Universidade do Minho
Escola de Engenharia

Mariam Eissa

Análise do ciclo de vida usando Lourenço modelo Caso da cidade de Damasco (1960-2015)

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Dissertação de Mestrado
Mestrado Internacional em Ambiente Construído Sustentável

Trabalho efetuado sob a orientação do
Professora Doutora; Júlia Maria Brandão Barbosa Lourenço

junho de 2015

Dedication

I dedicate this Master dissertation to my parents; Mohamad Hadi Eissa and Salma Eissa for their great support in my educational journey, to my siblings; Adel, Hadel and Obada for their loving and caring.

Also, I dedicate this study to my friends; Lujain, Eiad, Nahed and Housam for their great help.

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Mariam Eissa

ABSTRACT

Life cycle assessment is considered a modern concept in recent times. The life cycle of urban areas may be built upon mathematical equations that can deal with the assumptions and data. But it can also be built upon methods and tools to study urban changes and finding statistics on the development and modernization of the city's urban form and structure. This dissertation presents the state of the art, and the methodologies and the results of studying the life cycle analysis of the capital of Syrian Arab republic, which is based upon studying the urban changes that happened in the city together with the developments of its master plan over the years 1960-2015. Using the Lourenço's model for study, this model can be represented as a graphical tool to assimilate the progress of city evolution phases in order to monitor the behavior of an urban area and its planning process, by comparing the idealistic analysis from Lourenço's meta-analysis for urban growth areas to the current noticeable trends from the Syrian capital city´s current situation. The studying of urban life cycle analysis includes the settlements study intertwined with the city's plans and monitoring the future stages for the master plans and the workflow of several cycles and their intensities. The achieved life cycle of Damascus city allows comparing the negatives and the positives of each plan's stages, the urban areas distribution, the state of the current master plan for Damascus and the general phases of the city´s developments. It is also perceived through a specific study on the general effects of these phases´ impacts on the city, the effects of the on-going conflict in Syria and the enormous damages that affected the whole city and the normal life cycle. This negative occurrence can be analysed through a pulsar effect analysis which interferes in the cities´ life cycle, showcasing changes in the normal behavior of the city. The analysis of these changes caused by the conflicts and relating to the present main problems can be used for developing new strategies to help improve the future urban planning for Damascus. This case study can further advance urban studies applicable to disaster areas.

Keywords: Life Cycle Analysis, Damascus, Post-war Urban Planning, Monitoring, Master Plans.

RESUMO

A avaliação de ciclo de vida é considerado um dos conceitos modernos dos nossos tempos. O ciclo de vida de áreas urbanas não é apenas baseado em equações matemáticas que podem lidar com suposições e informações. É um conjunto de métodos e ferramentas para o estudo de mudanças urbanas assente em levantamentos estatísticos do desenvolvimento e modernização do tecido urbano de determinada cidade.

Esta dissertação apresenta os objetivos e a metodologia de estudo da análise do ciclo de vida da capital da República Árabe da Síria, a qual é baseada no estudo das mudanças que ocorreram no Plano de desenvolvimento urbano ao longo dos anos, assim como suas alterações, fazendo para tal uso do modelo de Lourenço **(Lourenço, 2003)**.

O estudo de análise do ciclo de vida inclui a avaliação das alterações dos planos da cidade, a monitorização de futuras etapas para os planos urbanos segundo os ciclos de vida detetados na cidade de Damasco. Também é efetuada a comparação de cada uma das fases, tanto positivas quanto negativas do plano, assim como da distribuição de áreas, do sistema das construções, e de suas alterações durante o período estudado do ciclo de vida da cidade. Inclui, ainda, o estado atual do Plano de Urbanização, e os pontos positivos e negativos de cada projeto destinado para Damasco, as fases gerais dos desenvolvimentos da cidade e também o estudo dos efeitos gerais dos impactos na cidade. Para tal, os efeitos da guerra actual na Síria, e os enormes danos causados que têm afetado a cidade como um todo e o seu ciclo de vida normal, serão levados em consideração.

Palavras chave: Análise de ciclo de vida, Damasco, Planeamento urbano de pós-guerra, Planos Diretores.

CONTENTS

LIST OF FIGURES AND TABLES

List of Tables

1 INTRODUCTION

Since the beginning of times with the overpopulations of the cities, they suffered from the shortness of natural resources due to the unconditional and overloaded consumption of the natural gas and petroleum products, which can lead to serious impacts on the environment and the sustainability of the natural materials. The important of the sustainability studies which reflect the state of balance between the environmental, economic and social parameters and objectives, takes great significance in the recent times due to the inability of most of the developing countries to meet the urban sustainable goals in its comprehensive concept. Sustainability can be established by achieving a prime life cycle for the building as a whole unit, this life cycle helps understand the three dimension parameters for the sustainability. Therefore, it helps make more informed decisions and plan to improve the urban environment. The boundary work done in the name of sustainability created an important momentum for innovation in ideas, political mobilization and policy change (Scoones, 2007).

In the case of developing countries, the life cycle analysis is further important due to the fact that sustainability indicators are harder to estimate. In the Arab World, these indicators must consider the physical, local and social situations that those countries have, and the lack of precise studies that can distinguish the special indicators make it more difficult to apply the methods set for more developed countries. In an agreement, argued that various case studies found in the literature are difficult to compare because of their specific properties such as building type, climate, comfort requirements, local regulation, etc.

The life cycle analysis (LCA) methods are used for evaluating products process or progress with time, LCA takes an inclusive approach for establishing environmental evaluation (Cabeza, 2014), where the life cycle of urban areas can be built upon methods and tools to study urban changes and finding statistics on the development of the city's urban form.

Applying the life cycle analysis for urban areas help creating better understanding for the impact of the

2 STATE OF ART

2.1 Life Cycle Analysis

Life cycle analysis is an applied theory to a better understanding of the changes and the process of the studied subject and the interaction with the time. Lourenço's model for study is one of the methods for life cycle analysis. It was presented first in 2003 and applied to area of tourism development. It consists in a three-dimensional graph (Figure 2.1) which represents the consistency of the life cycle and the time periods of the study. The time is illustrated in the horizontal axis and its measured as each period T represent 10 years, the consistency of the life cycle is illustrated in the vertical axis and its represented by three levels; (I) for minimum level, (II) for medium level and (III) for strong level, and this is compatible to the planning stages, it could be S-multiples curves to indicate the action and the living aside from the planning, curves present the cycle of planning process. (Figure 2.1) This model attempts to show the planning efforts, also what affects the urbanization and the public infrastructure (Lourenço, 2003a).

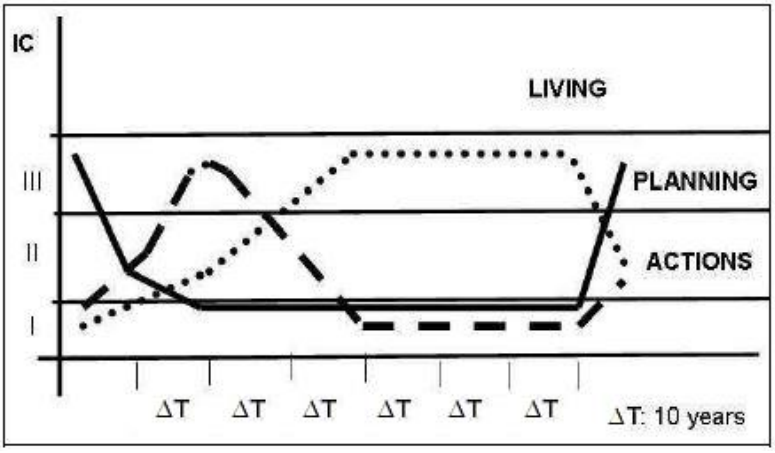


Figure 2.1 Lourenço model for ideal behavior

Source: (Lourenço, 2003)

According to Lourenço's study considering Holton model, the flawed four-level evaluation model. Human Resource Development Quarterly which was proposed in 1996 "Holton model is based on existing research and accounts for the impact of the primary intervening variable such as motivation to learn, trainability, job attitudes, personal

characteristics and transfer of training conditions" (Holton, 1996), the model has psychometric, social, and environmental properties, which depicted the gold mining booming growth in a quasi-model of the population prediction, the model started as evaluation Holton broke the attraction that surround gold mining and the excitement of a new field discovery to an analogy with the gold rush (Lourenço, 2003a), after that an acknowledged-based research was conducted by Saint-Paul, R. and Teniere-Buchot in 1974 (Figure 2.2) under the terms of discovery's time and importance, in the first period (O,T) there is an increasing in the flow of participation in fundamental research but this participation refluxes in the second period, also the fundamental knowledge curve decreases regularly while the applied knowledge increases (Elwood, et al., 2005).

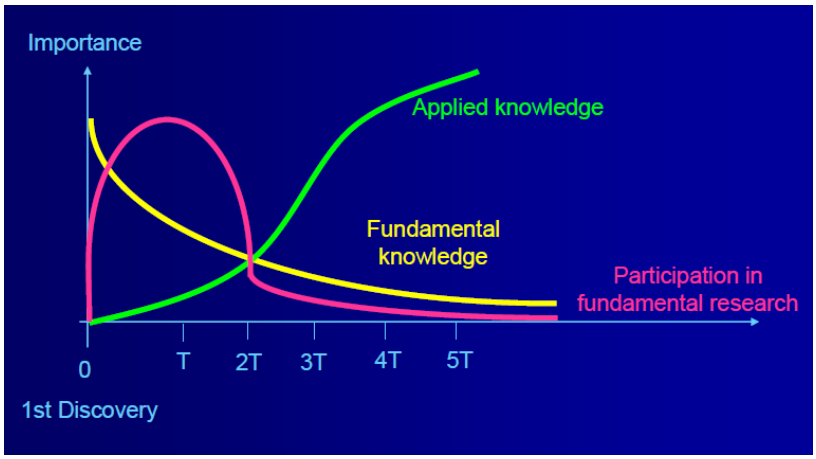


Figure 2.2 Quasi-model of Knowledge-Based Research Saint-Paul, R. and Teniere-Buchot (1974)

Source: (Lourenço, 2003a)

Lourenço relied on the framework of prediction heuristics in the quasi-model of holton in the process of defining the urbanized area, as it was mentioned earlier Lourenço noticed that Holton broke the attractiveness of gold mining, as a result Lourenço suggested a model of planning cycle which included three curves: planning, action and living, Lourenço proposed depending on those curves the ideal behavior of a planning process.

Lourenço depended on the knowledge-based graphic in the theoretical explanation of the planning process suggested model, where the base curve which is planning is demonstrated as participation in the fundamental research curve, the associated actions

curve is demonstrated as the logistic curve of fundamental knowledge and the living curve is demonstrated by the applied knowledge curve .

Never the less it must be mentioned that both the plan- process model suggested by Lourenço and the gold-rush model evolutions were conducted with an almost metaphor mathematical model that depended on a graphical representation of an explicit visualization.

Normally the achievement of the ideal model planning process is hardly possible and also it is problematic, this because of the uncertainty and complexity that come along with the reality, there are good chances that the planning will be interrupted, stopped, penetrated and even became unable to reach the normal stages of development, the same thing could happen to actions, not to forget that the living also could be affected by experiences. In analyzing the achievement of the model, its noticeable that it was first lunched based on calculation of mathematical expressions, which vary from one area to another, due to the changes in each area geographical, social and climatological nature, causing the official standers of the intensity of each life cycle to change from one site to another, but in proportion to the general instances, Lourenço model can be considered as a reference in studying the planning process of an urban area. In the case of Damascus, the model was applied in order to analysis the planning process of the city and compare the ideal behavior of the city to the observed behavior of the city as it will be signified in the results.

S-curves parameterization could be calculated by mathematical expressions, in the cases which are analyzed as a field to implement static analysis and evidence, for example the intensity of planning could be measured by the number of plans that are created, or by the amount of invested money that was spent on the plans and projects which includes the costs of consulting, planning and other different possible resources, also the intensity of actions curve could be calculated in a similar way to the planning curve by numbers or by costs and resources required to achieve development, while the intensity of the living curve could be concluded by analyzing the urbanization of an area or by population growth. This model could be useful in the cases of the presentation of a master plan process where the parameterized graphics are introduced for a long period of time.

Lourenço concluded that in order for the planning process to be successful there are several factors that must be taken under consideration and must not be negligible. The success of a plan is considered to be depending on the numbers of the rules that were adopted in the planning process; the rules were set according to their ability in achieving effectiveness of the plan actions, or at least their ability in maintaining safety of the proposed structural framework at local level.

However although the advantages of applying this methodology are hugely significant, it has some obstacles which can be explained by the meagre adequacy of reality, the methodology is based on a rational intellectual approach without any consideration for the intuitive in the character. In another hand in the contrast of the envelope analysis, it contains matrices of interdependence, methods of simulation and critical factors (table 1).

Table 1 Determinant factors

Physics	Technical	Cultural
Land Use	**Planning Proposals**	**Public Participation**
Morphology and the constitution of the land	**Technique and economic indicators**	**Policy measures**
Accessibility	**Management of urbanization**	**Land policy**
Cadaster	**Fines**	**Organizations and institutions**

Source: (Lourenço, 2003a)

However as it was mentioned above, plan-process model has an utopian conception which means it is hard to be practically achieved in the real life, that can be explained by the interruptions and disruptions that comes along with the concentrated planning sessions of actions and experiences, as a result to conduct a more effective assessment for the planning process the critical factors must be considered to be complemented with a range of interdependencies (Table 2) from this it can be noticed that the factors of continuation and perception of the innovations are considered to be effective factors according to their level of involvement in the planning process especially at crucial moments of the analysis. Normally those factors are related to the type of relations that were established between the social partner, the strategies that were developed and the

corresponding detour on the scale of time, also the discrimination is still used in the process and is preferred to be quantified if it was possible, in addition to that the resources that are necessary to provide the perfect tools for the process of master plan must be quantified under the framework of one or more planning sessions. (Astuti, 2012)

Table 2 Matrix of interdependencies in the plan process with innovations

Plan-process Politicians Technical Staff Private Group Lobbies	Politicians	Technical Staff	Private Group	Lobbies
Innovations perception (I1, …., In)				
Persistence abandonment				
Strategies used (S1, …., Sn)				
Dominant relations (Consensus &Conflict)				
Provision of resources (Financial, Human, Technical, Others)				

Source: (Lourenço, 2003a)

Jonggol green Islamic city

To illustrate a study case of the Lourenço model done in 2014 on the city of Jonggol in Indonesia, where the city is located in the Cibodas Village, Jonggol District, Bogor Regency West Java, 60 km southeast from Jakarta the capital of Indonesia; it is a city that is considered to be a developing residential area due to its strategic location.

The master plan of Jonggol divided the 100 ha area into three zones of Medina, Sunda and Mecca (Figure 2.3). Each of those zones was planned to have its own function and features and it is assigned with its own facilities, but also those zones were completed with several facilities such as a dormitory, market and hospital.

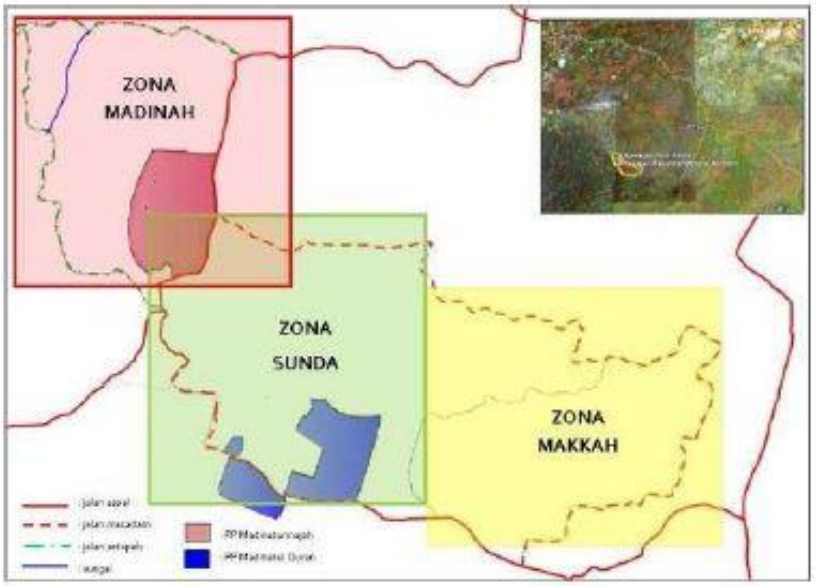


Figure 2.3 Zoning of Jonggol Green Islamic City

Source: (Kusumawanto, et al., 2014)

The main concept of the designing process is to maintain the level of wastes on zero, that concept could be considered to be an ethical concept by reducing the waste production and deal with it as a resource. There are a lot of opportunities that could help in achieving this concept, one of them is the availability of a large agricultural area which helps in providing a self-sufficient amounts of food and energy, furthermore there are the possibility of using the green area in the city as a free car zone which eventually will support the concept of an ethical modern Islamic city, the plan process of Jonggol green Islamic city is designed for 15 years, that long time is aimed toward accomplish the planning and implementation of the necessary infrastructure and basic buildings.

However, to evaluate the master plan process of Jonggol Green Islamic city, Lourenço model was applied (Figure 2.4) , and each zone and green concepts implementation was analyzed, between the year of 2011- 2014 (Table 3) it can be noticed that the conditions are broken down into chronological orders and classified depending on the zone development.

Table 3 The Resume Data of Jonggol Green Islamic City Plan Process

Year	Conditions	Planning	Action	Living
2011	Planning concepts of Jonggol Green Islamic City	Vision & Mission		
	Consolidation for the land availability		Legal agreement for the land usage	
2012	Start DED Planning for Sunda Zone		Infrastructure Planning	
2013	Build infrastructure in Sunda Zone		Infrastructure building	
	Start living for first-year students in Sunda Zone			40 Junior High School Students
	Held social events for the villagers		Mosque launching	200 villagers 50 volunteers
	Master plan consolidation for Medina Zone	The zoning and land use concepts		
	DED for Medina Zone		Infrastructure planning	
	Land work in Medina Zone		Land preparation	
	Master plan consolidation for Mecca Zone	The zoning and land use concepts		
	Master Plan for Green Concepts	Green Concepts Planning		
	Build infrastructure for green implementation		Water tank to spring water conservation	Using spring water for daily needs
			Farming activity	Plantation &

				livestock
	Fund raising through private property business to build facilities in Sunda Zone	Zoning for property land	Selling activity	60% already sold out
	Build more infrastructure for the second-year students		More houses and classroom	
2014	Changing plan for Mecca Zone	Quran Academy	Quran Academy DED	
	Preparing start living for the second-year students in Sunda Zone			

Source: (Kusumawanto, et al., 2014)

Where: blue represents all zones, red represents Medina Zone, green represents Sunda Zone, and yellow represents Mecca Zone.

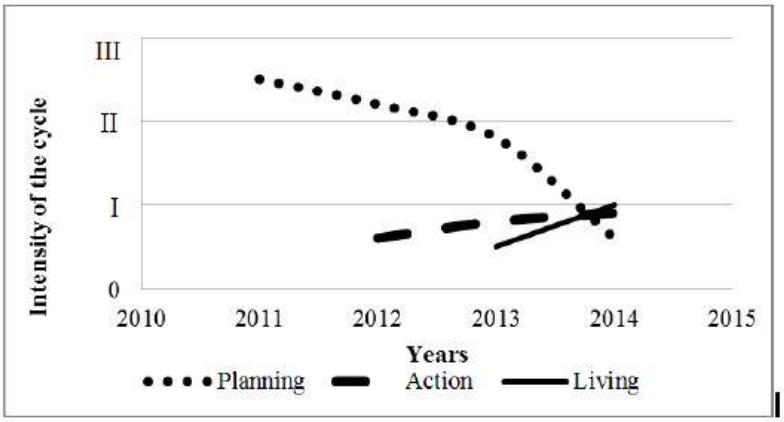


Figure 2.4 The Plan process Behavior of Jonggol Green Islamic City

Source: (Kusumawanto, et al., 2014)

Lourenço's model shows that the planning process for the concepts of the Jonggol Green Islamic city was intensive since the year of 2011 and it continued until 2012 then it went down in 2013-2014, meanwhile the action was still in the first stage and it didn't start to get intensive until the year of 2014 which includes the intensity in the infrastructure building in Sunda Zone and for some action activity starting to occur in Medina Zone.

However, the small amount of building and infrastructure in Sunda Zone allowed it to be occupied by permanent students of the Junior high school and the Islamic Teacher Academy, as a result, it can be concluded that the infrastructure in this zone interrupted in the creation of a new education-oriented living area, it also provided the opportunity for networking with the Government, the private companies and volunteers which enable the Zone to have some events held involving the villagers, In another hand the green concepts were applied to several fields including agriculture, livestock's raising, using the local materials for building and maintaining water resources. According to the procedure of applying the planning process model on the Jonggol city master plan, the importance of creating the ideal city integrating both education and tourism is still high. However, because of the basic needs this stage requires, the economic and social values are the first priorities, and the green concepts for the city could be developed and enhanced in the afterward process of development (Kusumawanto, et al., 2014).

2.2 Pulsar Effect

Pulsar effect is a special classification of a series of events or forces that led to the need to apply changes in the process of urban planning and the city life cycle. In this study it will be applied as a definition of the Syrian revolution impact over Damascus planning process. Biased on the definition given in ISoCaRP 2002, "Pulses" is the peaks troughs and recurrent or repeat events which have a distorting effect on the day- to-day operations of the contemporary city. These events may be shaped by a formal planning process or by haphazard and unpredictable forces, which put them beyond normal control mechanisms. It often demands new operational arrangements, new forms of governance and new approaches to participation and partnership.

Also, a conceptual line must be drawn between routine jobs and recurrent special events, based on criteria of their size, periodicity, predictability and risk. This would then enable us to define our core problem, as follows: A special events always require special management, including non-routine investments of public resources, in order to cope with the special events that are usually short-term as such but may have potential for longer-term benefits. The conditions of 'Pulsar effects' may lead to serious imbalances between public and private investments and their efficient use for certain periods of time and in certain areas. The challenge is to avoid such imbalances or, once they occur, to

manage them in the best possible way. There is enough evidence that this can be done, but it requires very capable management. (Kammeier, 2002). To overcome the effects of each Pulsar happening in the life cycle, it is easier to study the effects on different phases, (Kammeier, 2003 b). The issues of special events and their 'Pulsar effect' on urban development comprise four major phases that have to be handled by good management (Figure 2.5).

