1998. Besides, and this is the most interesting finding, they found this internal migration has changed and transformed to a high ability for job mobility through the daily commuting between home and workplaces, and it happens more smoothly due to the improvement of means of transportation than before (McCormick & Wahba, 2004).

Like it happens in all cities, daily commuting affects their urban growth. It helps increase the population size in cities (Atkinson, 1995) and widens the city's economic base by attracting more people to come from the rural zones to the city. Accordingly, daily commuting increases services and land use demand within the cities, which are required to fulfill the needs of services for both their inhabitants and the commuters who come from the outside (Rodríguez, 2020). So, the city expands horizontally to find new plot lands, especially in suburban areas. Thus, it sprawls upon the arable lands to provide these plot areas (Holmes, 1971), which also happened in the secondary Egyptian cities.

### 5.3. In terms of Economic Forces

According to the discussion in Part (I), the economic forces affect the cities' growth by encouraging the people to resettle from the economically stagnating areas to those with high economic potential. Therefore, this effect evokes the importance of understanding the economic relationship between rural and urban settlements by defining and understanding the city's intermediate functional/economic role (Cohen, 2004). Secondary cities, as a type of city classification, could be "*Urban Cores*" for the surrounding villages that depend economically on the city or "*Transitional Urban Centers*" that share and interchange many economic activities between different relevant secondary cities (EPSON, 2014). This spatially integrated definition that combines both the city's activity scale and its role in its urban system will help control the city's physical growth to be more balanced and less sprawled (Cohen, 2004).

Moving to the secondary Egyptian cities, they suffer from the inaccuracy of their definition as they only administratively defined without considering their intermediate role. The effect of this inaccuracy appears through criticizing this definition as the governorates that include all the secondary cities do not have the same economic opportunities equal their population in comparison to the primate cities. Focusing on the governorates, they demonstrate a remarkable disparity in the economic abilities and opportunities between the rural and urban zones. Generally, the average per capita urban income is 67 percent higher than the average rural income, and in detail, each governorate has clarified a remarkable disparity between the annual income per capita between rural and urban areas based on 2005 and 2009 data *Table 2*. This economic disparity, in turn, makes a spatial inequality between the urban zones in which the secondary cities represent them and the rural ones, and it encourages the people to resettle through the daily commuting to these cities to search for better jobs and opportunities. Accordingly, and as discussed in the former section, this daily "rural-to-urban" commuting increases the demand for finding new places for job opportunities which will absorb both the cities' inhabitants and the commuters outside them; consequently, the cities are sprawling to meet this demand.

Governor- rates	URBAN AREA		RURAL AREA	
	Annual Income By EGP		Annual Income By EGP	
	2005	2009	2005	2009
Cairo	5,132	4,434		
Alexandria	4,110	3,448		
Port Said	4,164	4,073		
Suez	4,777	4,855		
Damietta	3,609	4,273	3,457	3,113
Al-Dakahlia	3,630	3,291	2,870	2,730
Al-Sharqia	2,875	2,788	2,109	2,195
Al-Qalubiya	3,176	3,404	2,545	2,234
Kafr Al-Sheikh	3,517	3,416	2,693	2,703
Al-Gharbia	3,893	3,581	3,001	2,585
Al-Menoufia	3,226	3,310	2,498	2,403
Al-Beheria	2,977	2,514	2,364	2,278
Al-Ismalia	3,376	4,220	2,456	3,925
Giza	4,304	3,637	2,396	2,080
Bani-Suef	2,343	2,076	1,744	1,721
Al-Fayoum	2,811	2,189	2,541	1,878
Al-Minia	2,653	3,209	2,079	2,104
Assiut	2,245	2,618	1,566	1,486
Sohag	2,781	2,093	1,927	1,742
Qena	2,815	2,896	2,283	2,032
Luxor	3,624	4,041	3,212	2,915
Aswan	2,557	2,491	2,336	2,194
Red Sea	4,744	4,356	8,197	2,394
New Valley	3,744	3,437	2,434	3,274
Marsa Matrouh	3,567	3,807	2,796	2,563
North Sinai	3,810	2,563	2,650	2,054
South Sinai	6,006	15,019	4,676	3,858

**Table 2.** Annual Urban Income and Rural Income per Capita for different Egyptian Governorates, Based on 2005 and 2009 Data (Verme, et al., 2014).

