J. Basic. Appl. Sci. Res., 3(8)457-467, 2013

ISSN 2090-4304
Journal of Basic and Applied Scientific Research
www.textroad.com

Urban Density and Social Sustainable Development on Neighborhoods Case Study: Tabriz, Iran

Firouz Jafari, Rasoul Ghorbani

University of Tabriz

ABSTRACT

The purpose of this study is to examine the effects of increase in urban density on social sustainable development for neighbourhood of Maydan-e gotb (Gotb) and Golbad neighborhoods in the City of Tabriz, Iran. For this study, literature review was conducted and several studies were empirically tested. The results demonstrate although there is a close association between increased urban density and neighborhood social sustainable development, but it is important to pay attention to social sustainable development indexes, especially for neighborhoods. The survey measured the residents' attitudes towards social sustainability indicators such as accessibility, urban park(s), green area(s), welfare services, safety and security, satisfaction, and urban transportation. Developed questionnaire was completed by 233 respondents and analyzed the urban land use map.It was found out that social sustainable development differs for old neighborhoods (e.g., Gotb) in comparison to new ones (e.g., Golbad). In addition, many of the respondents were opposed to increased density. And, the concept of neighborhood satisfaction is based on balancing sustainable development indicators. From the results obtained in this study, one may conclude increased urban density associated in regard to social sustainable development may lead to increased residents' satisfaction.
KEYWORDS: Density, Sustainable development, Neighborhood, Social Sustainability, Tabriz

1. INTRODUCTION

The world is facing the largest rate of urban growth in the history. More than half of the world's population is currently living in urban areas and this number is expected to be almost six billion by 2050 (Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, 2007).In considering this, urban sustainable development in the future is a one of challenges for urban planners and authorities. With increasing urban population, there is an urgent need to conserve land and reduce greenhouse gas emissions. Among the various urban forms implicating to urban sustainable development, the concept of compact city development has become increasingly popular as a spatial strategy to reduce the environmental problem of urban sprawl (Jenks et al, 1996; Jenks and Burgess, 2000). Indeed, The conclusions about the sustainability of urban forms has focused on increasing the density of development, ensuring a mix of uses, containing urban 'sprawl' and achieving social and economic diversity and vitality – characterized as the concept of a 'compact city' (Jones and Macdonald,2004).

Compact urban form is perceived to be a sustainable urban solution that can, not only, contain urban sprawl but also conserve the environment (Yeh and Li, 2000), and provide the necessary population threshold for the support of public transport especially mass transit railways (Newman and Kenworthy, 1999). Against growing dissatisfaction with urban sprawl, compact city policies are going to be a more common development consideration in world (Jenks and Burgess, 2000; Jenks, Burton, and Williams, 1996; Salat and Majoor, 2005). Compact cities are characterized by central area revitalization, high-density development, mixed-use development and services and facilities such as hospitals, parks, schools, leisure and fun (Yeh and Yuen, 2011).

Also,the compact city has environmental and energy advantages, as well as social benefits like, including a better environment, affordable public transport, the potential for improving the social mix and a higher quality of life (McLaren, 1992; Jenks et al., 1996; Newman and Kenworthy, 1999). This concept of urban development refers to a well-defined urban mode with relatively high density, mixed land use pattern, and an efficient public transport system (Jenks et al., 1996; Jenks and Burgess, 2000).Indeed, high population and building higher densities are financially favorable for the better use of an efficient public transport system, save on the use of land creating multi-story residential buildings and etc. Thus, with consider to compact city, increasing density in cities is an essential factor to achieve to urban sustainable development. Despite, people in cities,like to live in low density housing, rather accepted idea that it has widely positive effects on the living environment. It is generally assumed that high densities are inherently evil and that low densities are good. Yet In the older areas of cities in many countries, despite high densities, living environment is often quite satisfactory. However, effects of high density could be negative that can give rise to unpleasant interferences, but it can also be very positive leading to social cohesion (Sivam and Karuppannan, 2009).

The move toward more dense urban forms needs to provide social, environmental and economic sustainability. These transitions will certainly have impact on communities. It is very important to consider the impact of the more compact and dense urban forms on the community.Forsyth (2003) argues that in the last few decades, urban growth and attention to way of utilizing resources in sustainable way have led to a number of physical, economic and social problems in cities. Jepson (2007) argues that when it comes to practicing sustainable development it remains outside the

*Corresponding Author: Firouz Jafari, University of Tabriz. Fjafari58@gmail.com

mainstream. The use of the planning system seems to be a common solution for achieving major environmental improvements and particularly for achieving sustainable development. Although Sustainability is central in the consideration of cities, for some reason it has received less attention in the development of neighbourhoods (Choguill, 2008). While the "New Urbanism" came as new paradigm to address sustainability issues of neighbourhood, cities and regions. The Charter of New Urbanism (CNU) characterizes a neighbourhood as a compact, pedestrian friendly and mixed-use area (CNU, 2012).