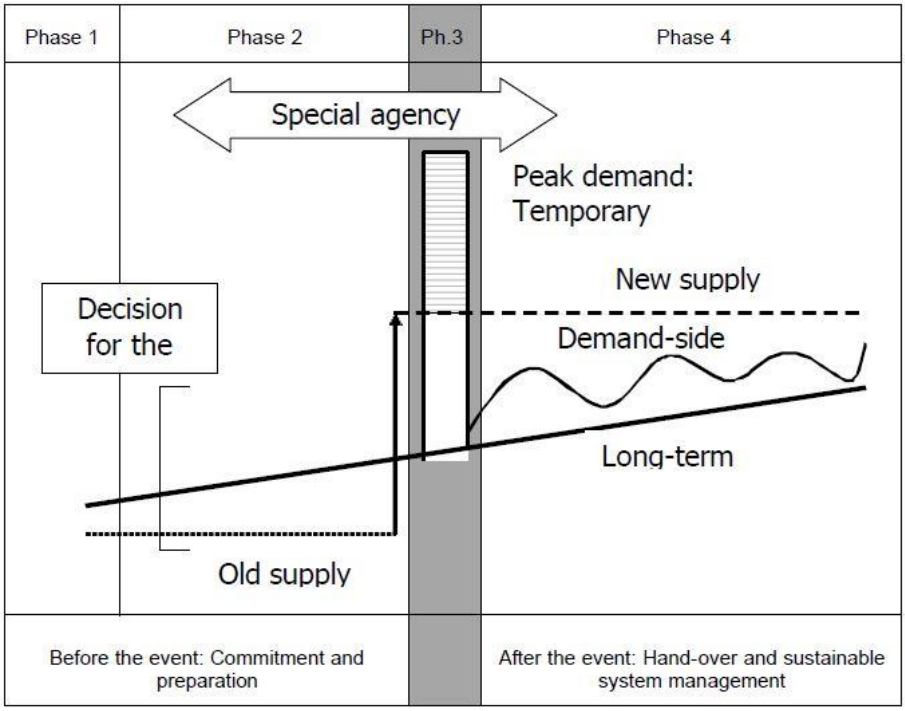


Figure 2.5 Supply and demand-side aspects of a 'big event' and its 'pulsar effects'

Source: (Kammeier , 2003 a)

- **Phase 1**: The time before and around the city's application for being a host of the big event (such as major sports competitions, exhibitions or trade fairs). This phase (and the time long before the application) must include a serious capacity analysis and pre-investment studies centered on the expected demand and supply functions. Without such 'dryruns', the preparation for the event in the short Phase two would hardly be sufficient.
- **Phase 2:** The preparations for the additional infrastructure and services required to host the event itself (sports arenas, e.g.) and to cope with the additional demand

(hotels, housing, transport, communications, e.g.); this includes planning, financing and implementation of all measures.

- **Phase 3:** The management of the event itself.
- **Phase 4:** The long-term management after the 'hand-over', including post-event adjustments (such as dismantling temporary buildings and winding up ad-hoc services).

Phases two and three would require some specific institutional arrangements, including an authority for overall planning, coordination and implementation. At the beginning of Phase four, most of the special institutional arrangements would end as the facilities are handed over to the agencies that are normally in charge. While Phases two and three are concerned with supply-side management. The preparatory Phase one must provide solid answers to both demand and supply-side questions. (Kammeier, 2003 b).

Based on Mesones (Mesones, 2003) who built taxonomy for the pulsar effects, it can demonstrate the characteristics of the events and this taxonomy present the relationship between them, it present various classification for the events recurrence in the X axis, either once, yearly, fortnightly or daily, however in the axis Y the taxonomy present the position classification of the event, that range from one point, sparse or ubiquitous. For example, Guimares (Portugal) in 2012 was labeled as European Capitals of Culture and Guangzhou (China) in 2010 to host the Asian sports games, and both classified one-point events that happen once because both events are recurrence event that passes between different cities and countries in every rotations, in the other hand, those events are concentrated in one city without the having any impact on the surroundings cites (Figure 2.6).

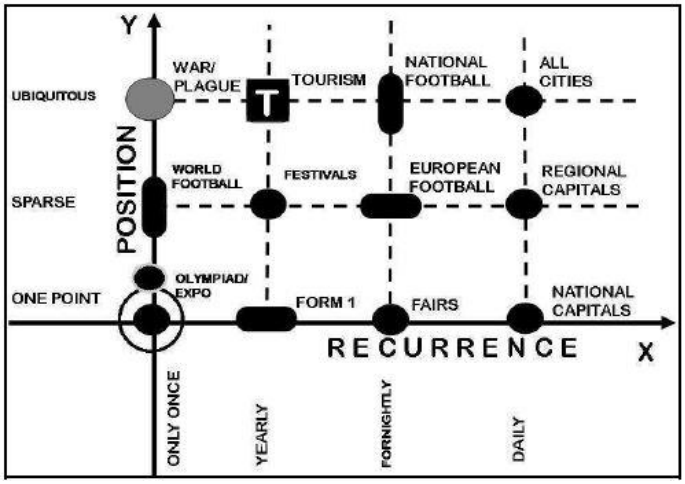


Figure 2.6 the Mesones taxonomy for the pulsar effects

Source: (Mesones, 2003)

The planning process behavior can change in different ways by 'pulsar effects', Expo-98 in Lisbon (Portugal) which is the world fair that took place in Lisbon between May and September, 1998, can be example of pulsar that affected the urban plan process of the Nation's park site in Lisbon which was planned without future outlooks of the needs and demands, it was polluted with near land used for illegal waste dumping, after the planning of Expo-98 the entire area was rebuilt for this event, the site now have new urban design to be considered one of the largest urban redevelopment projects in Europe. (Lourenço, 2010), the planning process was speeded up from 20 into 10 years (1990-2010) (Figure 2.7).

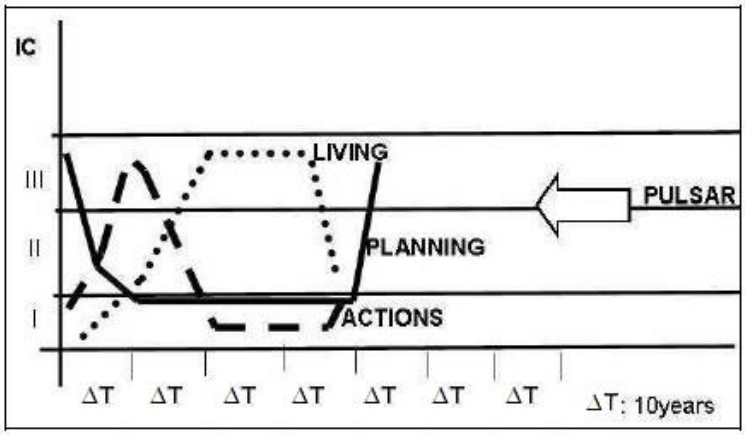


Figure 2.7 Behavior of Expo-98 in Lisbon (Nation's Park Plan-Process)

Source: (Lourenço, 2010)

3 THE COMPONENTS OF LIFE CYCLE ANALYSIS MODALLY

The Lourenço´s model adopted for urban areas, analyses three dimensions for the planning process of the urban sites; planning, actions and living dimensions.

The ideal behavior of a planning process shows a life cycle of about 70 years from the beginning to the end of the cycle where new plan process analysis starts, the studied time periods of 10 years clarify the development of the planning process dimensions with successive periods of time to monitor its changes and affects by the site circumstances. (Figure 2.1)

At the beginning of the life cycle of the planning process, it starts with high level of the planning ratio, however, low values of the actions and living curves, they reaches their highest ratio in the second and fourth decade respectively, the action curve descended to its lowest value after forty years and continue with steady low value until the end of the life cycle, also it is noticeable that living curve keep on steady high value until the middle of the sixth decade where it records a significant decline to its lowest values after seventy years of the urban plan.

3.1 Planning

Planning which also called urban, city's or regional planning it is a dynamical tool used to improve the welfare of the people and the communities by creating more convenient, healthful, efficient spaces for present and future generations. Planning enables public participation to play a meaningful role to create the rich communities and improves the people lives, offering better choices for the urban spaces and urban activities.

Professional planners research, design and develop the society image of the site with considering the data provided by earlier studies and by social work on the affected public parts to ensure setting the appropriate measures for preparing the site urban plan.

In creating the urban plan the main element is to specify the social strategies decided by the community to reach its objectives and purposes, planners responsible for designing and applying those strategies, often need to coordinate the teams and divide the working

sections, it's important to understand that the urban plan could take many forms included in its modality; policy, community, regulatory and incentive strategies, comprehensive and actions plans. (APA, 2015)

Planning requires different fields of specialization; these specializations represent different competence in planning knowledge so jointly enhance the plan performance to provide people welfare. Here several specializations within the planning profession discipline;

- Community development.
- Land use and law enforcement.
- Transportation planning.
- Environmental / natural resource planning.
- Economic Development.
- Urban Design.
- Planning management / financial.
- Housing.
- Parks and recreation.
- Historic Preservation.
- Community activism / empowerment. Δ

Other examples of plans including; redevelopment and investment plan, economic strategic plan, site plan, tourism plan and disaster preparation plan. (APA, 2015).

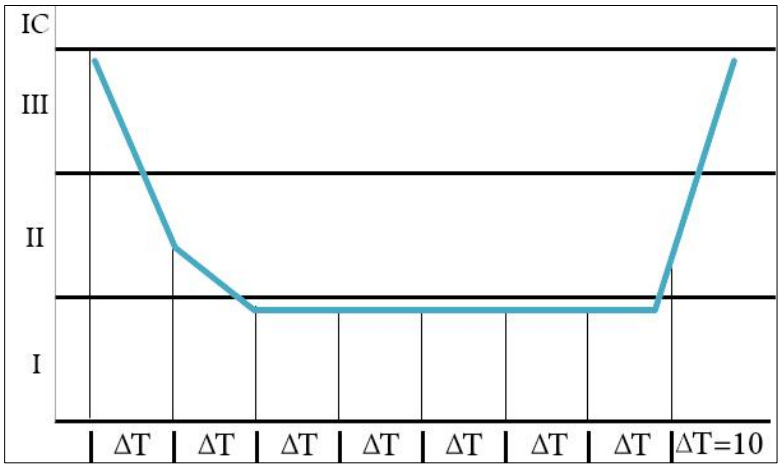


Figure 3.1 Ideal behavior of a planning process; Planning curve

The planning S-curve including data like number of urban and regional plans, urban infrastructure, public recommendation, structural behest and administrative policies and studies. Also it indicate the development of those data with the time periods in the life cycle, in the first of the cycle the high planning ratio values caused by the initial big investment in urban planning and the beginning of the planning efforts to cover the maximum need to start the cycle, after the second decade the curve start to decline because of the end of the urban planning activities and starting the actions to develop the site plan and using it for the designed purposes. By starting the third planning process decade the planning ratio values stabilized at its lowest rate for period exceeding four decades because of the idle of the required planning to sustain the site life cycle, and continue by this rate until it reach the end of the cycle, where the need arises to establish new life cycle studies (Figure 3.1).

The severity of the planning measurable for example by; the number of the urban plans suggested for the site, the money spent on this planning period, planning projects, data researchers, also the human and technical recourses.

3.2 Actions

Represents the second studied dimension of the model it could be measured by the financial sources and the amount of investment dedicated for establishing the approved site plan, also the works and construction actions of the plan aspects. It can be monitored by the work on two main aspects construction and infrastructure.

These actions should propose objective and organized new solutions to the problems in the planning policies and the integrated district project created in the urban plan.

In order to enhance the urban planning the administrative direction should manage to consider the three main aspects of sustainability; environment, social and economic, so the action can manage to enhance the welfare of the people by guardianship the rights for the future generation on the city plan.

The work on construction aspects including these action elements

- Public safety and site security.
- Operation hours, noise and pollution controls.

- Air and dust management.
- Water sources control.
- Waste and materials reuse.
- Traffic management.

In the case of city planning process the action should take magnificent role in the process because of the big scale procedures needed to take actions and pursuance the suggested plan, and with the high amount of actions comes the big initial investment from the governments into construction operations, also the study of the infrastructure needed to be used or to establish in the plan, which causes a big amount of studies and researches to avoids mistakes in sources supply where any delay or misplace can affect the whole life cycle of the city. The other major interest is the labor force of construction actions which could be majored by the workers number and shifting hours, used techniques and raw materials provided to the constructions sites. All of these forces included in the action dimension and considered in the model to study its development with time.

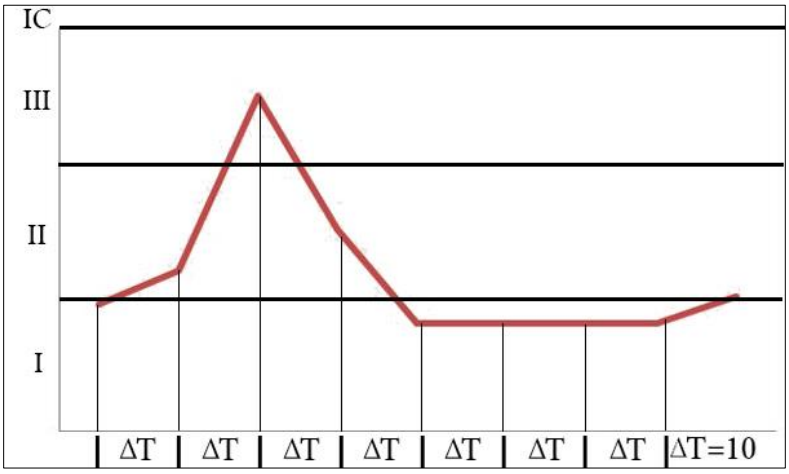


Figure 3.2 ideal behavior of a planning process; action curve

The actions curve data are; the investments provided for construction, labor values and construction materials. These data change over the time of the life cycle causing the differences in the curve, by the beginning of the cycle, the action curve starts with its lowest rate because of the planning periods where with the development of the urban plan there is no investment in any actions, with the times progress and the decline of the

planning curve the action curve witness a remarkable rise so that it reach its highest value by the second decade, this rising caused by the need for the rapid interfering with the actions over the urban plan settled in the planning period and the high initial investment dedicated for the construction actions, after this peak it descended rapidly to reach its lowest value at the end of the fourth decade and keep stable low value until the end of the life cycle and that because of ending the application of the plan and move to the utilization period where the living rate can take the highest rate also because of the end of investments and labor for constructing the urban site plan (Figure 3.2).

3.3 Living

The third dimension of the Lourenço´s model which indicate the demographical studies of the planning process, related to the population and the density rates which can be observed through the population statistics, economic and social opportunity, which can be epitomized in two main factors; population and natural resources.

- **Population** considered to be variable and important element and effective constants related to the spatial domain, and the size of the population considered essential for the growth of the site, formulated in the terms of density, indicating the volume of activity and the strength for defending the place, and refer to the possibility of migration to or from the site, but after connecting it to the economic potential, the diversity in the population could refer to the accumulation of delegations migrations of the place.

- **Natural resources** which is elements related to the activities in the place that can be increasing or decreasing, such as agriculture, fishing, timber, mining and precious stones, and the spatial domain of a place related to its core values of natural resource and it's quality and the wealth here is the productivity of trade exchanges, which cannot make a reciprocal processes without the presence of commercial lines, which imposes a kind of complementary relations between the population and the spatial domain. (Research Department, 2008)

Living dimension for city urban planning process defined by many factors including the city scale and capacity to obtain high population numbers, the city infrastructure and mobility structure, major initial investment in the action and planning area which in return dedicated to a massive population number with all the living and socializing activities, which in return provide most of the privet investment and economic exchanges between the private and the public's parties.

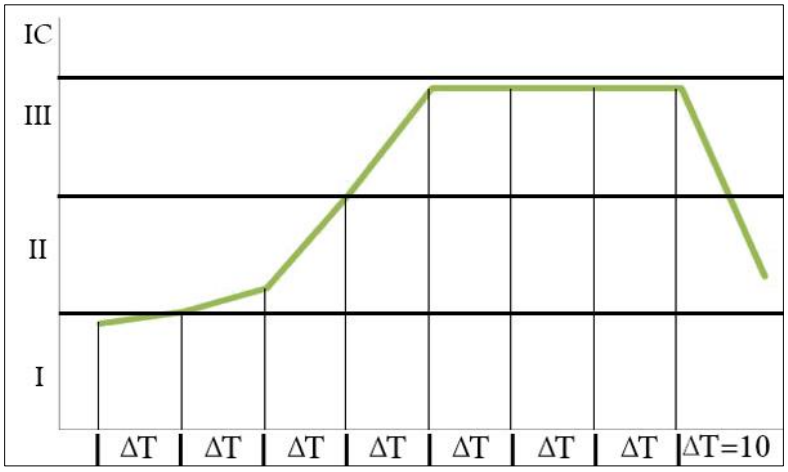


Figure 3.3 ideal behavior of a planning process; Living curve

The Living data are the; numbers of the population in the site, the density values, numbers of yearly visitors and tourism, economics and social activities.

At the beginning of the life cycle where the site is starting with urban plan and the urban condition, the values of living rate is at its lowest because of the uprising actions to implement the new plans, this lead to difficulty in population stability, economic state and social activities that can occur in the site. With time passing and the implement of the actions the living rate increases to its highest values by the fifth decade so that it equivalent the capacity of the site, and this uprising due to the stability of the site with time and its ability to provide the population welfare and the appropriate spaces to social and community activities, which in return increase the economic outcome because of the consummation behavior of the inhabitance.

By the end of the life cycle the living rate decline due to the low efficiency of the old planning process and the need to establish new studies and new planning process to amendment the breaking down of the site. (Figure 3.3)

3.4 Disruption

In the ideal life cycle analysis by Lourenço Model, the site has three dimensions, planning, action and living but this happens when the site is going through normal ideal life cycle but in many cases the site goes through abnormal conditions causing it to be divided into separate phases of development, and some of this phases could be studied as separate life cycle, this abnormal conditions could have positive effect on the site like a motive to accelerate the planning process to achieve certain time goal, for example the cases of preparing for hosting Lisbon 1998 exhibitions (Expo-98 in Lisbon) where the time scheduled for the site caused the process to be speed up, nevertheless not all abnormal conditions can be as corroborative as exhibitions, in the case of Opatija Riviera, Croatia, studying the tourism area life cycle of this destination that has been developing tourism for more than 150 years. The data for Opatija Riviera indicate that the area has witnessed all phases of the life cycle, and it's noticeable that the sharp declines in visitor numbers were caused by the exogenous factor; the wars which were the World War I, World War II and the most recent War for Independence from 1991 to 1995, so in this area the tourism has developed from almost zero activities four times.

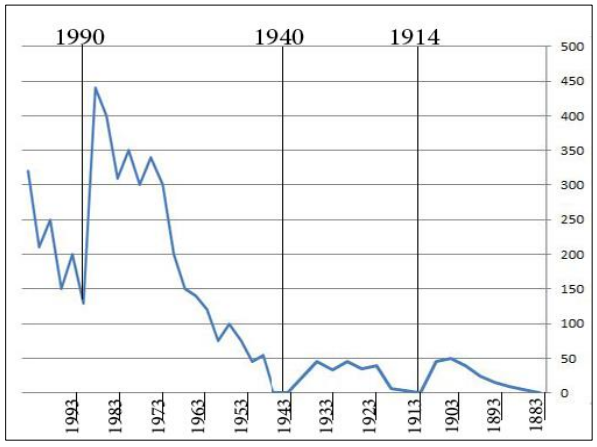


Figure 3.4 Tourism area life cycle for the Opatija Riviera (1883-2001)

Source: (Corak, 2006)

the long tourism life of this destination was abruptly halted by wars three times so that it had not followed the classic development curves, so the area development were divided into four phases depending on the three wars as time intervals for the life cycle analysis. (Figure 3.4).

- **Period I " Exploration and involvement" (1883-1914)**

  In this period the area experienced development phase driven by several actors who developed the infrastructure and built capacity necessary for tourism activities, as the health tourism dominated in this period key development directions of this period were quality of services, hotels accommodation, care for environment and product exclusivity that enabled it to attract tourists with a high spending power and to develop unique product features.

- **Period II "Involvement and decline" (1919-1940)**

  The second period was characterized by the development of new products and thus health tourism ceased to dominate, the destination used the risky strategy of new product development including orientation to the new market. However, this reorientation was driven politically, rather by the stakeholders involved in the tourism development which causes fluctuation in the numbers of tourists and degradation in the quality of the area.

- **Period III "Development" (1946-1990)**

  After several years of Wars, the area experienced initial stages of tourism development and caused it quickly entrance to the development phase, but this time was marked by the non-existence of a tourism development plan. The principles of the market economy were applied only partially and, therefore, the tourism development was not a subject of strategic decisions, this because of different reasons, the insufficient marketing, unsophisticated promotional efforts and a confused development vision. In this period, a congress tourism development introduced to the market but without the necessary investment in infrastructure and research.

- **Period IV "development and consolidation" (1990—)**

  In this period, the area was on the tourist market but with the inherited problems. It went through consolidation and party stagnation according to some parameters such as slowing growth rate, low occupancy rate, heavy reliance on repeat trade and reaching the limits of carrying capacity. Although the tourism numbers continued to grow, because of several problems in infrastructure and an aging product, the decline stage began to emerge slowly. If the area fails to increase the investment and does not apply appropriate strategic measures that enable it to enter the rejuvenation phase, the decline is inevitable (Corak, 2006).

4 APPLICATION TO DAMASCUS

4.1 Damascus profile

Damascus city is the capital of Syrian Arab Republic, the Middle Eastern country with population of 22,087,048 which is considered hastily growing country; the population grow from 8 million in 1972 to a current population of 22 million. Syria population also contains different refugee's communities. In 2014, there were 1.8 million refugees from Iraq, 540,000 refugees from Palestine and Syria was home to 130,000 Armenians (Estimates, 2014). However, Syria is a land that has been inhabited since ancient times. Given its strategic location firmly placed between East and West, Syria has long been the battleground site and "victim of various regional and international balances of power" (Quilliam, 1999).

Damascus today is the production of many successive civilizations, and its urban origin goes back to periods far in ancient history, coordinated and planned in every era according to geometric and scientific foundations as a response of religious, political, economic, environmental and security requirements, it was studied in advance and organized forms, and its legislation and plans were putted specific for its growth and development, Damascus can be classified as creative pre-planned capital, moved from the residence of gods and a houses of worship into cultural city, economical and finally political capital (Abdin, Al-Masri, 2008).