## 5.4. In terms of the Inefficiency of Urban Facilities and Housing

### 5.4.1. Urban Facilities

Based on the discussion in Part (I), secondary Egyptian cities represent the insufficiency of facilities leading to urban sprawl. It is true, especially with the ignorance of understanding their hierarchical physical and economic role as centers of services, besides the weakness of facilities in the rural area, which overloads the demand for secondary cities' facilities. Referring to the official standards of urban

facilities, *The General Organization of Physical Planning- GOPP* has stated the standard area for urban facilities by 23.95 m<sup>2</sup>/ per capita within secondary cities with a population size 100 000 people, *Table 3*. Nevertheless, secondary Egyptian cities have suffered a remarkable deficit in their urban facilities (Egyptian Ministry of Housing, Utilities, and Urban Communities- MoHUUD, 2014), proving its existence when measured in the field within some secondary cities with a population of 100 000 people and were found between 1.5 to 2.7 m<sup>2</sup>/ per capita (Mahmoud, 2015). Accordingly, This gap in urban facilities between the standards and actual shortage status motivates the secondary Egyptian cities to be sprawled to fill this gap and meet the increase of demand resulting from it.

### 5.4.2. Housing

Generally, housing in all Egyptian cities is a serious problem, and most of this problem is related to the massive demand. The annual demand for houses indicates between 520 thousand to 550 thousand (UN-Habitat, 2016), and this case of need is confined between two sides; each one is a problem itself. The first side is housing affordability, especially since the poverty rate is high and reaches 32.5%, while the annual expenditure on housing is 20.1% of the yearly income (CAPMASS, 2018), and it makes 54.3% of Egyptians are considered cost-burdened (10Tooba, 2016). The second side is the governmental role which appears through the state's weak deal with this problem. The state builds annually 326 thousand housing units (3.26 housing units annually per 1000 people) (Awasat, 2019), while the global criteria are 8-10 housing units annually per 1000 people (Afifi, 2004). Also, the distribution of housing projects between the governorates is unsuitable and based on the available vacant lands, not the real need for housing inside each governorate (UN-Habitat, 2020).

Accordingly, this housing problem has made all the primate and secondary Egyptian cities rely on urban sprawl to fulfill this demand because of the increasing need for housing and the official weakness to meet it, especially since this type of urbanization has become popular within the Egyptian governorates. Through revising *Table 4*, most of the housing units within the Egyptian governorates, from 2007 to 2014, have been implemented by the informal private sector, which depends on the transformation of arable lands to urbanized ones as there are no vacant lands for expansion. Besides, the individuals have done this transformation without legal action for building registration or formal provision with the basic infrastructure.

Urban Facility	Educational	Health	Social	Cultural	Youth	Sports	Religious (Muslims)	Religious (Christians)	Post Office	Telecommunication	Commercial
Area by m <sup>2</sup>	17	0.083	0.065	0.02	0.25	0.5	1.65	2.86	0.015	0.003	1.5
Total Urban Facilities Area is approximately 23.95 m <sup>2</sup> / per capita, within Egyptian Secondary Cities (100 000 people).											

**Table 3.** The Standard Area for Urban Facilities per capita within Secondary Egyptian cities with a population of 100 000 people (*The General Organization of Physical Planning- GOPP, 2014* ).