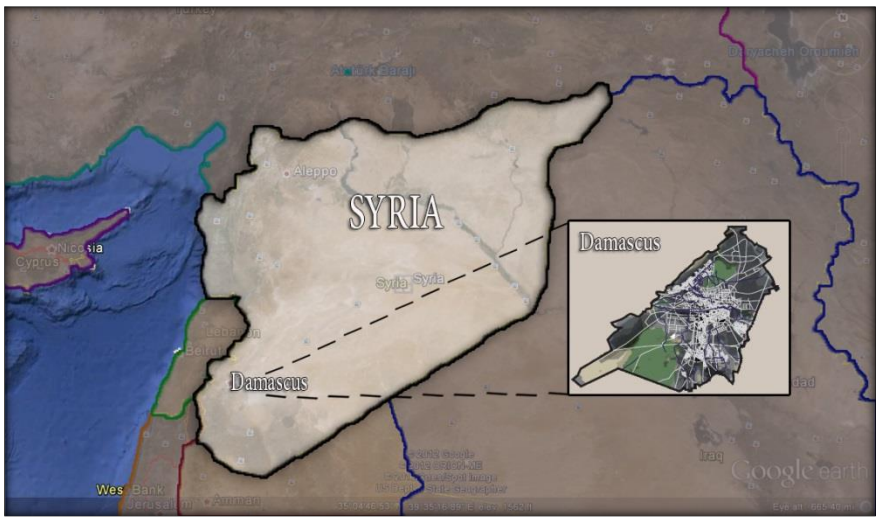


Figure 4.1 Damascus's Location
Source (Own work)

Located in southern western Syria, Damascus is the center of a large metropolitan of 4.3 with its suburb (estimate 2009), and in 2014 estimated to be over 3 million. While proud to be the world's oldest inhabited capital, Damascus celebrated its title of the Arab capital of culture in 2008. The city turned into cultural platform to attract the attention over full year of 2008, the most important urban activities; Rehabilitation of the open spaces in the city and removal of infringements and distortions.

Damascus as a city has an uninterrupted history goes back to 6 thousand years, owing the city's strategic geographical location in a plain narrated by Barada River and its branches, which are separated in seven branches distributed across Damascus, and the city is characterized by the existence of Qasioun Mountain in western north Damascus.

In 1979 UNESCO lapelled the old city of Damascus as world heritage, because the city represent a masterpiece of human creative genius (selection criteria I), and it considered an outstanding example of building, and it illustrates a significant stage in human history (selection criteria IV). This labelling caused the development of the rehabitations movement of this part of the city.

Figure 4.2 The great Umayyad mosque in the city center

Source: UNESCO, Silk Road.

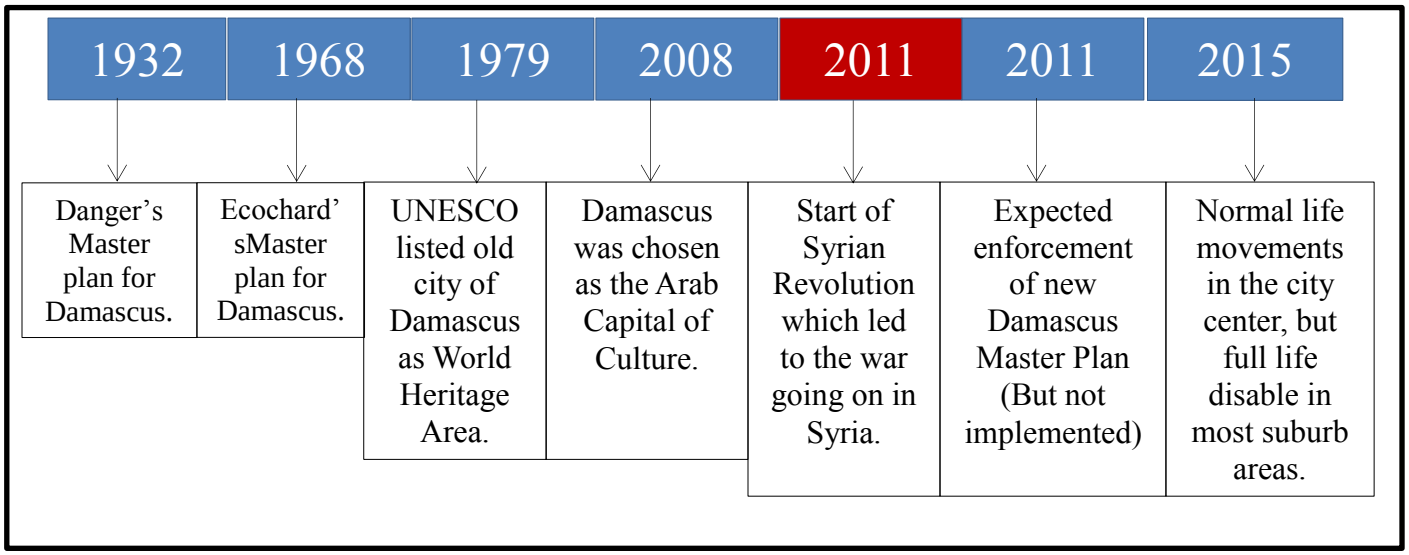
Damascus City located in Syrian Arab Republic which is one of the developing countries in the Arab world, in 2011 the Syrian revolution started heading from the south of the country to the capital and with political events turned into a war, caused the destruction of more than the half of the city rural areas in Damascus and those changes can cause the need to do more studies on their effects, one of them is the pulsar effect analysis.

4.1.1 Damascus history changes

Evidence of inhabitancy for Damascus city was found from 5000 BC in the rich plains of Al-Ghouta. After 1000 BC Damascus become the capital of Persian province Syria, In 64 BC Under the Roman Empire, the rectangular stone Roman wall with seven gates is approximately the same size as the old walled city today. (Figure 4.3)

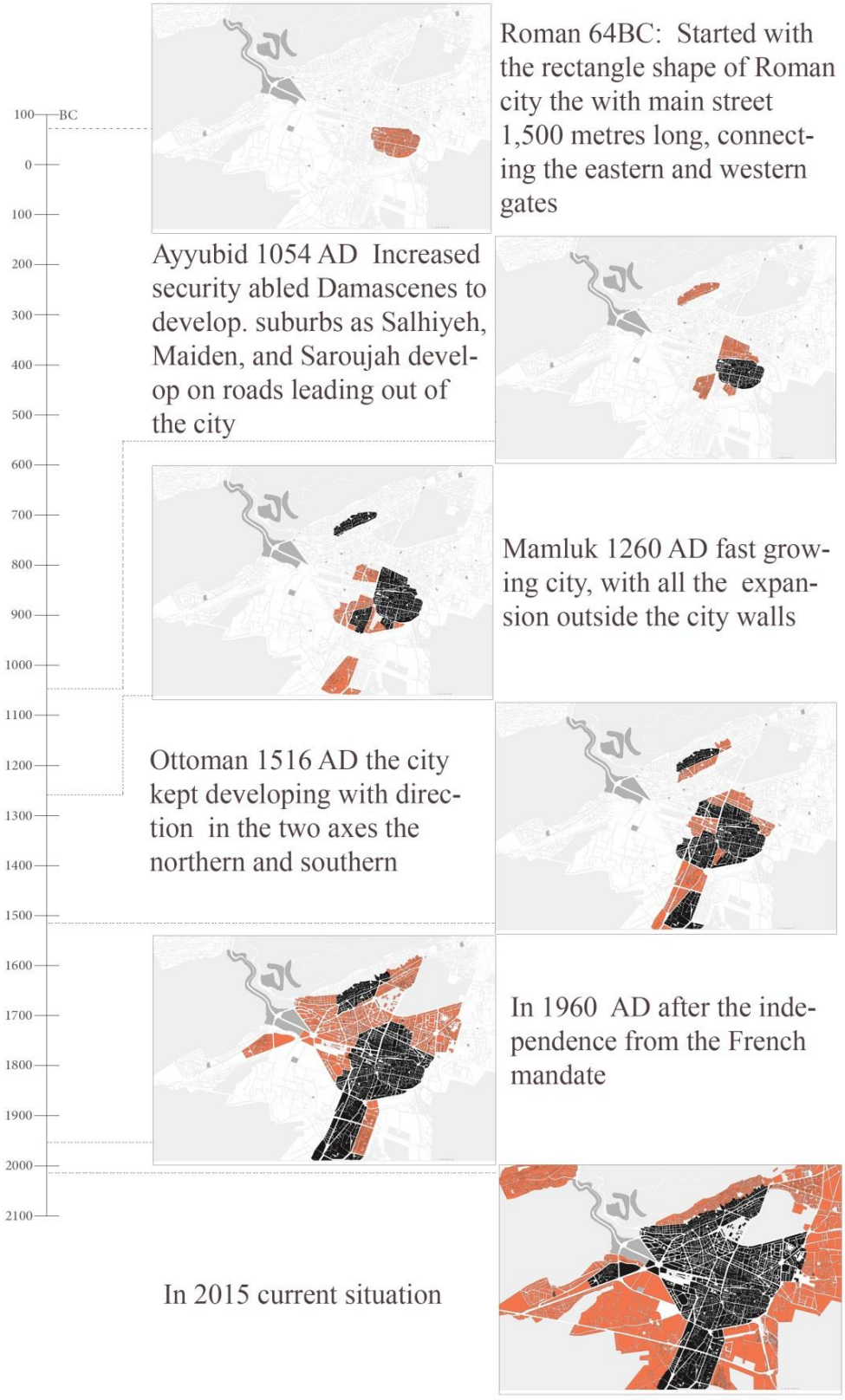
635 AD the city was under the Islamic rule. 661 AD the Umayyad mosque was built on the same site as Cathedral of St. john the Baptist.

Damascus became meeting point on the holy Hajj to Mecca under the Ottoman Empire, the city expanded with 25000-60000 people meeting in Midan area twice a year, the Hajj-migration added over 30% of the population and caused the rapid expansion of the suburbs. The French mandate continued what late Ottoman planners began, with master planning the city, after World War I the first master plan for the city ignored the local tradition of the old city.



Timeline of milestones in Damascus urban history

Source: Own work


100 BC
0
100
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300
400
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1300
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1800
1900
2000
2100
Roman 64BC: Started with the rectangle shape of Roman city the with main street 1,500 metres long, connecting the eastern and western gates
Ayyubid 1054 AD Increased security abled Damascenes to develop. suburbs as Salhiyeh, Maiden, and Saroujah develop on roads leading out of the city
Mamluk 1260 AD fast growing city, with all the expansion outside the city walls
Ottoman 1516 AD the city kept developing with direction in the two axes the northern and southern
In 1960 AD after the independence from the French mandate
In 2015 current situation

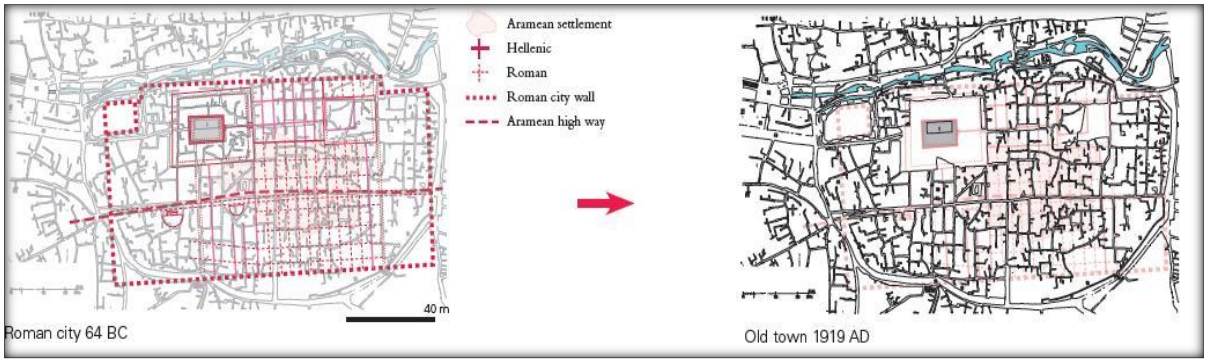

Figure 4.3 changes in old city of Damascus plan between the Roman period and the Ottoman period

Source: (Wifstrand, 2009)

1963 the Bath Socialist Party took control over Syria in a military coup, the Baath Party, is still ruling in Syria, between 1964-1968 Ecochard traffic plan is implanted. In 1970 upper-class suburb Dummar is built, the 1979 Ancient City of Damascus is World Heritage listed. And by 2007 a new master plan was suggested for the city with the help of the Japanizes agency JICA.

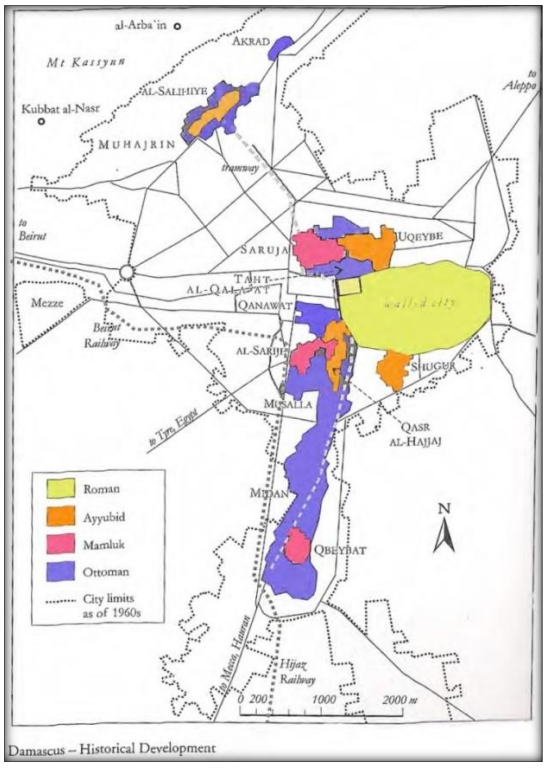

Figure 4.4 The development of Damascus

Source: (AlQattan, 2002)

4.1.2 Ecochard plan

In 1963 the Baath party took over ruling and it claimed the modernization of Syria, though these political changes in the country a new plan for Damascus represent the new era in the country history which is the end of French Mandate and the colonial period.
After the end of the French Mandate, between 1950 -1968, Ecochard was granted the setting the full plan for the city, the work was assigned 18 months to finish but it took four years from 1964-1968 and during this period he worked on studying the roads in the capital and the links between Damascus and other cities. In 1979, the UNESCO labeled the old city of Damascus as a World Heritage, which caused disruption the working on some of Ecochard's ideas to expanding small streets inside the old city.

4.1.3 The most important points of Ecochard Master Plan

1. Creating important main rod's network: the Southern Highway, Al-Thawra street and its extension, the rods around the old city walls, the sixth of Tishreen street, Al-Ithad street, Al-Hamra street, turning the Al-Salhiyeh street into pedestrian path, creating parking spaces for the area.
2. Edit residential roads labels: from Al-Koussour, first, second, third, etc, until it is named an old town, old town extension, modern residential area and newly organized area.
3. Creating a new residential area in Al-Malky, Kafar-Sousah, and outside the eastern gate, and organize it closer to free planning than to straight planning.
4. Expanding the commercial concept in Al-Mouhajrin passing Al-Marjeh until Al-Midan, and building commercial office building.
5. Creating industrial areas outside the city, and limit the industries allowed.
6. Suggest planning solution for the old city of Damascus inside the walls dividing it to zones from its current situation, and creating roads network, but the work on this suggestion stopped.
7. Creating green areas around Barada River, from Al-Rabwah into Dummar, with tourism serves.
8. Adopting radiographic planning principle between green and built areas.

Table 4 Negatives and positives of Ecochard Master Plan for Damascus

Negatives		Positives
The city extension reduced the green areas around Damascus city unconditionally.		Ultimate the industrial area outside the city.
Illegal settling Due to high growth		Ensure green spaces around the city and inside.
Starting the building trading business.		Insure offices building in the city.
The creation of residential suburbs without services and public utilities.		Creating new organized residential areas.
The separation in individual irregularities in licensed buildings.		Creating road systems in the city.
The overflow on roads inside the city center during rush hours.		Creating new squares and arenas.

Source: Own work

4.1.4 Analyzing Ecochard Master Plan

The growth rate

The plan counted on reducing the growth rate, in the following years it was almost 4% and the plan proposed three theories or possibility for population increases and the authorities requested fourth possibility which based on unify the yearly growth rate in 20 years of plan use, while the first and third possibility based on reducing the growth rate and table explain the growth rates (Table 5).

Table 5 the expected growth rate between 1965-1084

Growth rate	1965-1974	1974-1979	1979-1984
First possibility	4%	3.7%	3.7%
Second possibility	3.7%	3.7%	3.7%
Third possibility	3.5%	3%	3%
Fourth possibility (submitted)	4.5%	4.5%	4.5%

Source: Own work

In conclusion, the city before 1970 had a high growth rate because it was promoted by the residents, while the country was repellent to residents, but in the next years this image changed and Damascus suburb become attraction to residents and what contribute to that the tight area in administrative boundaries, which make suburbs contain the growth in population from city residents to the immigrants, but the growth rate in Damascus decreased to 1.7% between 1981-1994 below average while in Damascus suburbs it was 6.1% in the same period (CBSSYR, 2011).

The density

The plan showed that the average density of the city is 290/h in the consideration of the city area is 2000 h, it also indicate that the expected average density in the following years of 1964-1984 will be 200/h, and the expected density rate in organized residential areas is 350/h, also this density rate in proposed areas for resident in the future is 246/h.

In comparing, on the statistical data collected from 1981 – 1994, in Damascus city across residential neighbourhoods, which count to be 61 in 1981, and 62 in 1994 after adding Dwel'a area, the average city density rate 303/h in 1994, and this rate is at lowest in Dummar as 130/h, and its highest in Al-Yarmouk as 828/h. (Figure 4.5) in the year of 2011 from the CBSSYR statistic (CBSSYR, 2011).

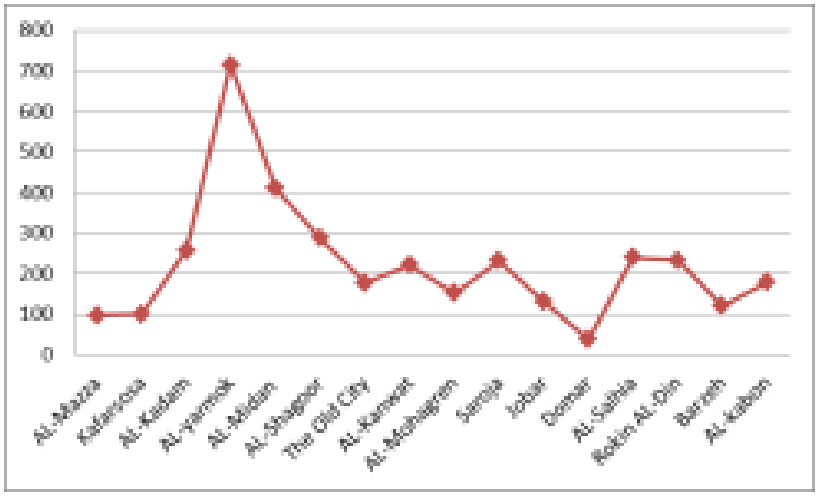

Figure 4.5 the city parts density rates

Source: (CBSSYR, 2011)

In conclusion, the density is high on the sides of the city where there are illegal settlements, while the density decreased in the central parts where the building function changed from residential to commercial and services and the change in the inhabitant sections, when the inhabitants in 27 parts from 62 decreased from 378 -302 thousand, while in 16 parts it increased from 402 -728 thousand during the same periods, and that caused the high density. This continuous increasing in density with its random levels and the growth in the sides parts of the city contribute not only to erosion of Al-Ghouta, but also in increasing the concentration of serves activities in central areas of the city which causes the decreasing in density in those areas (Figure 4.6).

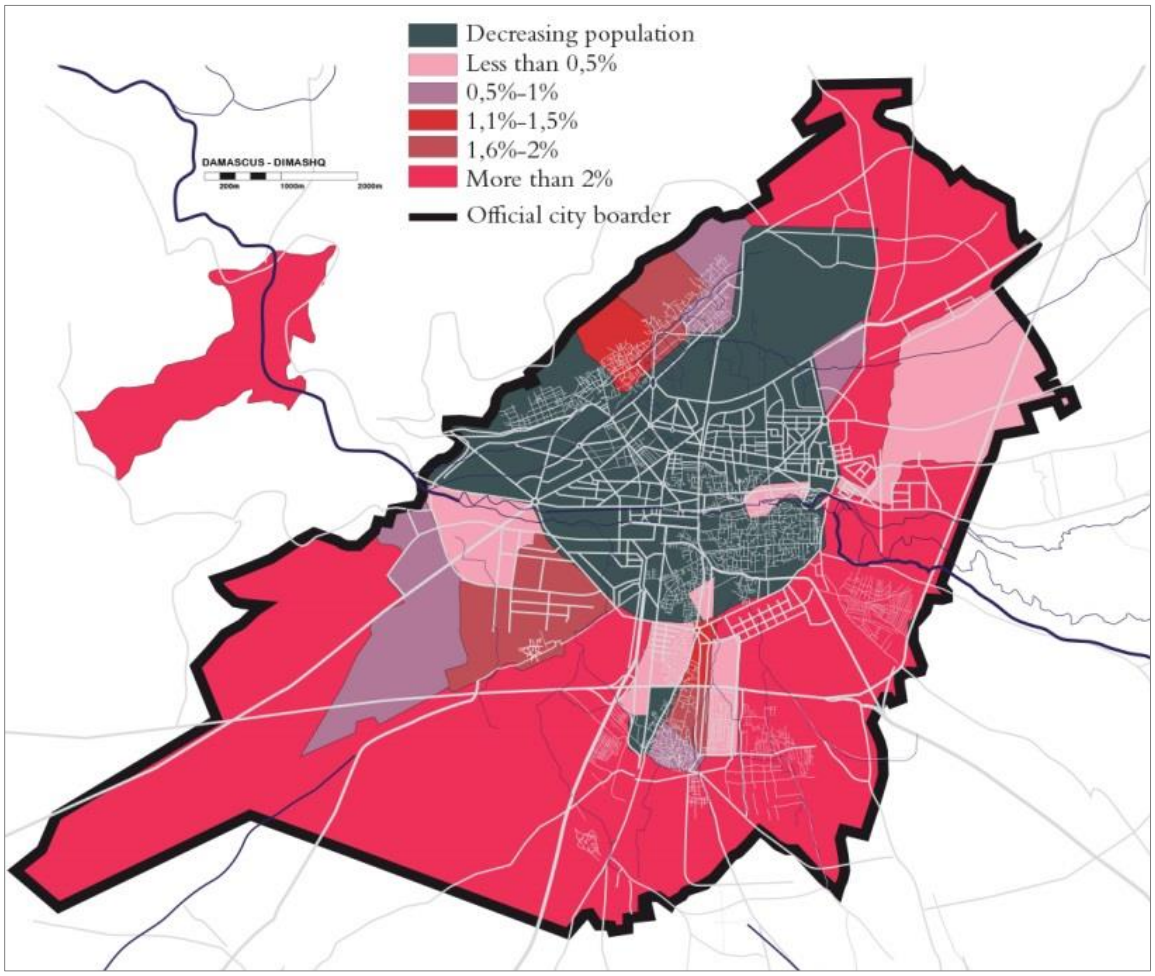

Figure 4.6 Population distribution in Damascus

Source: (Wifstrand, 2009)

The urbanism and residential areas

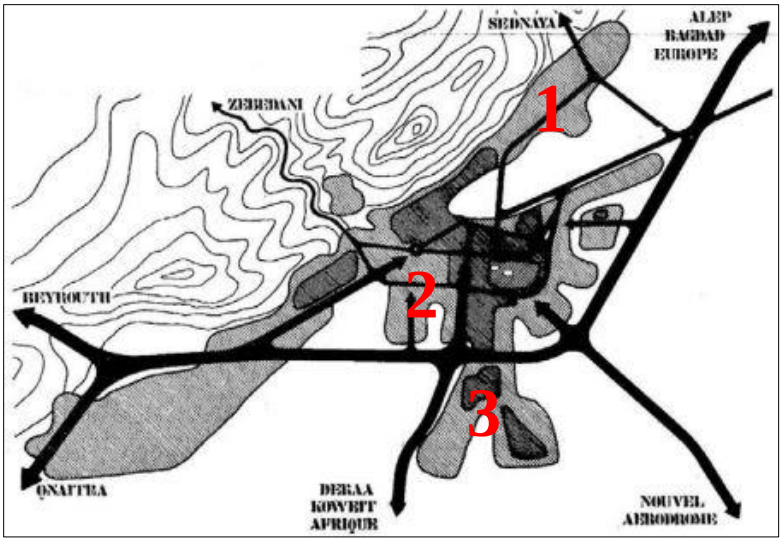

Figure 4.7 Ecochard Concept Master Plan of Damascus of 1968 showing expansion areas
Source: (Juvara, 2012)

The urbanism plan certified in the 1968 (Ecochard) master plan was:

- Inhabiting the predicted population's increases estimated with 840 thousand in 1984.
- Reduce the density by 100/h in the crowded areas of the city which is:

  1- Al-Akrad and its area 170/h.

  2- Saroujah and its area 80/h.

  3- Al-Midan and its area 160/h (Figure 4.7) .

- Reduce the density by 200/h in the old city of Damascus inside the walls and its area 110/h and inhabiting 23 thousand in results.

From mentioned above the residential areas of expansion must allowed to inhabit 904 thousand inhabitants distributed as following

1. Under preparation organized regions with an area of 316 hectare to accommodate 145 thousand inhabitants.
2. Regions of acquisition of popular housing to accommodate 52 thousand.
3. Future expansion regions with an area of 2875 hectare to accommodate 710 thousand.

In comparing, the suggested organized areas in 1968, all have been done except, Bab Sharqi and southern Al-Midan. The future expansion regions inside the administrative boundaries have been established either legally or illegally, except west Qasioun where now it is the location of unknown soldier monument and its surrounding, and in the 1970th a new residential suburb been established inside the administrative boundaries in Dummar unlike what in the Master plan and most of it have been done in the 1980th, most of future expansion outside the administrative boundaries in west Al-Mazzah, Al-Sahnaya and east Barzeh have not been appointed for residential purposes, but military purposed.

In conclusion, the idea of conforming Dummar Suburb is a positive alternative step in the field of urban planning compared to preparation of similar projects like new Qasioun city, and Assad suburb in north of Harasta, from the principle of establishing new cities and suburbs, not like the linear expansion used in the past, which caused destroying Al-Ghouta, and overcrowding the city, and the recommended points are, to accelerate in establishing the organized areas and the new expansion areas outside the administrative boundaries, and to use this empty land instead of having it owned by the military.

The city center by the Master plan in 1968

This area forms an expansion in the commercial area in Building system from 1948, by adding Saroujah, Oukaibeh, Faisal Street, Al-Qanawat and Qassaa Street to it.

To study this commercial facility it must be mentioned that the plan did not point to sub-commercial centres, but practically it adopted the past master plans which defined local services centres and the building system from 1968 and allowed opening shops in the old residential areas (area C).

In comparing, the parts added to the commercial areas have not been operated as city centre facilities, most of it is located in the old traditional building conforming the heritage urban fabric, and a lot of this building have been recorded as cultural building, in other hands the illegal commercial facilities spread in the old and new residential buildings next to the cultural buildings.

In conclusion, the old organized areas established by the urban law, was all divided into real estates to build it by the working laws, which lead to the rise of new residential neighbourhoods without considering commercial services, like Abou Rommaneh, Al-Mazraa, etc, where the building's basement worked as shops and stores.

While today those suffer from changing their function from residential to commercial because of its centration and the lack of central commercial area, in a lot of areas the privacy of residents mixed with the public functions, also its clear that the economic and services section did not receive the attention needed even it will contain 75% of the workers from all over the country by 2000.

Since the commercial areas did not develop from the year of 1948 even that the number of worker rises from 46% in 1970 to 64% by 1994 and decreased in 2004 to 48.2%. The trading in the city is based on individual radiance and suffers from the lack of a big modern institution, but the two areas in the west of the legal courts and Saroujah provide good opportunity for working markets.

The city green areas and its classification1968

The proposed city green areas in Ecochard master plan.

By the plan the green areas in the city is classified to:

1. Area (A) agricultural activities.
2. Area (B) protected zone which located on the foot of mountain Qasioun and around the urban area in east and south of the city.
3. Area (C) internal agricultural which is the following areas: East park, between Kafar-Sousah and Al-Mazzah, Jobar surrounding and the internal southern railway sides next to electrical faculty.
4. Area (D) the gardens area which is in those locations: Tishreen Park, on Barada River sides, net to Bab Touma around Barada River and different parts of the city.
5. Area (E) picnic and entertainments areas around Barada River.

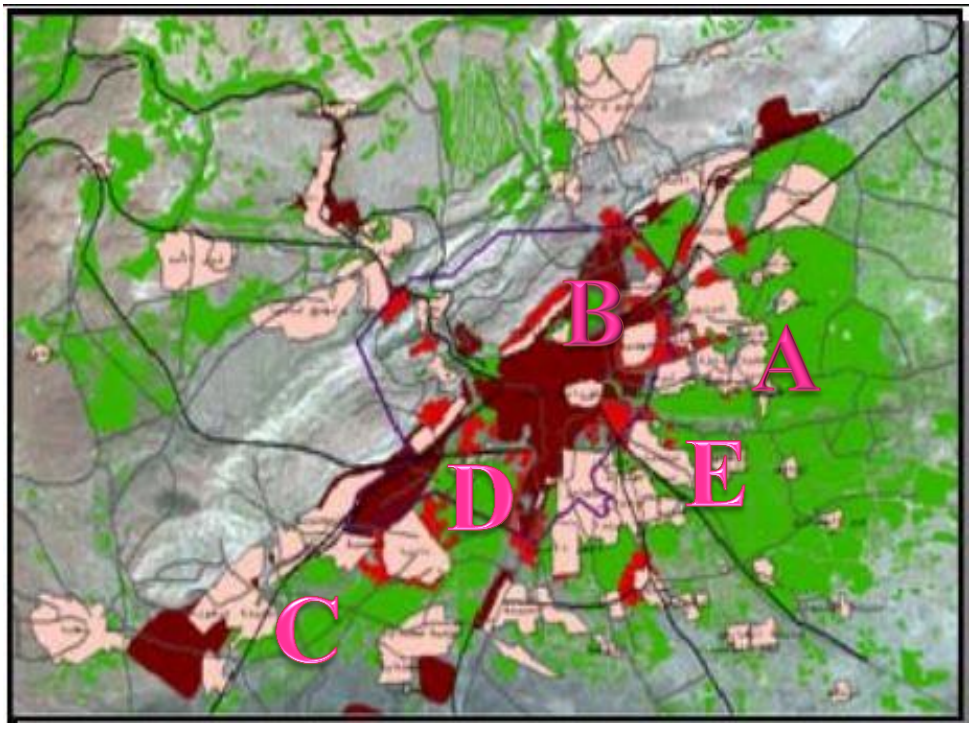

Figure 4.8 Green area by Ecochard master plan

Source: (Abdin, Al-Masri, 2008)

In comparing and conclusion

- Most of the area (A) located outside the city administrative boundaries and confirmed parts of Al-Ghouta, to heavy agricultural lands, but the illegal settlements spread in it and cost the erosion of Al-Ghouta with the expansion of urban plans of cities and villages, which require second reconsider for those plans.
- Area (B) the protected area was not safe from illegal settlements and establishing random buildings in it.
- Area (C) the illegal settlements spread to the internal agricultural lands until the urban is connected through it, like in Jobar and in decreased level of green area between Kafar-Sousah and Al-Mazzah, but the east park area part of area (C) was owned by the Damascus municipality after the organizing Al-Adawi and Ruken-Al-Din, but it wasn't made as a public park, and now its contain some military facilities with no connection to park function.

- Area (D) the western park have been established with a good amount of separated gardens, but the areas around Barada River was not promoted in the specified way of the plan either inside the city or outside.
- Area (E) to be picnic and entertainment area around the river, in this areas some building plans have been certified and done by the Dummar side, also near the city sides of the river several project have been established like Dedman and Sheraton Hotels and the national theatre (Figure 4.8).

The city's industrial area

The industrial areas provided in the master plan are located in eight areas, two of them specified to be heavy industrial in Adra and Al-Kiswah and both of them outside the administrative boundaries while other six locations are: Al-Qaboun, East and South of Al-Hal Market, next to Al-kadam, south Kafar-Sousah square, next to Al-Moadamyeh and Housh plas. The plan adopted the industrial density as 200/h for light industrial and 150/h for heavy industrial.

In comparing and conclusion:

- Qaboun, next to Al-kadam and Housh plas industrial areas matches the plan, but the industrial facilities are a little out of its defined areas on the sides green areas.
- South of Kafar-Sousah square industrial area was turned into an administrative area, including Al-Thawra magazine building.
- New Al-Hal market (south of Bab Sharqi) includes part of the organized area of Bab Sharqi and the specified area for it include Al-Dabaghat area which is less than the area on the Master plan.
- The industrial area next to Al-Moadamyeh it is not established yet and it is useful to reconsider it the result of corresponding between the Damascus Master plan and the suburbs plans, also it is important to coordinate between Damascus and its suburbs municipalities to move the heavy industrial from the city to appropriate locations (Jaboor, 2001).

4.1.4 The changes on Ecochard Master Plan in the following years

In the following years after the approval of Ecochard Master Plan, Damascus governorate population sharply increased from 425,000 in 1950 to 1.22 million in 1985, which causes overloads in the city buildings and high traffic crowded and high trades costs, this high population caused by the internal immigration from all over Syria into the city of Damascus also the number of Palestinian immigrants who came to settle in the city suburbs and after 1967 the number of immigrants from Al-Joulan heights, this increasing in population led to high expansion from the city residential areas towards the green areas around Damascus, and decreasing the green line that surround the city which Ecochard suggested, Al-Ghouta contains 55 residential community and the population of 20 community from them in the year of 1981 was equals to the whole Al-Ghouta expected population in 1985, and by the year 1994 this number came to 883 thousand, and the yearly growth rate in those residential community was 6.1% while the growth rate to whole Syria was 3.32% yearly, and the expansion in Al-Ghouta was directed towards East and Western South, which conclude that this expansion was on a fertile land and the urbanism spilled continuously from inside the administrative boundaries to outside, those villages formed a developing belt of urbanism which have huge impact of the illegal settlements and that led to Al-Ghouta erosion, which require serious steps to stop this impacts and turn the expansion into different directions than the city green surrounding. (Figure 4.9)

Figure 4.9 the expansion of Al-Ghouta illegal settlements (1965-2006)
Source: Own work

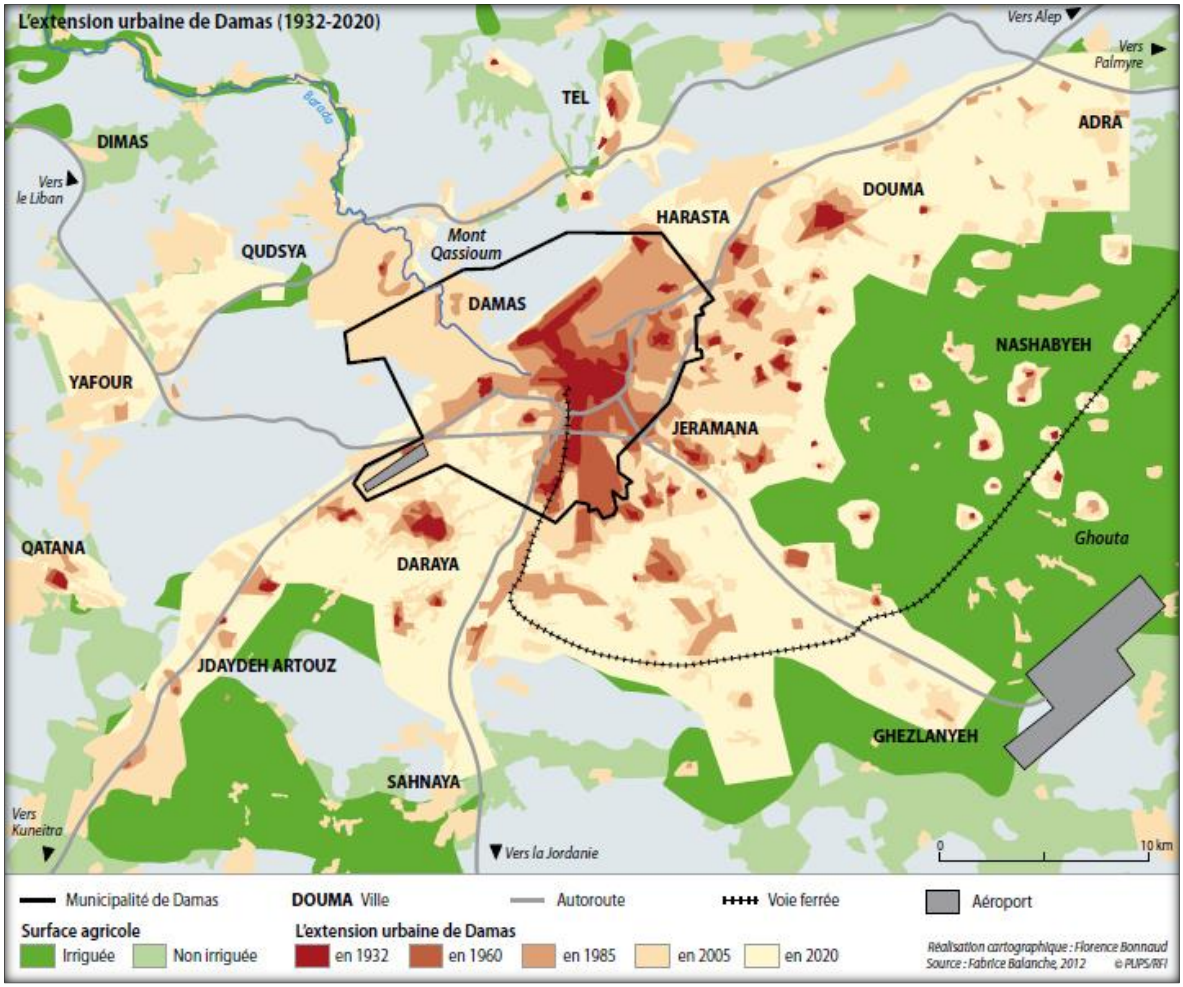

Figure 4.10 The urban expansion and the green areas suggested in Ecochard Master plan

Source: (Balanche, 2012)

4.2 The components of life cycle analysis

Through analyzing the city historical changes and its everyday demographic changes the analyzing periods was chosen from 1960 until the estimation of 2015, where the most effective changes in the city life cycle occurred, starting with the installation of Ecochard master plan for the city through its surviving the first conflict times between 1980-1982 until its recent ongoing civil war started from 2011, in this 55 years of study the city main dimensions of planning, action and living.

4.2.1 Planning in Damascus

- **Period I (from 1960-1982)**

The planning process in this period remarkably evolved due to the installing of Ecochard master plan, the beginning of this period started with collecting and analysing the data for the master plan and then in the following years the final form of the city clarify through the establishing of the new ring road and modifying the major residential blocks around the capital main destinations, with the work on rehabilitation the old city centre and introduction the green area into the city neighbourhoods, the city peak in the planning process occurred at 1968 where the new master plan was introduced to the public and put under implementation, this plan was prepared to last from 1965 until 1985 where a new master plan should be installed for the city but complicated routine procedures caused the delay on releasing the master plan and as a result the delay in the implementation process, a lot of Ecochard master plan have not been implemented until now like Al-Assad city between Al-Moadamyeh and Al-Mazzah, Qasioun new suburb and regulation of east Bab Sharqi, and by the year of 1979 UNESCO labeled old city of Damascus as a World Heritage which caused the interception of the development procedures in the city center (old city of Damascus) and only allowed the rehabilitation of the destroyed areas without prejudice any urban form within the limits of the city ancient wall, this event caused decline in the planning rate and it kept on this low rates until the start of the 80th conflict in the country with the attempt to starting a revolution.

- **Period II (from 1982-1992)**

Passing through the master plan expiration date in 1985 without any attempt to start planning new city's plan, and the planning rate keeps on its low rate until the year of 1992 where it was the general institution for studies first attempt after 24 years, to prepare a newly organized plan for Damascus and its expansion, this study was launched from the need to increase over the expected increase in population which is concentrated at the city administrative line and the surrounding green strap (Al-Ghouta) with strong emphasizing the proposals to develop the suburbs cities outside (Al-Ghouta) which will

bear the burden of the high growth in population, in this study it was proposed different expansion areas based on several conditions:

1- Maintaining the cultivated areas, and working on expanding it through exclusion the urban developing work of the arable lands.
2- Maintaining the organized and implemented residential areas, which are being currently, finalized within the limits of the city lines.
3- Reduce the random housing phenomenon to achieve the goal of protecting Al-Ghouta and preserve its green areas from erosion.

The proposed expansion for the urban area included those urban development axes, the direct urban strap with these urban localities; Harasta, Irbin Zamalka, Ein Tarma, Hazeh, Kafr Batna, Saqba, Hamoryah, Jaramana, Yalda, Babbila, Beit Sahm and Al-Hajar Al-Aswad, the expected population in those communities reached 375 thousand inhabitants of 1994 estimates, and the study of 1992 suggested scalable the growth in this area in the future, where it do not exceed 619 thousand inhabitants. The proposed master plan indicate that other than Al-Assad suburb and the new Qudssaya suburb, Damascus province will allocate with those new area the urban developed area on Qudssaya axis, AsSaboura, the urban developed area on Al-Moadamyeh axis, new Qasioun city and the area between AsSaboura and Qatana.

Due to the routine procedures and the absence of an integrated planning strategy, the working on the1992th general institution for studier's master plan was not finished with its final form until 2007; therefore the plan was not put under any actions and stayed on papers (Subh, 2008) (Figure 4.11).

- **Period III (from 1992-2015)**

In this period the master plan was still in execution, the 1968 Ecochard master plan where a lot of its details were edited due to the high growth of the city population and the big spread of the illegal settlements. With the cooperation with the Japanese International cooperation agency (JICA) came the project of studying the expansion areas with the

illegal settlement, also developing the city's master plan. This study included 17 areas in the city for new settlements and developing the urban area while rehabilitating the old city of Damascus. This project was called **Greater Damascus Region** and its main goal was to achieve solutions for the ever going urban problems in the city and meet the requirements and the needs of city's urban community where it was coordinated between the Syrian and the Japanese teams to choose several areas in Damascus region to be considered case studies for the rest of the city, including Al-Qanawat as an old area study case, Qaboun as an illegal settlements and Qatana as expansion area. This study indicates several considerations caused by the lack of updating of the city's expired master plan from the authorities so it hasten to put the results under implementation especially in the following topics:

- Deterioration of the cultural values of the city.
- Traffic congestion.
- Air pollution.
- Inappropriate private spaces and public facilities.
- Inadequate management of national heritage.
- The general urban view declining.
- Increasing in health risks (increase in communicable diseases due to population growth, respiratory diseases resulting from increased air pollution).
- The recession of the economic activities.
- Lack of a plan to direct the industrials sites and illegal urban work.
- Encroaching on agricultural lands.