Region	Governorate	Number of Units built by Informal Private Sector (2007-2014)	Percentage of Units built by Informal Private Sector (2007-2014)	Number of Units built by Formal Private Sector (2007-2014)	Percentage of Units built by Formal Private Sector (2007-2014)	Number of units built by the Public Sector (2007-2014)	Percentage of units built by the Public Sector (2007-2014)	Total Built Units	Percentage
Greater Cairo Region	Cairo	348,263	46.7%	117,307	15.1%	279,629	37.5%	745,199	100%
	Giza	533,675	83.7%	92,754	14.5%	11,168	1.8%	637,597	100%
	Al-Qalubiyah	320,114	83.2%	49,560	12.9%	15,004	3.9%	384,678	100%
Delta Region	Al-Menoufia	156,919	65.6%	61,376	25.7%	20,912	8.7%	239,207	100%
	Al-Gharbia	283,637	92.6%	18,395	6.0%	4,394	1.4%	306,426	100%
	Kafr El-Sheikh	173,421	82.1%	23,641	11.2%	14,174	6.7%	211,236	100%
	Al-Dakahlia	384,657	92.3%	27,060	6.5%	5,122	1.2%	416,839	100%
	Damietta	68,531	56.4%	42,058	34.6%	10,949	9.0%	121,538	100%
Suez Canal Region	Al- Sharkia	336,965	77.7%	72,662	16.7%	24,250	5.6%	433,877	100%
	Port Said	37,594	40.7%	6,099	6.6%	48,645	52.7%	92,338	100%
	Al- Ismalia	40,176	43.3%	37,580	40.5%	14,960	16.1%	92,716	100%
	Suez	27,643	53.4%	19,581	37.9%	4,485	8.7%	51,709	100%
	North Sinai	4,615	10.1%	21,064	49.6%	16,819	39.6%	42,498	100%
	South Sinai	1,195	7.6%	4,437	28.2%	10,095	64.2%	15,727	100%
Alexandria Region	Al-Beheria	274,691	76.3%	76,940	21.4%	8,513	2.3%	360,144	100%
	Alexandria	301,277	63.5%	163,382	34.4%	10,104	2.1%	474,763	100%
	Marsa Matrouh	16,099	28.2%	32,591	57.0%	8,467	14.8%	57,157	100%
North Upper Egypt Region	Bani Suef	65,953	71.4%	20,896	22.6%	5,552	6.0%	92,401	100%
	Al- Fayoum	83,788	79.4%	14,895	14.1%	6,904	6.5%	105,587	100%
	Al-Minya	121,660	77.0%	31,589	20.1%	4,653	2.9%	157,902	100%
Assuit Region	Assuit	108,709	64.1%	55,739	32.8%	5,226	3.1%	169,674	100%
	New Valley	2,772	10.1%	23,616	86.2%	1,004	3.7%	27,392	100%
South Upper Egypt Region	Sohag	206,516	73.7%	52,587	18.8%	21,051	7.5%	280,154	100%
	Qena	153,210	77.7%	32,150	16.3%	11,898	6.0%	197,258	100%
	Luxor	18,269	50.7%	14,282	39.7%	3,456	9.6%	36,007	100%
	Aswan	52,623	61.4%	27,688	32.3%	5,414	6.3%	85,725	100%
	Red Sea	12,960	24.5%	23,724	44.8%	16,242	30.7%	52,926	100%

<b>Total Built Housing Unit (Informal Private Sector, Formal Private Sector, Public Sector ), (2007-2014 )</b>	<b>5,888,674</b>
<b>Total Built Housing Unit (Informal Private Sector, 2007-2014)</b>	<b>4,135,931</b>
<b>Percentage</b>	<b>70.2%</b>
<b>Total Built Housing Unit (Formal Private Sector, 2007-2014)</b>	<b>1,163,653</b>
<b>Percentage</b>	<b>19.8%</b>
<b>Total Built Housing Unit (Public Sector, 2007-2014)</b>	<b>589,090</b>
<b>Percentage</b>	<b>10.0%</b>

**Table 4.** Details of Built Housing Units by Different Sectors in the Egyptian Governorates 2007-2014 (*10Tooba, 2016*).