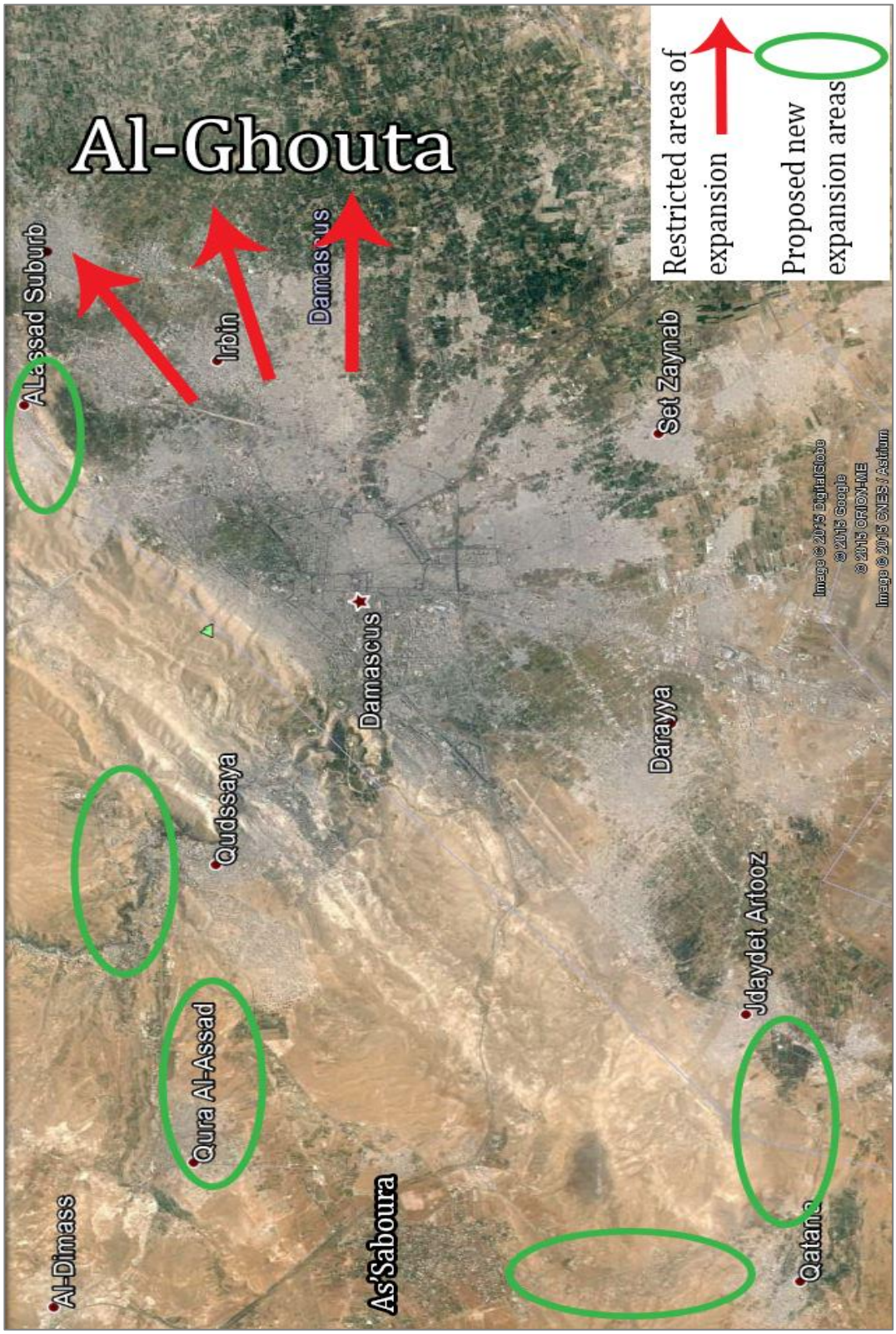

Figure 4.11 Damascus expansion area by the 1992 proposed plan (1992-2015)
Source: Own work

This proposal included working on improving the road network, the public transportation, installing new transportation with underground parking, implementing good form of pedestrian road network, while for the civil security, the goal is to create comfortable spaces for the pedestrian (gardens, commercial centers, paths networks and sidewalk) also improving the general view for the city, implementing the traffic safety, disasters managements and social safety networks. And this study did not forgot to preserve Damascus cultural values by creating spaces to communicate between the different social segments, also creating cultural centers, and developing the infrastructure as a base for tourism movements in the city. In the greater Damascus region, four cities will exist under the administrative limits of Damascus, and it was expected to be released in March of 2008 after the authorities modification, with an area over 4000 km² and expected population over 6 million inhabitants. The project suggested having the four cities with in a30 km distance far from Damascus center, which were: city in industrial area in Adra, information technical city in Qatana, governmental city in Al-Dimass and industrial development city in Al-Kiswah. Greater Damascus region includes main parts which are Damascus with its expansions, Al-Ghouta with 78 urban areas and the rest of 126 residential areas, the urban development settled for three axes:

1- Northern extension axis in this several area; Adra, Ad-Dumayr, Al-Tal, Hafir, Ar-Ruhaybah, Muadamyat Al Qalamon, Al-Qutayfah, Al-Assad suburb, residential part in industrial city of Adra, Qasioun new city, northern suburb in Qasioun.
2- Southern western extension axis; Qudssaya and Qatana, the work on this axis is in Qudssaya new suburb and its extension toward AsSaboura and Qatana, and also Al-Moadamyeh to Al-Quneitra.
3- Southern extension axis; north Al-Kiswah and the hills located on its southern eastern direction. (Figure 4.12)

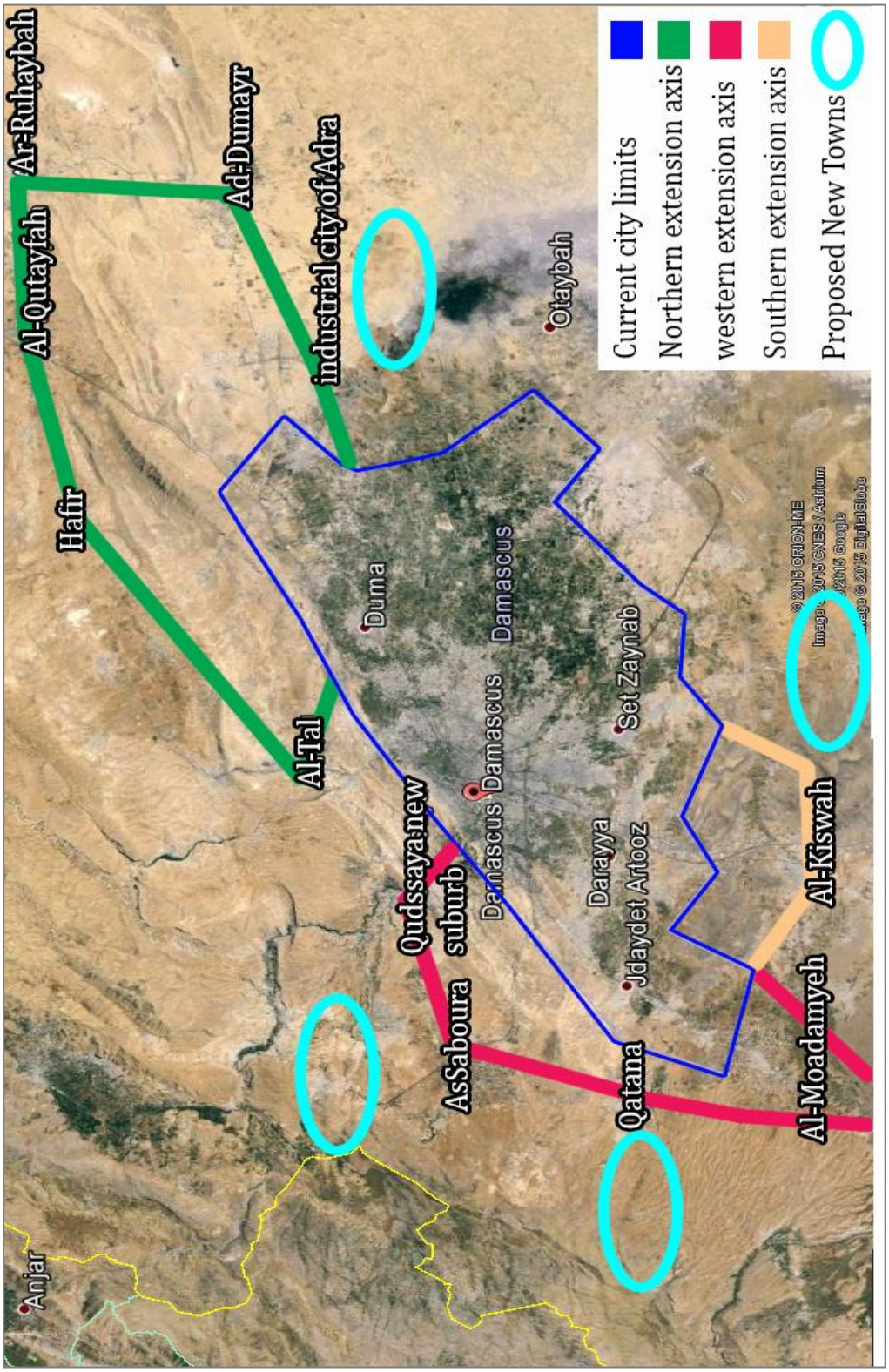

Figure 4.12 the development in 2007 JICA proposal
Source: Own work

Because of the delay on the authorities modifying for this proposal plan, also a lot of problems existed like the fate for the people living in the area proposed to be developed, which need to prepare alternative residential solutions, also because of the conflicts started on 2011 in Syria the work on this proposal stopped until unspecified time, and the proposed ideas remain on papers with estimated costs of 20 billion dollars.

4.2.2 Actions in Damascus

- **Period I (from 1960-1982)**

The action took place in this periods is related to the completion of the planning periods with Ecochard master plan, those actions started with the estimated costs of implementing the master plan, governmental financial with the help of external financial assistance, under the rule of Al-Baath political party, with its policies to raise the taxes value and imposing harsh conditions on the citizens in order to seek country developments, after 1973 war in Arab countries, the governments in Syria received external financial assistance from Oil states in Arab Gulf countries reached 35% of the gross domestic production until the year of 1980.

Major building projects started with the year of 1970 after the political stability, with the direction of Ecochard master plan, and technical help of the socialist countries, massive public building were established; Al-Assad public library, Tishreen Stadium, Al-Mazzah campus and most of the ministry buildings (Balanche, 2012).

The main working on the master plan started with:

1. Establishing main road network with its main element the southern ring road around the city where it's open for the public by the 1980, but did not finished until 2008 where the latest editing work turned into maintenance work. (Al-Khalil, 2008).
2. Creating a new residential area in the city with buildings 2-3 floors high.

3. Establishing the new resident suburb Al-Mazzah around the main highway in the 1970's, by the end of the 1980's full road network completed in the suburb and connected it to the city center.
4. Establishing commercial buildings around Al-Marjeh square in the city center. (Figure 4.13).
5. The suggested work on the old city of Damascus stopped because of the selection of it as World Heritage in 1979, which caused stopping any amendments on this part of the city so it does not cause any harm to the historical monuments.
6. Establishing several public services buildings for example; the new university campus on the first of Al-Mazzah highway, the national museum (Figure 4.14), Tishreen Park and the presidential palace on one of the Al-Mazzah hills.

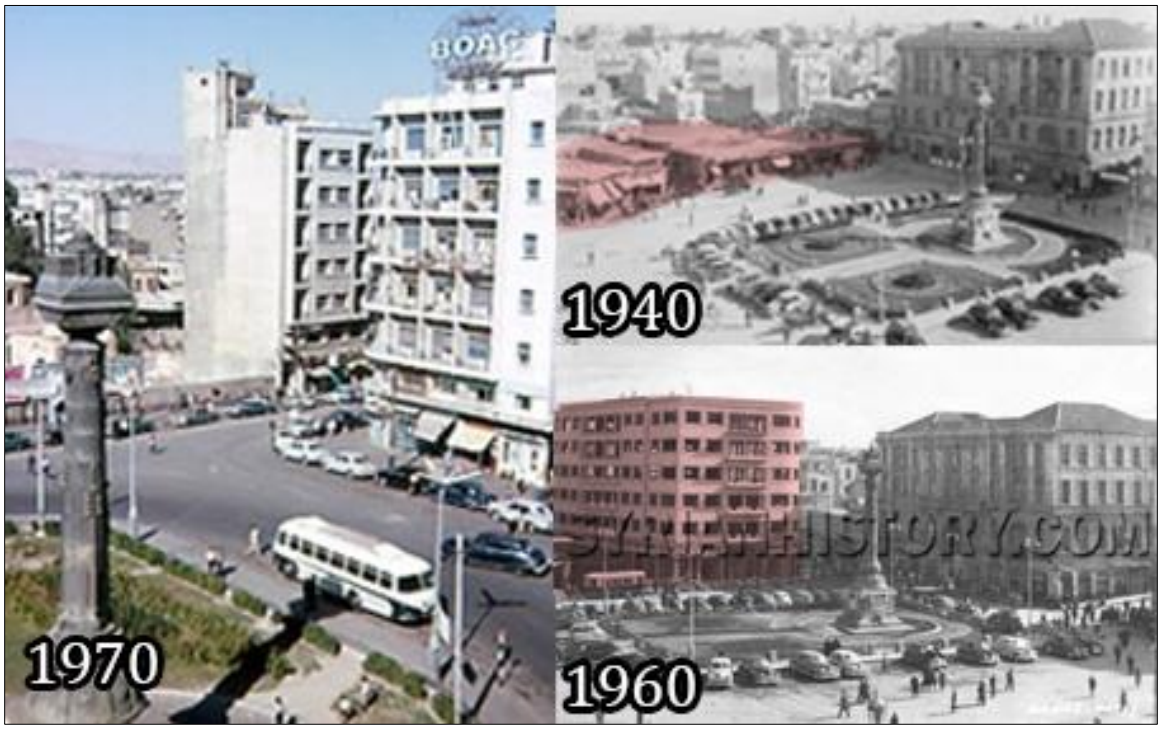

Figure 4.13 AL-Marjeh square development 1940-1970
Source: Own work

Figure 4.14 Ecochard proposals for the national museum
Source: Own work

In addition to the delay in implementing the master plan, the conflicts of the 1980-1982 caused changes on the planning actions, and caused narrowing the security range on facilities and residential neighborhoods especially in crowded center of the city. Due to the number of the internal and external immigration in Syria, several suburb of the city were dedicated to absorption the large number of the immigrants as an example; Al-Yarmouk camp in eastern southern side of the city dedicated for the Palestinian immigrants after 1950, also the arrivals camp northeast the city dedicated for the immigrants from Al-Golan heights after 1967, where those area developed with high growth in illegal settlements and population rate.

- **Period II (from 1982-1992)**

The working on Ecochard master plan continued with some of the field editing, not much of the actions were added in this period other than the implement of the roads network and increasing the residential settlement in the city's suburb, within half of the 80's decade, it was imposed to be the end of Ecochard master plan life cycle and to start with new master plan for the city, but the plan implement was not finished and it needed to be edited in several locations to acclimate with the high population growth in this period, where the city population doubled in just a few years and caused several problems in inhabiting, transportation and civil security. Therefore, a lot of real-estate traders found a way for easy profits by using the immigrants and rural resident's resident need who relocate into the city, and with the absent of the authorities control over the illegal settlement it spread into the suburb of Damascus, leading into growing dozens of neighborhoods without any consideration to environmental, health and aesthetic terms.
The most common illegal neighborhood is Al-Mazzah 86, which started as military residence and spread to provide a residence for more than 125 thousand inhabitances. (CBSSYR, 2011). By the year 1991 in May the law number 10 came out as a beginning of economic openness ending economical tightness lasted from late 1970's, which led to the work on a new master plan for the city by the year of 1992 (Balanche, 2012).

- **Period III (from 1992-2015)**

This period known for the economical opening in the Syrian market, where the private sector took the lead and with a lot of foreign investments in the Syrian trading structure causing increase in social inequality, due to the accelerating in economic liberalization without strong foundation to carry this loads either in the public authorities nor in citizens private investment, while the middle class has become economical better but in return there was new poverty in the bottom of the social pyramid, a new class of massive wealthy groups appeared to increase also the corruption which is a perennial problem in Syria. (Perthes, 1995).

While the statistics show that the ethnic structure of the population was vary from 95% of Arab population, 4% Kurds, and about 1% of other ethnics like Assures, Turkmens and Circassia. The majority of populations were Muslims 93% with the rest Christians. (Estimated 1999).

In the year of 1992 with the help of the JICA, the Japanese's agency, a study for a new master plan was been released, the findings of the study are based on figures and data, statistical information, graphical and environmental that have been collected and analyzed, but in understanding this study and strategy it is clear that it was directed to the aristocratic class, it did not take into consideration when developed the approach advocated by the tenth yearly plan, the central authority confined while developing and validation this study in involving some specialists and academics, this strategic came in theory vision, unrealistic and unconvincing (Safasi, 2009).

In the nineties, the decision of the council of Damascus province comprise on protecting the horizontal identity of Damascus, and by 2002 the protected area for Damascus extended to include other than the old city within the ancient wall, also Saroujah, Oukaibeh, Al-Phrain and Bab Al-Salam.

In the urban developing movements in the Damascus in this periods it is noticeable that the city is divided into neighborhood dominates the character of luxury and extravagance shapes and materials with wide streets and organized urban forms like Al-Mazzah which experience major developments in this period (Figure 4.15). By the year 2003, the city experienced an urban explosion with the arrival of the Iraqi immigrants where they settled in different area of the urban gathering depending on their affordability, lifestyle and religious sects, in addition to the urban deteriorating reality, and the rapid number of immigrants, caused spread of the illegal settlement leading to declining in health, service and environmental problems for daily life.

4.2.3 Living in Damascus

- **Period I (from 1960-1982)**

In the Ecochard master plan Damascus area was defined to be 105 km², this master plan was settled for population of 550 thousand inhabitances in 1961 (CBSSYR, 2011), and this period is considered one of the richest periods in Damascus urban history, where the city extended in newly organized vision and illegal expansion, those illegal settlement started with the biggest wave of immigration to Damascus which was from the general Syrian provinces, this coincided with the bureaucratic state apparatus and central that marked the political and economic system of that period.

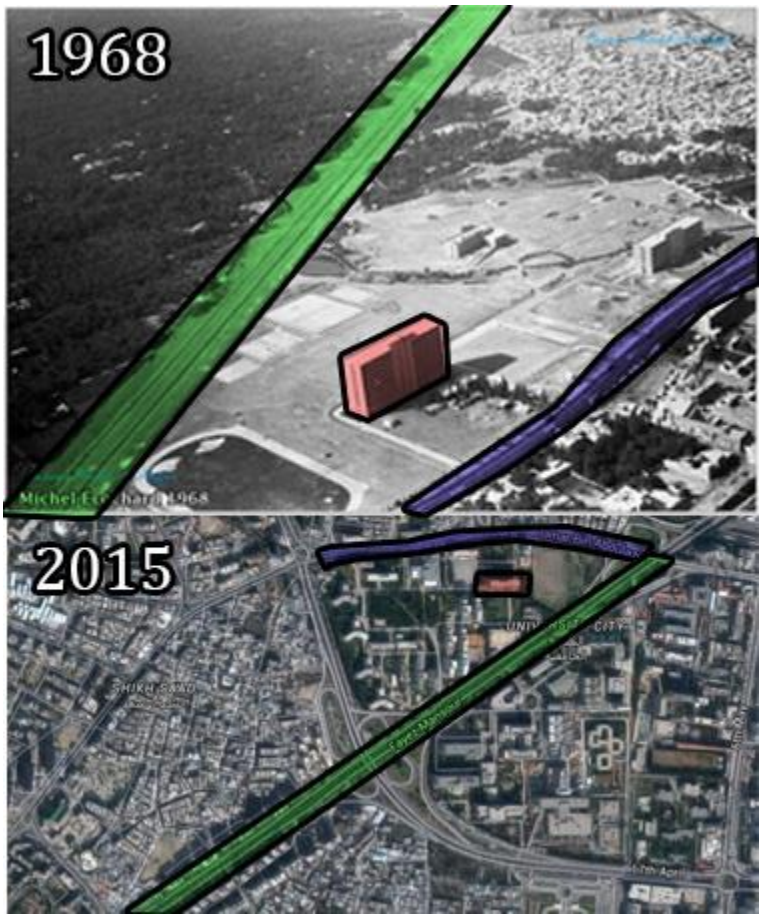

Figure 4.15 Al-Mazzah development
Source: Own work

Therefore, Damascus is the political, economic and cultural capital, and where the ministries, universities and commercial activities and major laboratories based. Those

new arrivals took over different suburbs from the sides of the city, the northern suburbs on the sides of Al-Qasioun mountain in Barzeh, Ruken Al-Din and Al-Mazzah 86, the majority is concentrated on southern of Damascus in At-Tadamon and Al-Hajar Al-Aswad, the highest population rate in Damascus is in Al-Yarmouk camp where the Palestinians arrivals from 1948 settled and created small society, at first 90 thousands Palestinians arrived to Syria, most of them settled in Damascus, in 1960 their numbers reached 126 thousand in addition to the number of population in Damascus, in 1967 Al-Golan immigrants due to the conflicts in the area arrived in Damascus and settled in Arrival camp and Set Zaynab with population reaches 131 thousand.

In 1960-1981, Syria entered a stage of rapid population growth (blast) with annual population rate of 3.34% (Al-Kash, 2012).

- **Period II (from 1982-1992)**

By the beginning of this period with the 80's conflict in the country the massive immigration movements started outside the country by the year of 1980, whereas it is difficult to get the accurate statistics of migrants from Syria at the period of conflict in the 80's, by observing the statistic from the Central Syrian Bureau of Statistics, it is noticeable that in the year of 1980 the number of people departed Syria where almost 1.5 million person while comparing to the number of departed people in 1979 it was about 200 thousand, and this high rate continue in the following year of 1981-1982, this number affect the population in Syria and Damascus, even studies show that the high numbers of migrants were from other Syrian provinces than from Damascus, but it lead to an increase in number of internal migrants towards the capital where the situation where less complicated.

In the following years the city remained in the peak of its population growth rate with 3.34% annually, after reaching 1 million in 1976, the population in the city kept on raising, during the year 1983-1989 the number of inhabitants increased from 1.22 million to 1.34 million, after about three decades of an intensive urbanization process, it changed at the end of the 1980s, the slowing of the process was reflected in the big cities where in

1970 Damascus share of the population was 13.3% of the total Syrian population and by 1990 it declined to 11.4% (Ayalon, 1993).

- **Period III (from 1992-2015)**

Although this period starts with the commercial and economic opening, but it is considered one of the worst periods in owing to the population explosion, even that the population growth rate decline reaching 2.4% at the beginning of the third millennium, in other words the population doubled over 32 years, as this rate did not continue to decline after the limited reduction after the peak of rapid population growth witnessed by Syria in the third quarter of the last century or in the best cases, the decline recorded in recent years is very slow, any approach to the issue of population and it's relation with the urban development must first recognize that Syria is suffering from population problems that needs adjusting and control, first the rate of population is one of the highest in the world, also the distribution of population in the country is clustered on the western part of Syria in very high density, while in the eastern part of the country its low rates of density.

The Infant mortality rate (deaths/1,000 live births) range from 34 in 2000 to 15.2 in 2012, due to the better health situation in the country accompanied with the better economic situation, but also it's due to the decline in the growth rate in the first decade in the third millennium.

In 2004 statistics Damascus and its suburbs population reached 4 million inhabitances distributor as 1.5 million in Damascus city, and 2.5 million in the suburbs, in 2007 the number increased to reach 4.15 million, 2.48 million in suburb and 1.669 million in the city, by the year of 2010 the number of the region population reaches 4.4, with increment of almost half million in 6 years, the general region of Damascus which consists of fifteen residential districts contains 19.5 % of Syrian inhabitants (CBSSYR, 2011).

When the conflict started in Syria, it's reached the suburbs of Damascus by the end of the 2011, which caused major displacement wave for the countryside and suburbs into the city and more stable areas, with the last statistic done by Human Rights Organization the number of displacement people in Damascus suburb reaches 2.2 million inhabitances, which took the lead in all Syrian provinces, now many areas in the suburbs are

considered semi-free zones starting from Darayya, Eastern Al-Ghouta, Duma, Harasta, Jobar and Qaboun as a result of the siege and directly targeted by the forces.

The number of displaced people who settled in Damascus reached 1.2 million, with 45% the percentage of children. Most of them settled in common areas in Damascus like; Al-Tal, Barzeh, Qudssaya and its suburb, Jaramana, New Cham (Dummar) and Al-Mazzah. It was chosen depending on the political situation of the area. The emigrants did not receive any kind of assistance from the governments and they end up living in camps and schools out of any terms of durability, safety and protection or any necessary supplies (Figure 4.16).

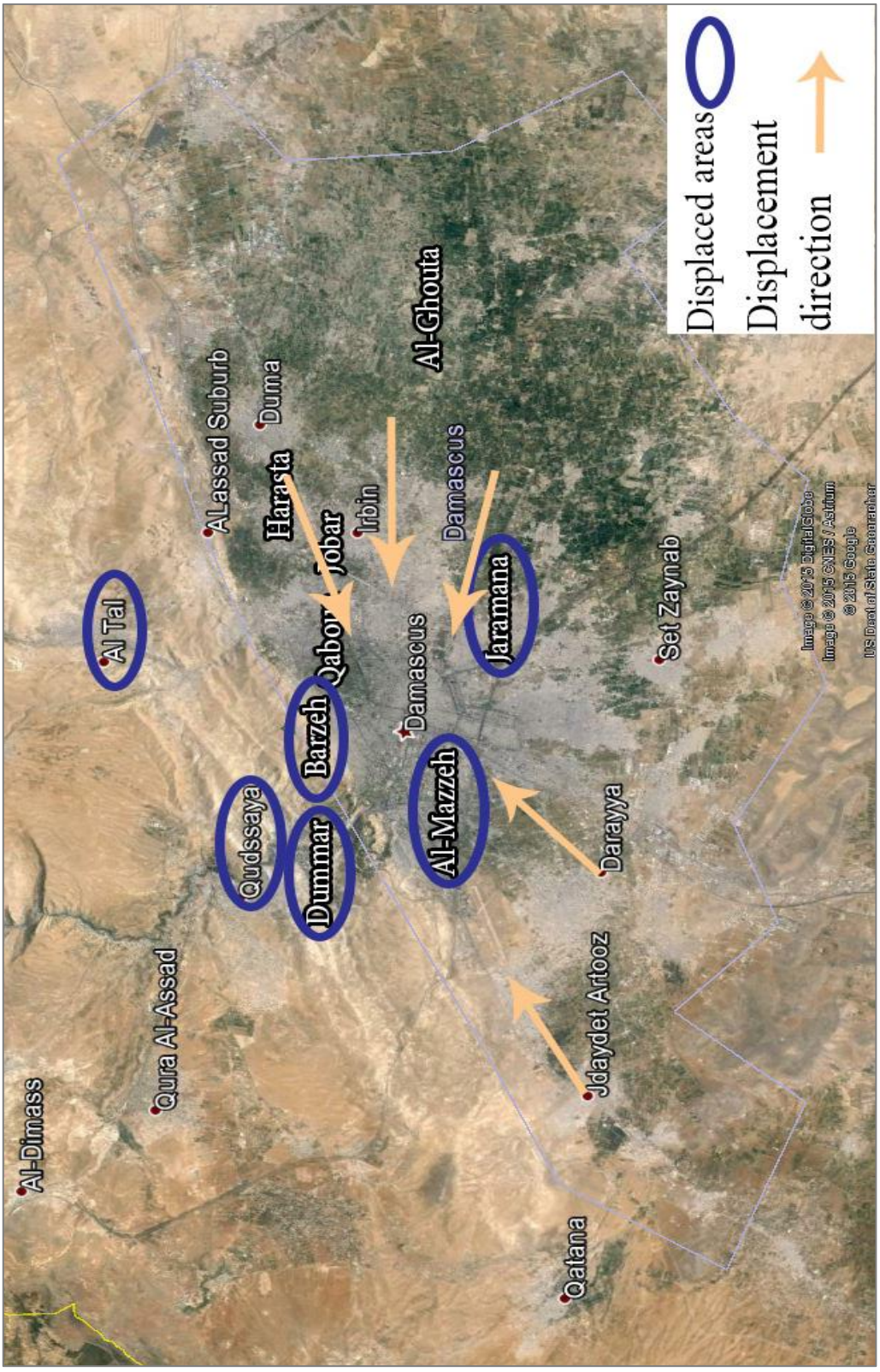

Figure 4.16 The immigration wave from the suburbs into Damascus
Source: Own work

4.2.4 Disruption in Damascus

- **Period I (from 1960-1982)**

With the need to install master plan and the new political changes in the country, the development movements were going without much of major disruption other than routines procedures and the amount of bureaucracy adopted in the country, but in overview the planning process was moving slowly but continuously.
In announcing the old city of Damascus as World heritage, the suggested work in the city plan were discontinue causing postponement the installation of Ecochard master plan, and the need to add moderation to the working plan.

- **Period II (from 1982-1992)**

The conflicts in the beginning of this periods did not affect the city planning process actions as much as it affected the living condition of the city, with the changing numbers of the inhabitances, emigrants and arrivals to the city, causing congestion problems, but with the government policy of maintaining the march of everyday life, kept the developments of the city majors aspects ongoing without plentiful disruptions.

- **Period III (from 1992-2015)**

With the start of 1991 the government's role has dwindled in the new urban investments and development, on the other hand the new investment low opening all the sectors for the private investors, all of this new challenges caused developing many projects on small scale projects in the city, but without any steps towards developing urban areas, or even solving the many problems caused by the illegal settlements which is forming 27% of the region total area with inhabitants of 40% of total city population.
The biggest events causing enormous disruption to the city planning process in this period is the conflict started in 2011 with the revolution on the Syrian regime, it started as small, inchoate protest movement, eventually it evolved in the face of violent crackdown.

Syrian Revolution

The United Nations reports that 5,000 people flee Syria every day, and 28% of its population has now been driven from their homes. There are now 2 million Syrians who have fled, and 4.25 million who have been displaced but stay in the country. The United Nations High Commissioner for Refugees (UNHCR) predicts 10.25 million Syrians will need aid by the end of 2014, which is equal to 46% of Syria's total nation. There are now 2 million refugees from the country in nearby countries. 110,000 are in Egypt, 168,000 are in Iraq, 515,000 in Jordan, 716,000 in Lebanon and 460,000 in Turkey. Now Population is estimated as 17,951,639, approximately 18,900 Israeli settlers live in the Golan Heights in 2012 (UNRWA, 2013)

Table 6 Syria Statistic in 2014 estimation

Population growth rate	**-9.73%**
Birth rate	22.76 births/1,000 population
Death rate	6.51 deaths/1,000 population
Net migration rate	-113.51 migrant(s)/1,000 population

Source: Own work

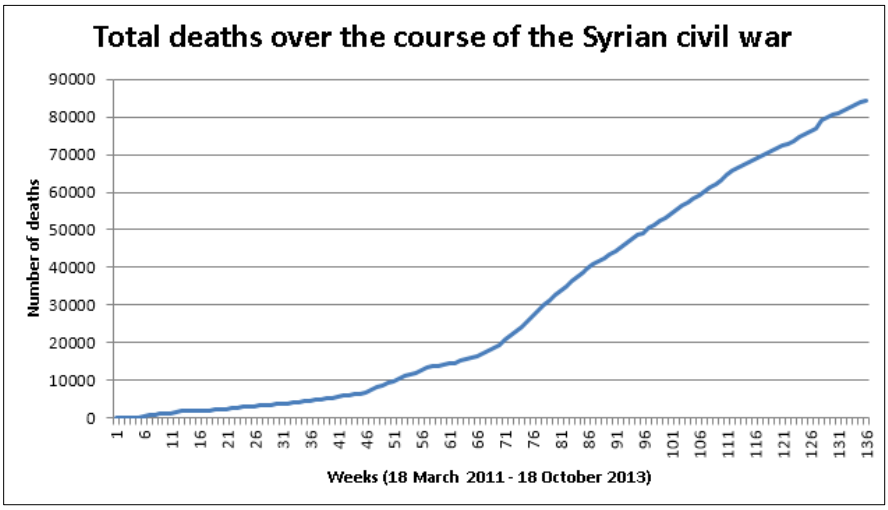

Figure 4.17 the death rate in Syria (2011-2013)

Source: (UNHCR, 2014)

Syria's Future Population

5.2 million Refugees are expected to be registered as refugees by the end of 2014, with another 6.5 million internally displaced by December 2014. In 2010, Syria was dealing with a surging population, but this has dramatically reversed. Last year, the population growth rate was -0.8%, but this has dropped much further. The number of refugees alone will top 5 million by just 2015, according to the UN, which means that Syria's population will be just 17 million in two short years. This drop does not include any further deaths from the country's civil war, which will only drive the population down past this point.

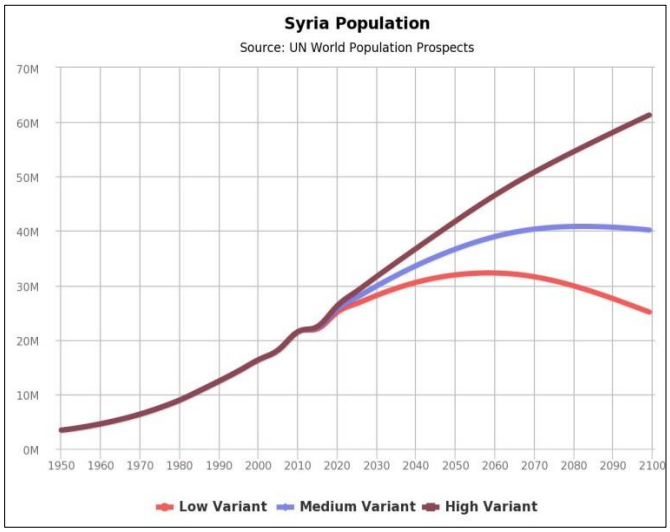

Figure 4.18 Syria population (Prospects UN World, 2015)

Source: UN World population prospects

Damascus situation

Damascus is about 17 neighborhoods, divided into 95 lane and alley, mostly under the Syrian regime’s control, with about 300 checkpoints in the entrances and exits of the alleys, the city outskirts are conflicts areas starting from Darayya to Al-Hajar Al-Aswad, passing Nahr Eshe southern of Damascus, while the eastern Al-Ghouta is still under the rebels control and it is estimated as two third of Damascus area.

Currently, fighting occurs in Damascus suburbs while the city center is relatively protected. Nowadays, it is very difficult to know the actual number of inhabitants because some left while others are displaced or have immigrated. Certain families settle for a

while before reaching Jordan or Lebanon while others are inclined to stay longer, the displaced population comes from every corner of Syria: Aleppo, Homs, Hama Deir ez-Zor, Qamishli, etc. The poorest find shelter in public gardens and those who can afford to pay rent settle in popular areas despite the increasing cost of rent.

In Damascus, the security situation differs considerably compared to other cities. In the city center, life is almost normal during the day, inhabitants are now used to the sound of regular bombing and the risk of a bomb attack. The numerous checkpoints of the loyalist army and closed streets complicate traffic circulation. It takes 2 or 3 hours to cross the city center depending on the time of day. Some peripheries or villages are under the control of loyalist forces so they are connected to the city Centre (Jaramana, Sednayah, Maaloula, etc.) whereas some closer neighborhoods controlled by the rebels are less accessible. Despite these difficulties, the population moves from one area to another depending on their needs as many may live in one area and work in the other (CBSSYR, 2014).

In analyzing the revolution impact over the city, is clearly a destruction impact with the high level of damages in the urban form especially in the suburb, an addition to that the high rates of death in the city populations, in spite of the high death rate, the number of immigration increasing in both sides internal and outer, due to the Damascus condition in Syria, this different reasons caused the highest level of destruction in the city life cycle.

Destruction in Damascus

The Syrian revolution had main role in the Syrian economic decline, depending on the statistic of the Syrian human's rights organization around 2.8 million buildings have been destroyed in Syria since the beginning of the conflict in 2011, and the estimated rebuild costs are about 80 billion dollar.

The greatest impact of the economic decline in Damascus was in the spread of opportunists taking advantages of the situation to trade buildings services and materials without any license, within the first months of the revolution, it have been overlooked for the illegal construction especially in rural area in Damascus suburb in might it relieves public discontent, but with the continuation of the protests and turn it into armed conflicts with the use of weapon of mass distraction in the suburb of Damascus, many of this

illegal buildings either been destroyed or depopulated in order to find safer places (Balanche, 2012). In the Figures, it shows the amount of destruction in Damascus highest density area which is Al-Yarmouk camp with the majority of Palestinian refugees by density 828/h. in the year of 2011 from the CBSSYR statistic (CBSSYR, 2011).

Figure 4.19 The destruction in Damascus suburb

Source: (UNitar, 2014)

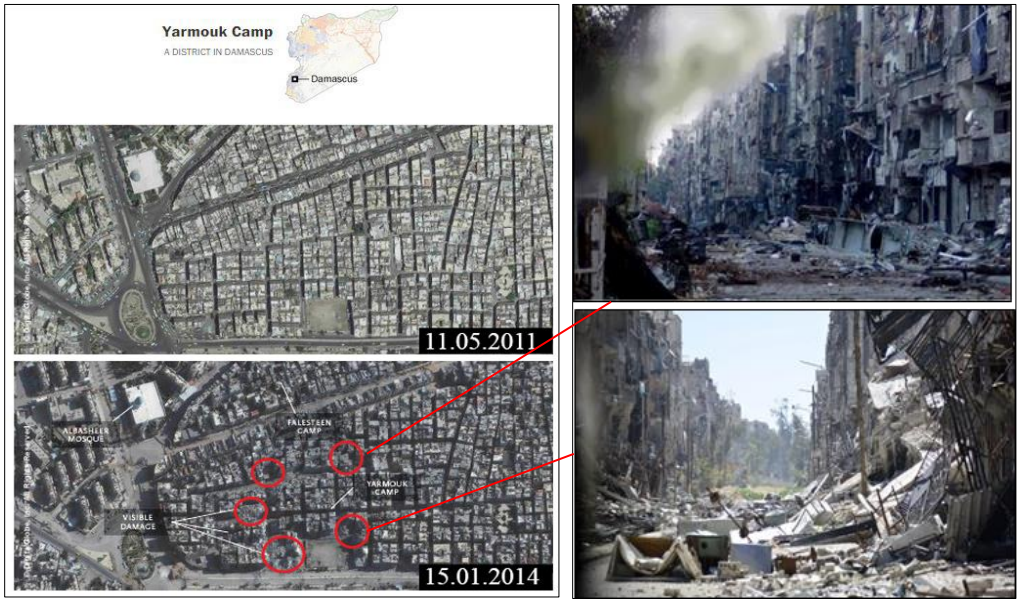

Figure 4.20 The destruction in Al-Yarmouk camp in Damascus

Source: (UNitar, 2014)

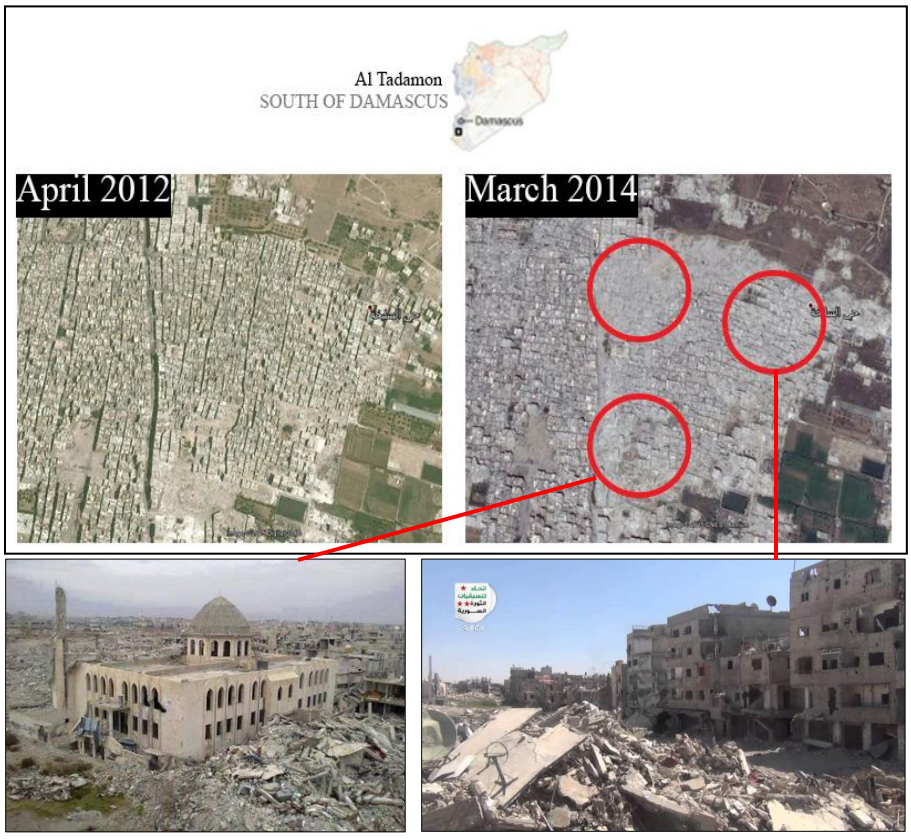

Figure 4.21 The destruction in Al-Tadamon in Damascus suburb

Source: (UNitar, 2014)

5 DISCUSSION OF RESULTS

5.1 Results

- **Period I (from 1960-1982)**

The estimation methodologies used in order to demonstrate the planning process curves is to divide the time length into portions, The time is illustrated in the horizontal axis and its measured as each period T represent 3 years. The intensity of the cycle is illustrated in the vertical axis with three majors range from (I) for the minimum level, (II) for the medium level and (III) for the strong level.

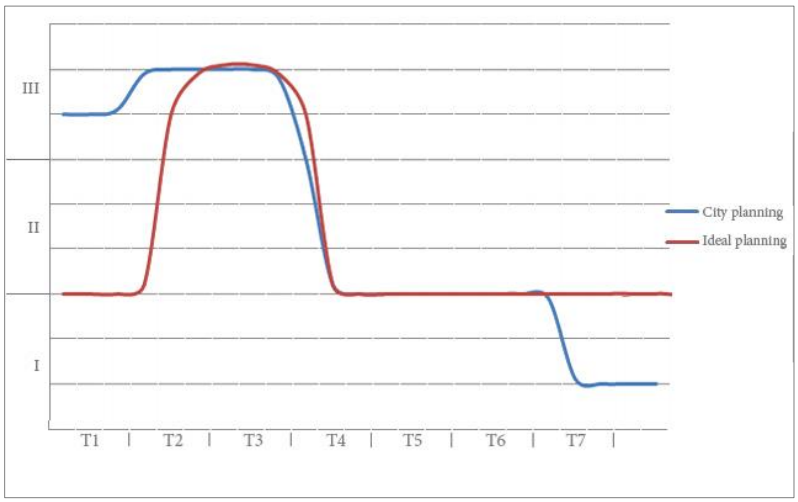

Figure 5.1 planning process of Damascus 1960-1982

In Figure 5.1 demonstrate the intensity of the city planning process from 1960 where it was the data collecting stage for the Ecochard master plan until starting with the planning between 1964-1968. It is noticeable that the curve decline in 1979 when the old city of Damascus was labeled world heritage and causing disturbance in the cycle of planning especially to the center of the city. By the end of 1982 the master plan kept its deterioration due to end of the ideal cycle of the plan made in 1964 where it should be replaced as the planner Ecochard suggested but in the case of Damascus the plan was not fully installed in the city so this caused the service period of the plan to extend until later dates.

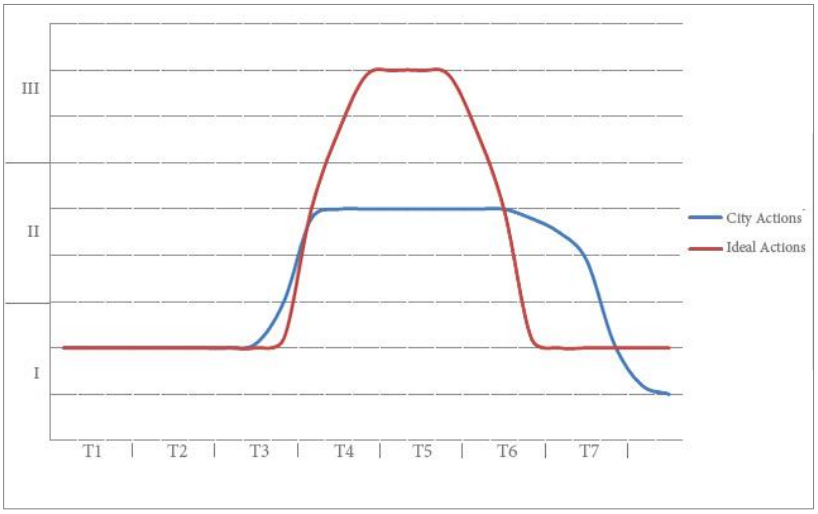

Figure 5.2 Actions in Damascus 1960-1982

In Figure 5.2 demonstrating the action implemented in Damascus, it is noticeable that the actions in medium intensity due to the bureaucratic procedures in the country and the political changes, therefore the implementing of the Ecochard master plan proposed for 20 years of Damascus life cycle persevere for more than 10 years in comparing to the ideal actions should be pursuance in Damascus, by the year of 1979 the actions rate declined, although it had not been finished implementing the whole proposals, due to the obstruction of working in the old city of Damascus.