### 5.5.1. Policies

There is no adoption or definition for a mitigating-urban-sprawl-based policy in Egypt like the other developed countries, such as Smart Growth in the USA and Principles of Intelligent Urbanism- PIU in Asia. All the urban developmental plans focus on allocating the Urban Growth Boundary-UGB around the urban settlements (The General Organization of Physical Planning- GOPP, 2015). This method is no doubt important for mitigating the urban sprawl, but it has proved its need to be a more multi-dimensional one, the same as the other policies in America and Asia are.

Locally, Egypt adopts two important policies for achieving urban development: Egypt Vision 2030-SDS and Vision 2053. According to the Sustainable Development Report 2021 (The University of Cambridge, Sustainable Development Solutions Network- SDSN, and Bertelsmann Stiftung, 2021) that assessed the state's performance in achieving sustainability, Egypt has scored on the SDG 11 Index of urban development a moderate increase while there are challenges that remained. This acceptable score of urban development may refer to the successful dealing by the urban policies for mitigating the urban sprawl as it is one of the urban problems for Egyptian cities. However, depending on other related measures, they will give another negative significance. Concerning SDG No. 15, which is interested in life on land, Egypt has achieved on its index a stagnating performance with the remain of major challenges, especially the related ones to biodiversity and protecting the lands that are mainly affected negatively by the urban sprawl. Accordingly, this signifies that urban development policies deal weakly with the problem of urban sprawl, and they need to be modified and considered this important urban problem.

### 5.5. In terms of Policies and Legislation

#### 5.5.2. Legislation

Unfortunately, many of the lands management laws in Egypt work against protecting the arable lands as they counter each other, and each law does not consider the previous laws that worked before it. Accordingly, this conflict encourages the individuals to transform their arable lands into buildings plots. Although they know this action is against the law, they prefer to keep doing it as they know the resulting gaps in the laws due to this conflict that enables them to overcome these laws and sprawls progressively (Nada, 2014).

Investigating the effect of Egyptian urban laws' conflict globally, On *the 2019 Global Competitive Indices- GCI*, Egypt occupied the worst rank on the "Quality of Land Administration Index" and scored rank 133 out of 141, while on the same index, Tunisia occupied position 89 and Morocco occupied rank 50 (World Economic Forum, 2019). Tracing some of these laws as examples for interpreting this result, "The Land Reform Law" was released in 1954 and updated in 1958 and 1969 to re-arrange the ownership of the arable lands. However, it crumbled the land ownership until it reached five acres or less, and in turn, it reduced the revenues of cultivated lands and maximized its importance as land for construction than arable land. Accordingly, many peripheral arable lands were occupied by many constructions with a visible urban sprawl (Masoumi, Gouda, & Hosseini, 2016). Also, both the unclearness and inconsistency between building regulations are responsible for increasing the degree of urban sprawl. The Egyptian Parliament had set (*Law Number 166 for 1983*) as a protection and punishment tool against those who encroached upon the arable land and switched it to construction land. Nevertheless, it also has set (*Law Number 17 for 2019*) to reconcile with

the infringed people in building constructions, including those who encroach upon the arable lands.