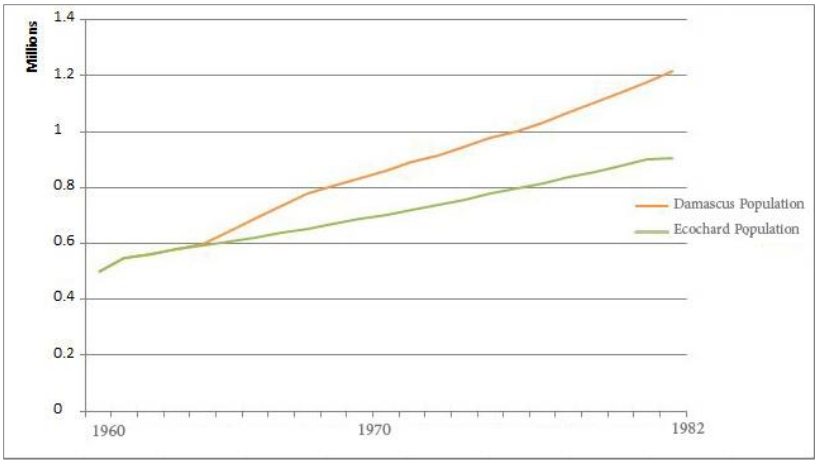

Figure 5.3 the expected population in Damascus by Ecochard and the actual population Statistics

In Figure 5.3 a comparison between the expected populations by Ecochard when first starts working on the master plan when he expected the population to reach 904000

inhabitants by the year of 1982, and the actual population in 1982 when it exceeded 1.2 million inhabitants.

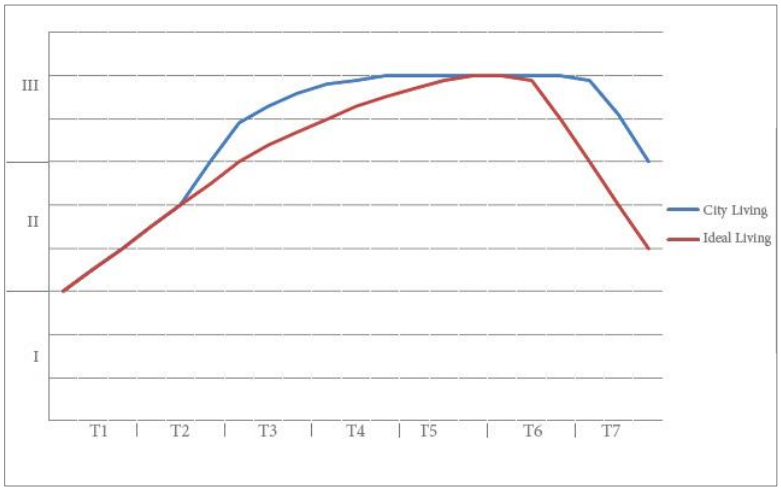

Figure 5.4 Living in Damascus 1960-1982

By analyzing the living rates (Figure 5.4) in Damascus city it was clear that the curve witness sudden rising due to the increase in population in 1967 because of the internal immigration of Al-Golan's inhabitances into Damascus, although it had many disadvantages on the housing situation, but this raise in population gained revival in the investment market of the city, by the end of this period the living rate declined due to the 1980's conflict causing disturbance in the political situation of the city.

- **Period II (from 1982-1992)**

The estimated methodologies to demonstrate the planning process in this period will be with considering each time periods T represent 1 year.

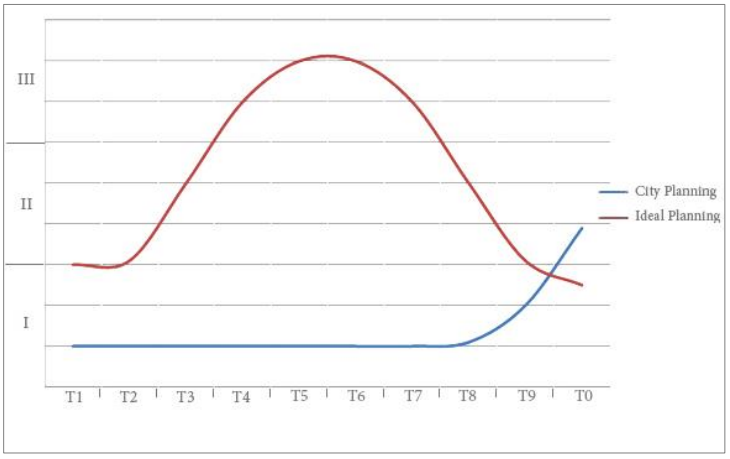

Figure 5.5 Planning in Damascus 1982-1992

Although this periods is relatively short comparing to the other two periods, but it is the end of the planning process of Ecochard master plan, although the plan should be replaced in 1985 with new city's master plan, the implementation of Ecochard plan was not completed yet, with a lot of amendments and editing the 1985 execution of the plan lacks a lot of proposals and projects. In 1992 with the general institution for studies attempt to study the city situation and produce new master plan after 24 years of the former Ecochard plan.

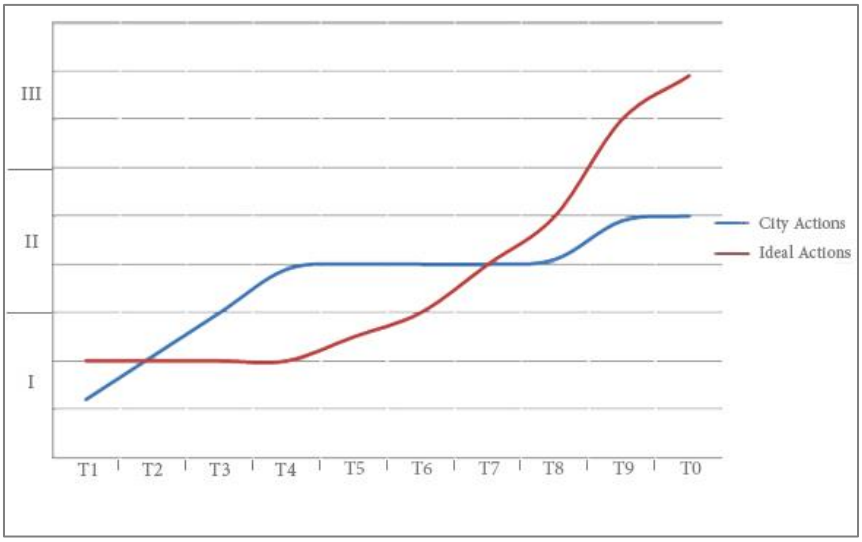

Figure 5.6 Actions in Damascus city 1982-1992

In Figure 5.6 demonstrating the actions in the city, it is noticeable that the actions rate started slowly after the stalemate periods after the 1980's conflict and by the year of 1985 the actions rate rises to its medium level while completing the implementing of Ecochard master plan, in 1991 the law number 10 of investment came to open the market for private and foreign investors, and caused recovery in the actions of the urban processes, while in comparing to the ideal behavior of the city situation it is clear that by the year of 1989, it should start the actions to develop and implement the new master plan replacing the former one. Therefore, by the years of 1985-1986, the life cycle of Ecochard master plan should have ended, but in Damascus case in this time the city had many projects and proposals postponed until finding new funding sources, which caused the releasing of investment law number 10.

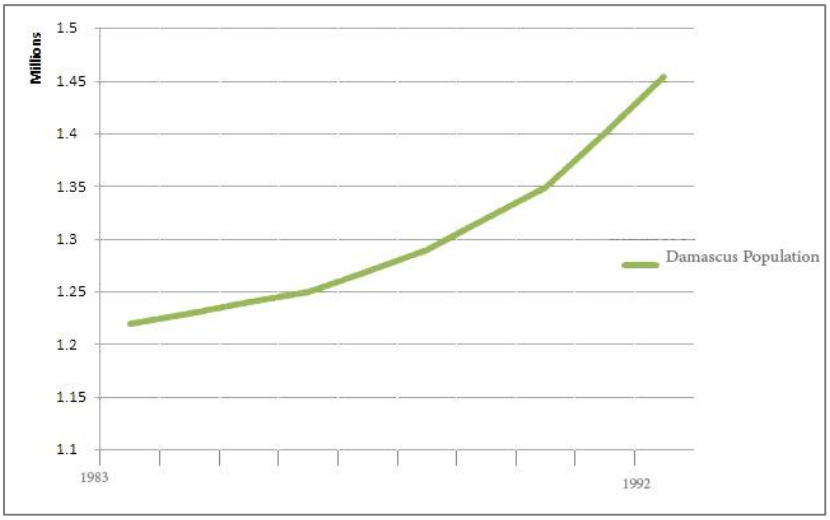

Figure 5.7 Population in Damascus 1982-1992

In 1982 the population rates witnessed major decrease in the actual number due to the immigration rate and the absence of significant number of inhabitants within the conflict, although with the high growth rate in Syria over 3.8%, the city tolerate with the losses of the inhabitants and persist with growing in population principally with the last decade of the millennium, where the city reached 1.4 million without the suburbs population which exceeded one million inhabitances by the year of 82.

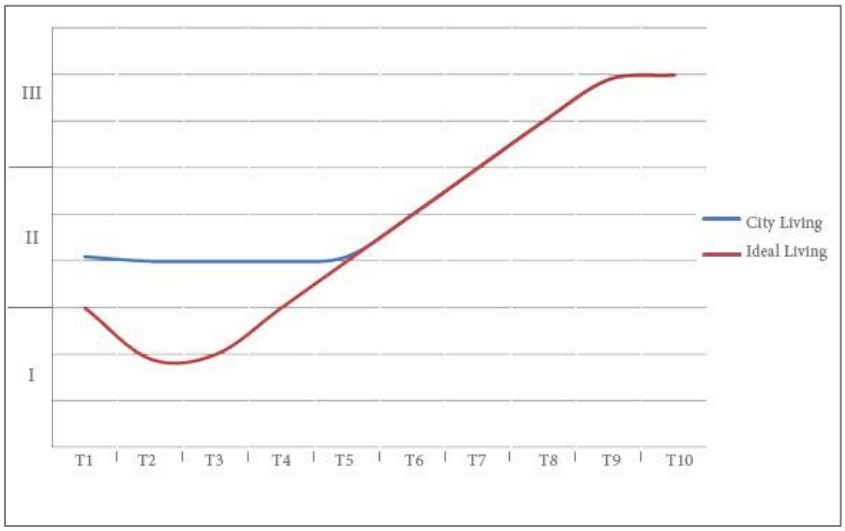

Figure 5.8 Living in Damascus 1982-1992

The curve of living demonstrate the city uprising in population, investment and the attempts to develop the living situation, therefore relying on the population statistic with the population density and the economic situation of the inhabitant, , it was affected by the conflicts in the 1980's. leading to slow growth in living rate between 1982 until 1988, when it certificate increase caused by rise in the population and investment, with the year of 1991 the curve witness increase in living rate because of the new opportunity presented by the new market opening.

- **Period III (from 1992-2015)**

Demonstrating the time periods in models is illustrative as time periods (T) each one represents three years of the city life cycle, with the intensity level ranks from the minimum, medium and maximum intensity.

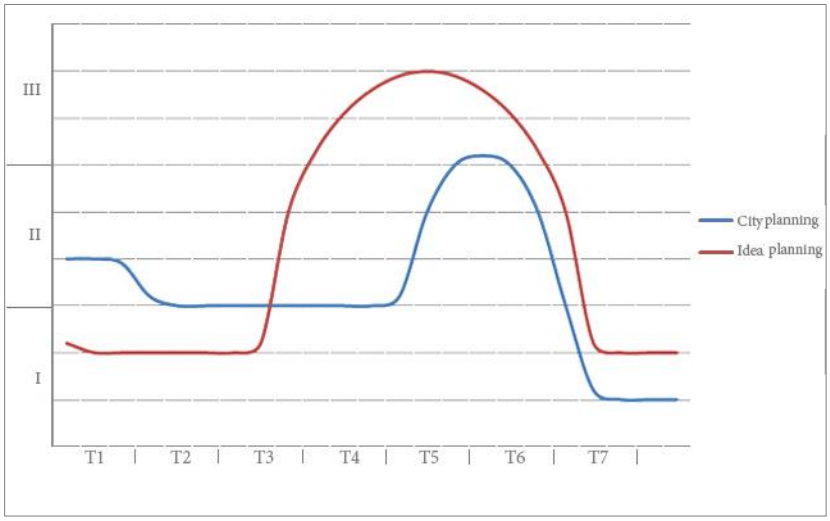

Figure 5.9 Planning in Damascus city 1992-2015

In Figure 5.9 illustrating the planning process in Damascus city it is noticeable that the city planning went through different stages, when it witnessed a rise at the beginning of the period with the new investment but declined to the medium level because of the difficulties in the implementing of the project, the planning process endured the changes the suggested project of Damascus greater region with cooperation with the Japan International cooperation agency (JICA) started in 2006-2006, the planning project suggested many proposal about the problems of the illegal settlements and the rapid increase in population, the implementing of the project was delayed because of the lack of professional's assessment in the responsible authorities, by the years of 2011-2012, the conflict caused the suspend of the planning implementing until unspecified time. Furthermore, the intensity of the conflict raisin caused suspending of all the possible procedures for planning suggestions in the city.

Meanwhile in the ideal city behavior, the city proposed master plan in 1985 following Ecochard master plan came to the end of its life cycle, to cause the need for suggesting new master plan, where the planning intensity raisin to reach its peak by the year of 2006.

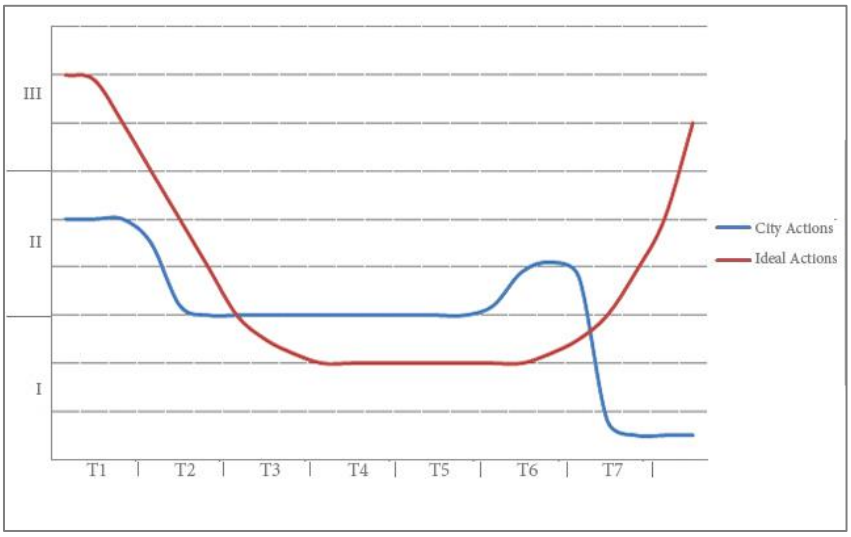

Figure 5.10 the Actions in Damascus 1992-2015

In the actions analysis it is noticeable that in the ideal behavior for the city, the actions related to the implementing of the suggested master plan of 1985 declines at the end of the actions raise, by the year of the 2011 the actions for implementing the suggested master plan of 2005 increase the intensity of the action's rate to finish the implementing of the new plan by 2017, however the actions in Damascus planning process maintained the medium intensity at the first of this period, declining to the minimum intensity in 2000 with the new political changes, before the conflict the curve risen in 2009 due to the first actions towards implementing the Japan International cooperation agency (JICA), nevertheless the conflict postponed all the actions that could have started in the city, not just postponed the proposed action, it causes the disruption of all the developing and habitations actions, on the contrary the conflict caused the need for major rebuilding procedures particularly in the suburb where the conflict caused massive damages to the urban forms of the cities, in the rural area of the city as well.

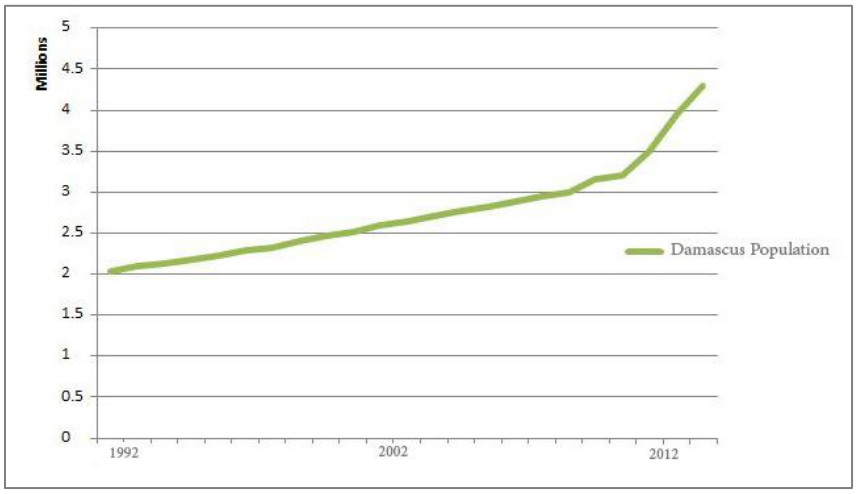

Figure 5.11 the Population in Damascus 1992-2014

The increase in the population of the city endure for the last decade of the millennium, although the growth rate decreased for about one point reaching 2.4 but the population increase remained with its high level due to the significant population increase in the last thirty years of the city life cycle, by the year of 2011 with the conflict intensification the city witnessed major changes, the amount of external immigration from Damascus suburb and other Syrian provinces, as well as the amount of the internal immigration into Damascus from Damascus suburb and other affected provinces. This quantity of internal immigration caused a high increase in population (Figure 5.11).

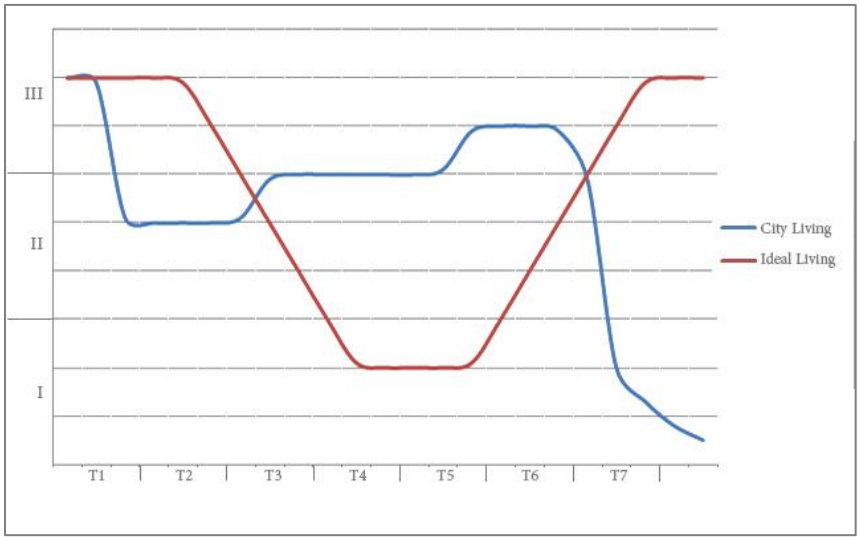

Figure 5.12 the Livings in Damascus 1992-2015

Figure 5.12 demonstrates the living ratio in Damascus and it is noticeable that the city living process took transformed direction from the city expected behavior, where in the expected behavior the city would witness declining due to the end of the life cycle of the 1985 expected master plan, and by the end of this periods the living rate would witness raise caused by developing the new plan of 2005, starting new life cycle for the city, while in the city behavior it witness decline after the rise of the 1990's due to the exacerbate of the housing problems in the urban situation without any proposed strategies to solve it, even with the rise in the population the living rate would not express any increase until the start of 2000's, when the new political changes would lead to living recovery for the rate, by 2008 a significant increase in living rate caused by labeling Damascus as the Arab's capital of culture, in 2011 the living rate witness massive decrease because of the ongoing conflict in Syria, which in turn would lead to the largest setback in the country, having enormous effect on the city, causing raisin in the population in contrary of the high external immigration, the internal movement from all the provinces into Damascus for being safer place would cause deterioration of the service situation and economic life of the inhabitance providing the biggest reason for the decline of the intensity of living quality in the city.

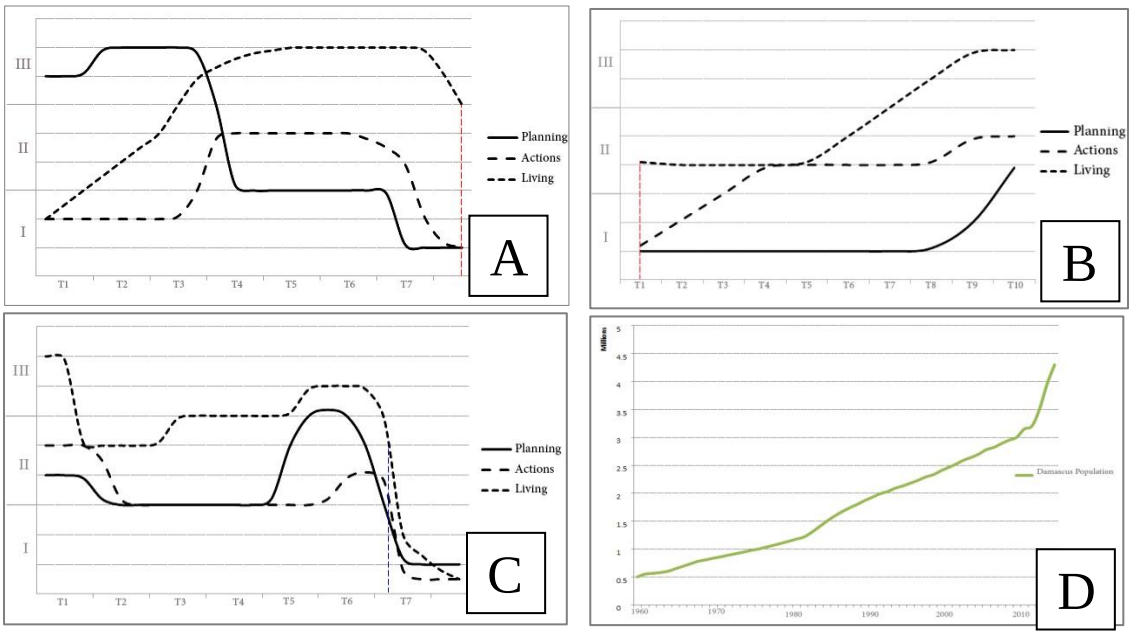

Figure 5.13 A, B, C The planning process for the three periods, D the population Damascus city 1960 – 2015

Figure 5.13 (A) demonstrates the life cycle Lourenço's model for the planning process from 1960-1982 where the first planning process starts with a major evaluation on the planning aspects with the Ecochard master plan, this step has control over the actions aspects, which continued for longer time than expected for the proposed plan's actions, causing slow process for the life cycle and to postpone the later expected proposal to follow 1968's plan, although the first planning process appears to be closer to the ideal behavior, the conflict of 1980's caused delay on the process of the three dimension of the cycle, with the decrease in living and planning curves, it caused disruption to the overall life cycle. In figure 5-13 (B) demonstrate the life cycle Lourenço's model for the planning process from 1982-1992 it is noticeable that the planning aspect override the expiration date for the Ecochard plan in 1985, and persist with the minimum intensity level, without any attempts to develop new master plan, on contrary the actions related by the former plan were still in slow progress, the apparent effect was the increase in living curve and in population.