**6. Part (III): Discussion and Proposed Roadmap for the Solution.**

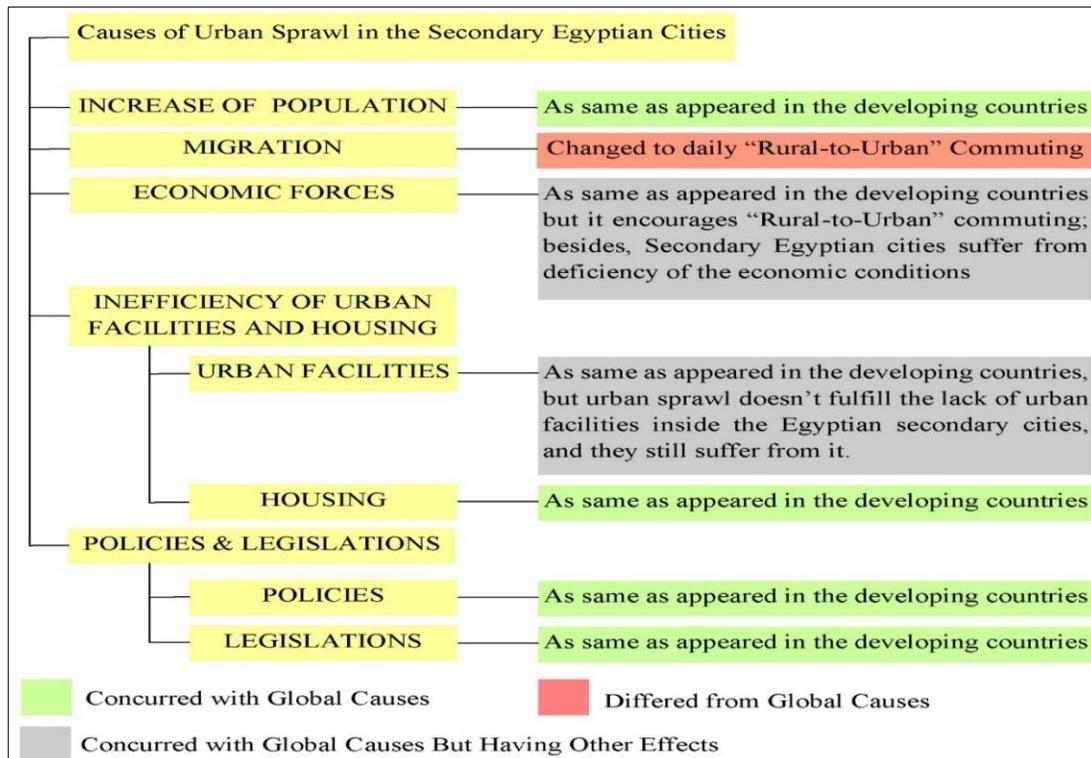
**6.1. Concurrence and Difference of Causes of Urban Sprawl, Locally and Globally**

Based on the argumentation in parts (I) and (II), urban sprawl influences the physical planning of the city in different ways for the developed and developing countries. Despite Secondary Egyptian cities are not far from this phenomenon as it also occurs inside them, the impacts of urban sprawl are not the same as those in developing countries. The relationship of urban sprawl reasons between secondary Egyptian cities and the other developing countries appears in three ways: concurred in some causes, different from them, and concurred with the causes but having other effects, as shown in *Figure 5*.

Starting with features of concurrence, urban sprawl in the secondary Egyptian cities happens due to the increase in population, inefficiency of housing, absence of policies, and deficiency in legislation. Moreover, these causes are similar to their role in achieving urban sprawl in any other zone globally. Then, moving to the features of difference, Urban sprawl in the secondary Egyptian cities differs from

its global causes in terms of migration, which non-effectively exists, but instead, it has transformed into daily “Rural-to-Urban” commuting.

Finally, the other causes of urban sprawl in secondary Egyptian cities concur with their global appearance in other zones; however, they have other side effects. The Economic Forces affect occurring urban sprawl in the secondary Egyptian cities as they globally are. On the other hand, the economic forces also encourage the daily rural-to-urban commuting to the secondary cities regardless of their weakness in conditions and potentialities compared with the primate cities. Subsequently, the urban facilities influence attaining urban sprawl in the secondary Egyptian cities due to their lack and dysfunction, which are also the same in the developing countries. Yet, adding more urban facilities to the secondary Egyptian cities does not tighten the gap of demand for urban facilities within these cities suffering from the extreme lack of urban facilities. Accordingly, it is essential to mitigate urban sprawl in the secondary Egyptian cities as it hinders their developmental role within their urban system; besides, it weakens their intermediate position in sharing and mobilizing resources between primate cities and rural settlements, as mentioned before.



**Figure 5.** Concurrence and Difference of the Causes of Urban Sprawl between Secondary Egyptian Cities and other Developing Countries “By Researchers”.

## 6.2. Proposed Roadmap for Mitigating the Urban Sprawl within the Secondary Egyptian Cities.

Dealing with urban sprawl in the secondary Egyptian cities requires working through two axes:

- First Axis: Redefining the secondary Egyptian cities; to deal with the different causes and the causes appearing in other effects.
- Second Axis: Improving the utilized methods of mitigating urban sprawl; to deal with the concurred causes.

## 6.3. First Axis: Redefining the Secondary Egyptian Cities

This axis focuses mainly on the causes of urban sprawl that differ from the global causes or concurred with them but have other effects. As formerly discussed in part (II), there is a complete difference in defining secondary cities between Egypt and the global definition. Globally, secondary cities are determined by combining various dimensions and considering their transitional and intermediate role between their surrounding zones, while they are only administratively defined in Egypt. The disparity of the global and local definitions of secondary cities is mainly responsible for differing causes of urban sprawl, like migration, which exists as daily rural-to-urban commuting. Furthermore, This disparity is also responsible for achieving other additional effects on the secondary Egyptian cities, like the economic forces and the housing process, which appear as they are in the developing countries, and their effects also cause other problems inside the cities. As the local definition of secondary Egyptian cities does not consider their role and impact within their surroundings, secondary Egyptian cities suffer from the inefficiency of mobilizing their resources, reflecting on their participation in many economic activities like Gross Domestic Production-GDP Sharing Businesses Services and Amount of Trade (Youssef, Mostafa, & Amer, 2022). Accordingly, the absence of embedding the intermediate role of these cities makes the urban sprawl differently appears within them, and in turn, it makes all familiar followed procedures to mitigate this phenomenon will be inefficient due to the consideration of cities only from an administrative view isolated from their surrounding urban system. Therefore, the redefinition of secondary Egyptian cities and considering their intermediate role will enable them to deal with the daily rural-to-urban commuting, which assists in achieving urban sprawl. Furthermore, it will help improve the economic forces and reduce the gap

between urban and rural settlements, which will help mitigate the urban sprawl and uplift the financial ability of these cities as transitional zones between primate cities and rural villages. Finally, considering the intermediate role of secondary cities will assist in detecting rightly and accurately the required demand of housing units, besides following other methods to meet this increasing demand for housing like population redistribution in other new growth poles.

## 6.4. Second Axis: Improving the Utilized Methods of Mitigating Urban Sprawl

This axis focuses mainly on the causes of urban sprawl that concurred with global causes and uplifting the capacity of utilized tools for decreasing this phenomenon within the secondary Egyptian cities, especially dealing with urban sprawl and controlling the growth of cities are embedded within the targets of the plans of urban development implemented by the General Organization of Physical Planning- GOPP. GOPP is mandated to be responsible for drawing up the general policy for sustainable urban planning and development for different Egyptian rural and urban settlements, and also it is responsible for preparing plans and programs for this development from 1973 till now (GOPP, 2022). Based on its mission, GOPP is concerned with setting the developmental plans for the secondary Egyptian cities. Therefore, it has released and supervised its working guide for making the developmental plans for these cities through an interdisciplinary process that considers the urban dimension by allocating the "Urban Development Boundary- UGB" for controlling the cities' growth. Besides, the plans also consider the other related dimensions to urban development, like economic, social, environmental, and administrative. For many years, GOPP has struggled to present developmental plans, or "Strategic Plans," as they are named, to mitigate the urban sprawl within the cities. Nevertheless, these plans failed to deal with this phenomenon, and the urban sprawl increased year by year, and the loss of arable land is in progress. Accordingly, the implemented developmental plans need to be improved to mitigate the urban sprawl efficiently. These improvements are:

- Technical Improvements.
- Administrative Improvements.
- Legislative Improvements.

### 6.4.1. Technical Improvements

These improvements relate to the procedures that facilitate technically preparing, releasing, and implementing developmental plans. They can be summarized as the following:

### **(A)- Policies Alignment**

As the plans of urban development suffer from the non-alignment between the other adopted policies (Aboud, 2018), it is required to align the urban development plans, which work locally, and the upper strategic levels such as regional or national plans. Moreover, it is required to align the urban development plans and the related domains like economic, social, and environmental.