In figure 5-13 (C) the demonstration of Lourenço's model for planning process between 1992-2015 clarifies the frequent changes of this period starting with the first substantial attempts to develop the city plan, causing rise in the planning, actions and living curves after few setbacks in the process of the curves caused by the political changes.

The biggest setback in this period is the conflict that started in 2001, causing major declines in the three curves progress, the conflict caused variety of disruptions in the life cycle on all the three curves sides, the planning curve decline after the newly increase of the JICA new proposal prepared to start implementing in the year of 2011, with all of the anarchy in the country the city suffered from all kind of urban damages, destructive area within the city administrative lines, massive destruction in the suburbs causing immigration waves to sweep the city urban neighborhoods, impairment in living standards and service quality produced by the sudden increase in the population leading to complexities in housing and providing proper shelter for all the immigrants, additionally the economic siege caused high impairment in the Syrian pound value to reduce the ability to afford the necessary improvement to the shelters, which in most cases were schools and socials centers. The decline in the planning process of the last studied period continued during the making of this study.

5.2 Syrian revolution as a pulsar effect

Based on Mesones (Mesones, 2003) who built taxonomy for the pulsar effects can demonstrate the characteristics of the events to be labeled as pulsar effect, figure
Damascus case is categorized as a national capital in this taxonomy, the classification of Syrian revolution can be demonstrated as a one-time event with ubiquitous effect causing the changes in all Syria as a country not localize as in one point of the city also to classified as War.

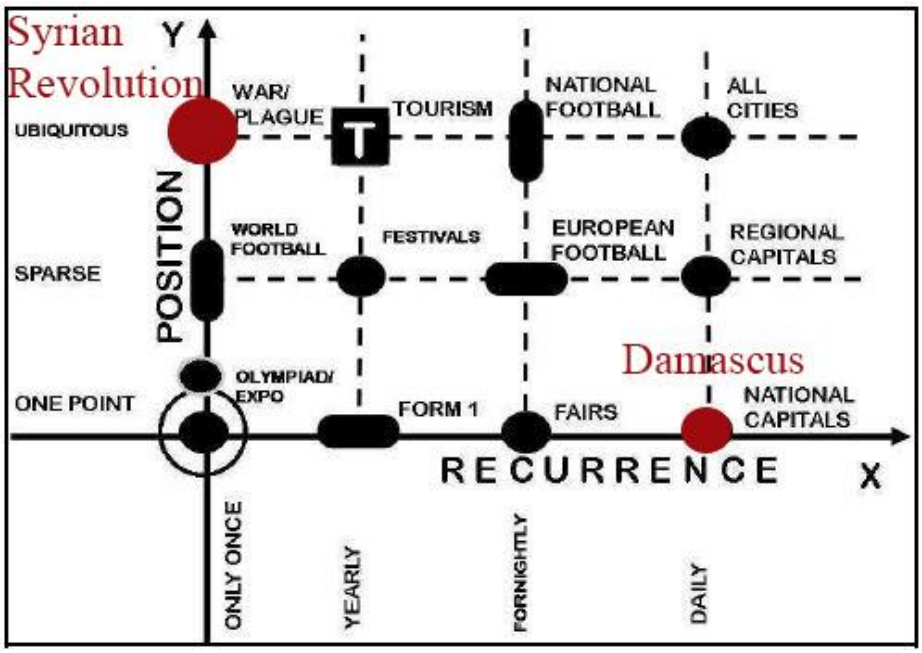

Figure 5.14 Mesones taxonomy of Damascus case

Based on Kammeier (Kammeier, 2003 b) the Syrian revolution as an event cannot be classified like other event because of its changes in the four phases for studying the effects of the event on the process of urban planning and Damascus life Cycle, due to the special condition of the event (Table 7).

Table 7 Generalizing on the basis of Syrian revolution as an event

Event	Magnitude of impact	Predictability of the event	Ability to cope	Generalization	
				Type of event	Management options
The Syrian War	Destructive, but important trigger function	Time of the event unpredictable	Need for remedial action,	Civil war with weapons of mass destruction	Risk analysis, Real challenge

The event 'Syrian revolution' cannot be predictable and it has destructive impact over the city, therefore the four phases of the event is shortened to the third phase which is the management of the event itself, and because of its currency until the study time it would not be able to go to phase four the long term management.

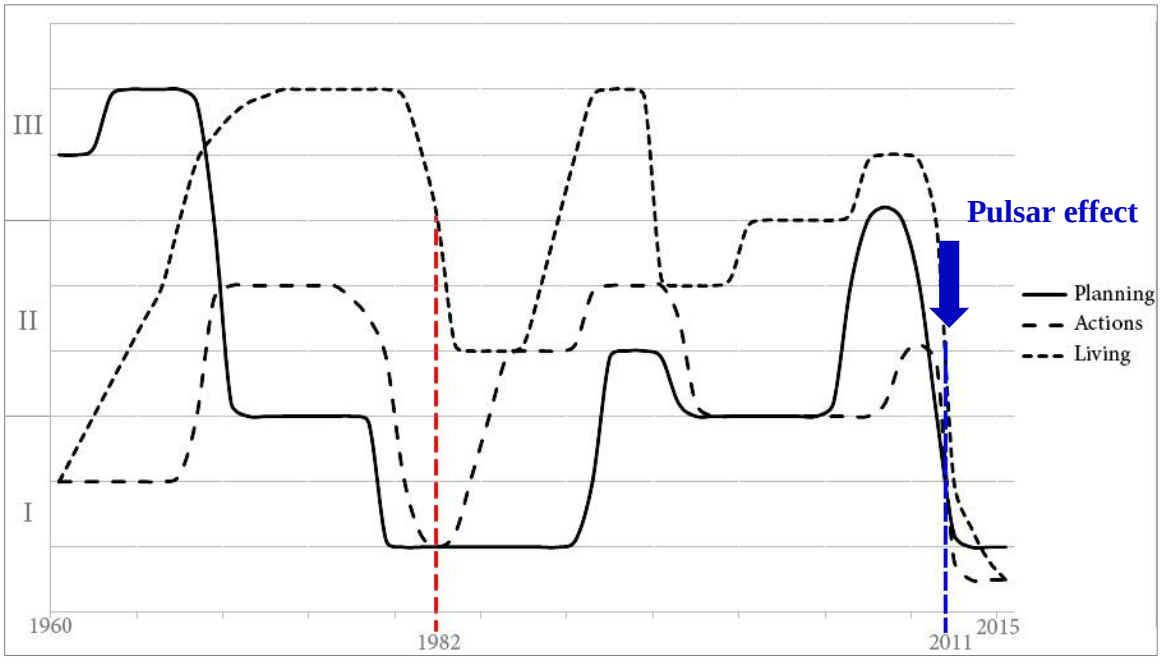

Figure 5.15 Damascus behavior on planning process 1960-2015

From figure 5.15 it is noticeable that the event of the Syrian revolution caused major changes in the city behavior, causing the planning process to decline into significant minimum level by its incessant effect over the city of Damascus.

Although the city witnessed few changes in the 1980s with the discussed conflict, but its effect did not cause the massive decline of the Syrian revolution at least not a direct effect on Damascus city.

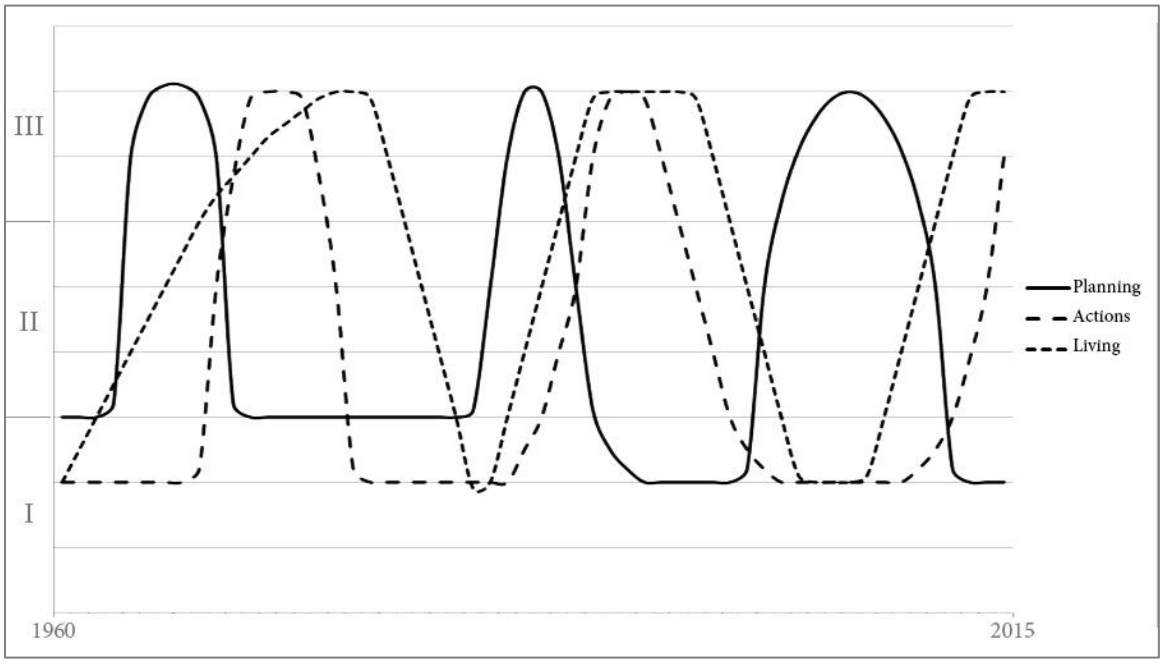

Figure 5.16 the Ideal behavior in Damascus 1960-2015

In figure 5.16 it is noticeable that the city ideal behavior includes three planning cycles in the city life cycle between 1960-2015, with ideal behavior on the actions and living aspect as well, with the first and last planning proposal expressing major changes other that the second one, due to the changes in the city situation between 1960s and the first decade in the third millennium, also to have changes on the living aspects with the projects proposed to solve the high growth rate in Syria, and solving the illegal settlements problem, which causing the biggest problem in Damascus urban progress.

6 CONCLUSION

6.1 Conclusion

In this study the life cycle analysis of the planning process for Damascus city was presented using Lourenço's model, considered a tool to monitor urban areas' behavior. In addition, an analysis of the pulsar effect caused by the Syrian revolution event over the city´s development behavior was performed. The life cycle analysis provided scientific background and an approach to illustrate the changes in Damascus´ urban areas progress. It is also a tool to monitor the changes that happened in the period under study and it is a most useful tool in order to achieve a better planning process and better life quality for the inhabitants.

Also, it was noticeable that in the relationship between the three aspects of the model such as planning, actions and living, that the planning aspect control over the actions by providing the plan as a basic reference for the action needed and to be implemented for the city. This relationship is directed on one hand by the actions needed to overcome the challenges that may face the city development, on the other hand by the actions´ aspects which affect the living intensity. This is done by preparing the needed foundation to create better living conditions for the inhabitants.

Therefore, the relationship between the actions progress and the living aspect is directed from the effect of the actions toward the living development. While the need for a new or updated plan is caused by the decline of the living conditions of the inhabitants. In fact, when the quality of the living declines it is the notice that the city may need to start a new life cycle and new planning process to be re-started with a new plan. In this case of Damascus, it is noticeable that the relationship is directed from the living towards the planning, this relationship causes the cycle of the planning process as demonstrated by the figure 6.1

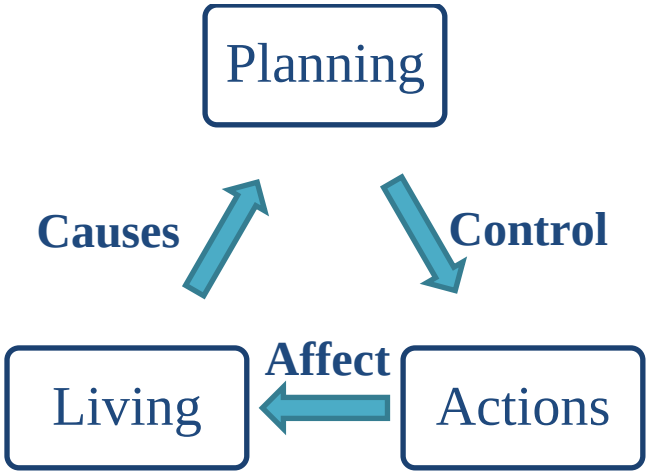

Figure 6.1 the relationship between the three aspects of the planning process; Planning, Actions and living

The planning aspects have the demonstrating effect over the planning process, because they creates the reference for both other aspects, even that the living creates the need for the plan by the population effect, but the planning controls the aspects of living by the consecration of the city master plan.

By applying Lourenço's model over Damascus city many observation have been noticed:

- As a result of this analysis, a comparison between the city's ideal behavior for a city with Damascus situation and the city´s actual behavior enables the researchers to monitor the changes occurred due to the pulsar effect;

- The difficulties in separating the city´s ancient history from its urban behavior especially with labeling the old city of Damascus as world heritage, which is located in the center of the city, causing several contraindications in the planning aspects, with the need for limited solutions for the city problems without impacting the world heritage in the old city.

- The numerous obstacles in collecting data due to the current situation in the city of Damascus, the political situation of the city, and the frequent changes in the urban behavior of the city.

- The lack of recent statistics and figures over the city situation after the conflict of 2011, coupled with the deteriorating security situation which makes it a difficult task to provide data for the city status.

- The absence of any justified sources for the 1980's conflict in the country, with the political sensitive situation and the lack of modern scientific methods used these days for collecting data.

In conclusion, this dissertation applied analysis methodologies to monitor urban areas planning process and studied the case of one national capital in the Middle East; these methodologies could be applied on several cases studies to compare the results of different urban behaviors. As a result of the case study analysis, it was noticeable that the domination of planning aspects over the living and actions lead to a decline in the city process due to the planning retrogradation over the studied periods. After analyzing the effects of the destruction caused by the 2011 conflict over the city and country, by analyzing the current situation and the possibility of reform or replace of damaged areas, basing on this analysis a database for each urban area. This process can be the foundation to choose alternatives and rehabilitation methods and it can be used as a trigger to redevelop the city planning situation and establish a new master plan considering the recent progress of the city.

Although the methodologies were used to analysis the impact of a positive impact such as exhibitions, but in this study it was used to analysis the impact of a destruction and negative event causing major changes in the city planning process, but it provided a methods to monitor the changes caused by negative event, also it provided a comparison method to be used as a reference in the rehabitations and developing step after the end of the conflict.

6.2 Recommendation and possibilities for future work

In this study it is noticeable that the time chosen for the study demonstrate long time in the city life cycle and urban changes, however the city need further investigations and analysis in order to detection the effects and causes of the urban changes.

Various aspects to be considered for future work;

- Investigate more on the effect of the 1980s conflict on the city urban changes in that period.
- A proposed behavior for the city future planning process.
- Damages analysis for the urban destructive caused by the Syrian revolution on the city of Damascus and other affected cities as well.
- A new approach defining the effects of events with massive distractions on the life cycle of the cities.
- Tourism area life cycle analysis of Damascus and the effects of the conflicts over the tourism movement for the city and the country as well.

References

Abdin Yassar and Al-Dejani Dimma The best of future directions for Damascus expansion with the help of GIS technology [Journal]. - Damascus : Damascus University Journal of Science and Engineering, 2009. - 1 : Vol. 25.

Abdin Yassar and Almasri Imad Study the effect of irregularities Urbanism applicable regulations to the accommodate the planning aspects of the city of Damascus [Report]. - Damascus : University of Damascus, 2008.

Al-Kash Mohamad Akram Population issue in Syria .. of a challenge to the problem [Online] // Higher Institute of Population Studies and Research. - 2012. - http://www.hidsr.edu.sy/index.php?page_id=119.

Al-Khalil Saad Allah Southern ring road in Damascus.. where to ? [Online] // Syria news. - 2008.

AlQattan Najwa The Communal Topography of Ottoman Damascus Comparative Studies in Society and History [Book]. - 2002.

APA American planning association [Online]. - APA, 2015. - www.planning .org.

Astuti Zulaikha Budi Intertwining Big Events and Urban Strategy within Life Cycle Analysis: the case of Solo, Indonesia [Book]. - 2012.

Ayalon Ami Middle East Contemporary Survey 1991 [Book]. - Ramat Gan, Israel : [s.n.], 1993.

Balanche Fabrice City under the Al-Baath control; Damascus the Syrian Capital [Journal]. - Lyon, France : Middle East Journal, 2012. - 14.

Balanche Fabrice Les municipalités dans la Syrie baathiste (Municipalities in Baathist Syria) [Book]. - 2002.

Cabeza Luisa F Life cycle assessment (LCA) and life cycle energy analysis (LCEA) of buildings and the building sector: A review [Report]. - 2014.

CBSSYR [Online] // The Central statistical office of Syrian Arab Republic.. - 2009. - http://www.cbssyr.sy/index-EN.htm.

CBSSYR CBSSYR [Online] // The Central statistical office of Syrian Arab Republic.. - 2011. - http://www.cbssyr.sy/index-EN.htm.

CBSSYR Central Bureau of Statistics in Syria [Online] // CBSSYR. - 2014. - http://www.cbssyr.sy/index-EN.htm.

Corak Sandra The Modification of the Tourism area life cycle modeel for reinventing a destination: the case of the Opatija Riviera, Croatia [Book Section] // The Tourism Area Life Cyle / book auth. Butler Richard W. - 2006.

Elwood F and Holton E Holton's Evaluation Model: New Evidence and Construct Elaborations [Journal]. - 2005.

Estimates The World Factbook [Online] // Syria Demographics. - Central Intelligence Agency, 2014. - https://www.cia.gov/library/publications/the-world-factbook/geos/sy.html.

Holton Elwood F III The flawed four-level evaluation model [Journal]. - [s.l.] : Human Resource Development Quarterly, 1996. - 1 : Vol. 7.

Jaboor Saleh the urban developments and the Master plan between 1965 – 1985. [Book]. - 2001.

Juvara Martina Urban Design-based Zoning to Guide Fast Growth [Conference] // 48th ISOCARP Congress 2012. - Buchanan : [s.n.], 2012.

Kammeier Detlef H Coping with ‘Pulsar Effects’ in the Context of Sustainable Urban Development: Towards a Conceptual Framework [Conference] // 38th International ISoCaRP Congress. - Athena : [s.n.], 2003 a. - pp. 27-29.

Kammeier Detlef H Coping with ‘pulsar effects’ in the context of sustainable urban development Towards a conceptual framework [Conference] // 38th International ISoCaRP Congress. - Athina : [s.n.], 2002.

Kammeier Detlef H Coping with ‘Pulsar Effects’ in the Context of Sustainable Urban Development: Towards a Conceptual Framework [Conference]. - Athena : [s.n.], 2003 b.

Khawaja Marwan International migration in Syria: Findings from a national survey [Book]. - [s.l.] : Fafo 2002, 2002.

Kusumawanto Arif , Astuti Zulaikha Budi and Lourenço Júlia Maria LIFE CYCLE ANALYSIS OF JONGGOL GREEN ISLAMIC CITY, INDONESIA [Report]. - 2014.

Lourenço Julia M Expansão Urbana. Gestão de Planos-Processo. Textos Universitários de Ciências Sociais e Humanas, Lisboa: Fundação Calouste Gulbenkian e Fundação para a Ciência e Tecnologia. [Book]. - 2003a.

Lourenço Julia M Expo - 98 and Trickling Down Effects In Lisbon [Conference] // 38th International ISoCaRP Congress. - Athena : [s.n.], 2003. - pp. 163-170.

Lourenço Julia M Urban Planning Through Pulsar Effect [Book]. - Braga : University of Minho, 2010.

Mesones Javier de A Characteristic Pulsar Effect – EXPO'92, Sevilla, Spain. In: The Pulsar Effect in Urban Planning, [Conference] // 38th International ISoCaRP Congress. - Athens : [s.n.], 2003. - pp. 27-29.

Perthes Volker The Political Economy of Syria Under Asad [Book]. - Michigan : I.B. Tauris, 1995.

Prospects UN World World Population Review [Online] // Syria Population. - UN World Prospects, 2015. - http://worldpopulationreview.com/countries/syria-population/.

Quilliam Neil Syria and the New World Order [Book]. - 1999.

Research Department Agence Française de Développement Population and natural resources [Conference] // 6th AFD-EUDN Conference,. - 2008.

Safasi Hussam The expansion of the city of Damascus between the dreams of the strategic vision, tragedy adjacent countryside and facts Japanese study. [Online] // Syria news . - March 07, 2009. - http://www.syria-news.com/readnews.php?sy_seq=91517.

Scoones Ian Sustainability [Article] // Development in Practice. - 2007.

Subh Ammar 45 years after Ecochard urban plan for Damascus [Online] // buildex online. - Buildexonline, April 14, 2008. - http://www.buildexonline.sy/detail.aspx?id=6539.

UNHCR Refugees of the Syrian Civil War [Report]. - 2014.

UNitar Four Years of Human Suffering; The Syria conflict as observed through satellite imagery [Report]. - Geneva : United Nations Institute for Training and Research, 2014.

UNRWA the syrian catastrophe:socioeconomic monitoring report [Book]. - 2013. - Vol. first quarterly report .

Wifstrand Elsa The Urban Develompent of Damascus [Report]. - Damascus : [s.n.], 2009.