### **(B)- Effective Land Allocation**

It is essential to allocate the lands for development based on the benefit of their developmental possibilities, like infrastructure and existing economic activities. Especially most urban development plans suffer from the unsuitability of allocated lands for the development to match the characteristics of the required developed zone, which leads to the change of proposed land use (Aboud, 2018).

### **(C)- Influential Social Involvement**

The strategic plans in Egypt need to enhance the role of social participation within their implementation, especially in the existence of some challenges like the non-effective analysis of civic society's opinions, which badly leads to wrong information affecting the development plan (Al-Saied, 2011). Also, the non-caring and absence of trust from civil society members to participate because of the bad organization by the authorities for the meetings of participation (Attia, Eid, & Abdellatif, 2012).

### **(D)- Uplifting the Capacity of Resources**

The strategic plans of Egyptian cities suffer from the technical weakness of human resources that participate in preparing them (Nada, 2014) and the lack of funding sources for the developmental projects they propose (Attia, Eid, & Abdellatif, 2012). Accordingly, the participants in the strategic plans need to be provided with suitable and skilled techniques and technologies to attain their mission effectively. Moreover, the strategic plans should rethink finding new funding resources in addition to the governmental ones to be able to commit to the project's implementation as they propose.

## **6.4.2. Administrative Improvements**

These improvements are the actions for facilitating the related administrative procedures for releasing and implementing the developmental plans of Egyptian cities and can be summarized as the following:

### **(A)- Cross-Authorities Coordination**

Generally, the Egyptian administrative system suffers from poor coordination between different

stakeholders, especially the governmental ones. In implementing strategic plans, this case also exists and generates an absence of sharing the interests between the participated parties (Nada, 2014). Accordingly, it is essential to share and coordinate data between different participating authorities to guarantee the successful implementation of the strategic plan, especially land multi-ownership between different authorities (The World Bank, 2006).

### **(B)- The Adoption of the Concept of Decentralization**

The Egyptian Administrative system is struggling to adapt reformative concepts to improve its performance, especially in the light of Egypt's global low ranks for the ease of doing business due to the governmental bureaucracy (The World Bank, 2018), which in turn, is reflected in the implementation of the strategic plans (Nada, 2014). Accordingly, The implementation of strategic plans should consider adopting concepts of decentralization, particularly at the level of local authorities, to ease the procedures of implementing the strategic plans.

## **6.4.3. Legislative Improvements**

These improvements related to the utilized urban laws within the implementation of the cities' developmental plans and can be summarized as the following:

### **(A)- The Integration between Laws of Urbanization**

The conflict between laws of urbanization is a remarkable issue and plays an important role in achieving urban sprawl in Egyptian cities (Aboud, 2018), such as the conflict between laws " *Number 166 for the year 1983*" and " *Number 17 for the year 2019*", as same as it is discussed in section (4.2.3). Accordingly, to efficiently implement any strategic plan, It is too essential to check the interaction between workable laws and test their validity and whether they achieve a conflict.

### **(B)- The Activation of Laws Application**

The absence of mandatory laws is one of the main causes of urban sprawl in Egyptian cities, as this absence encourages individuals to be non-obligated to follow the restriction of laws organizing urbanization (Nada, 2014). So, implementing the strategic plans should be performed in parallel with applying the urban laws and monitoring their obligation to the individuals to commit to them.

## **7. Conclusion**

Urban sprawl is, as same as globally, a remarkable phenomenon within the secondary Egyptian cities;

however, its causes do not concur with their properties as they are usually defined from the global perspective. Therefore, dealing with urban sprawl in these cities in Egypt requires considering its distinctive features and re-exploring the intermediate role of secondary cities by redefining them as they are globally defined. Furthermore, controlling and mitigating this phenomenon needs to improve the utilized dealt methods technically, administratively, and legislatively, to guarantee efficient urban development within the secondary Egyptian cities.

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