Increasing density in cities is one of the fundamental policies that is encouraged and followed by authorities of urban planning in Iran,because it can reduce infrastructure costs and address environment problem that is related to low density in cities. For many Iranians,density increase is associated with crowding and congestion, therefore they prefer low-rise development. Nevertheless, today we are facing with increasing urban density in Iranian cities because of economic benefit (Azizi, 2002). Therefore,this paper focuses on the social aspects of the sustainability and the impact of increasing densities on residential neighborhood sustainability with emphases on the social dimensions of the development. The first part of the paper gives an overview on density, neighborhood and sustainable development and their relationships,while the second part outlines effects of the increasing density on social sustainability on studied neighborhoods.

2. CONCEPTUAL FRAMEWORK

2.1. Density

Density as a key concept is a measurement of units in an area. While many people use the term density, different countries and even municipalities, as well as different professions, it is associated with a wide variety of definitions e.g. building density, residential density, gross density and etc. and a variety of land units, including acre, hectare, square mile and square kilometer (Alexander, 1993; Churchman, 1999; Forsyth, 2003; Forsyth et al2007; sivam and Karuppannan, 2009; Pont and Haupt, 2007).. Density is a term that represents the relationship between a given physical area and the number of people who inhabit or use the area. It is expressed as a ratio of population or number of dwelling units to area (Magri, 1994; Burton, 2000; Montgomery et al., 2003; Forsyth, 2003; Cuthbert, 2006; Forsyth et al., 2007).In the built environment, 'density' mostly means the ratio of population and/or of built space to a given area of land. Density of people and density of buildings are intermingled; an increase of density in one, generally leads to an increase of density in the other. Forsyth (2003) arguesPopulation density in adevelopment field might not be a practical measurement because it will be lower with smallhouseholds such as empty nesters than with large families with several children. The most widely used method to determine density is dwelling unit (DU) per hectare(Pont and Haupt, 2007). In most cases a differentiation is made between net and gross density, or between net residential density, neighbourhood density and city density Alexander 1993; Churchman 1999; Forsyth 2003).

Net residential density includes the area occupied by the housing itself, any services andfacilities for its immediate benefit, private gardens, communal gardens; children play areasand incidental open spaces. It includes parking spaces, access roads within the site and halfthe width of surrounding roads. Small scale facilities such as a local shopping or acommunity center may also be included. Gross residentialdensity (neighbourhood density) includes, in addition to the above, open spaces serving awider area and other landscaped areas, primary schools, local health centers, distributor roadsand transport networks, small scale employment, services and mixed use. It does notnormally include large industrial and commercial areas or major roads and transportinterchanges (DeChiara et al, 1995;Burton, 2000; Montgomery et al, 2003;Forsyth et al, 2007). Gross and net residential density is typically expressed as dwelling units per hectare. In this research gross and net density were used. It should be noted that density andcrowding are different and they havenot always same meaning because we can create low and high density with specific building without crowding (Figure 1).Nonetheless, In Iran, now the main aim of high rise development is to achieve higher population density.

Figure 1: Urban Sprawl or High Density Apartment. Source:http://www.mynewplace.com

2.2.Sustainable Development and Social Sustainable Development (SSD)

The subject of sustainable development has been widely acknowledged and spread rapidly after United Nations conference on environment and development in Rio 1992 (UNCED, 1992). There are many definitions of sustainable development. The most commonly accepted definition of sustainability is that provided by the World Commission for

Environment and Planning (WCEP), which says cities are seen to be sustainable if they meet 'the needs of the present without compromising with the ability of future generations to meet their own needs (World Commission for Environment and Planning, 1987). Sustainable development has been globally a paradigm in various fields. In the residential environment field, worldwide experts adopted "The Habitat Agenda" of 1996 and outlined ten major issues of society, economy, and environment for sustainable residential development (Sung and Lee, 2011). Indeed, Sustainable development is the practice of human's arriving at a level of economic and social development that does not inevitably alter ecological balance (Matthew, 2011). There is a growing literature that sustainability includes on three main constructs: environmental (including transport), social and economic dimensions (Turcu, 2012; masnavi, 2007; Teriman et al, 2010; Jones and Macdonald, 2004).Terms 'Sustainability' and 'sustainable development' have generally been defined as an aggregate of characteristics including economic security and growth, environmental quality and integrity, social cohesion and quality of life, empowerment and governance. The complex interdependencies between economic, social and environmental phenomena, and the need to balance or harmonize these over time, have been the focus of particular attention in defining sustainability (Atkisson, 1999; Lafferty, 2001; Turcu, 2012). Sustainable development is not a single, well-defined concept; rather, various positions and perspectives exist. Whichever view is propagated, it entails a normative choice (Zeijl, and Martens, 2010).

However, the definition of sustainability is hotly contested and debated. In sum, the three pillars of sustainability or triple bottom line have remained (Kavanagh, 2009):

- Environment;
- Economy; and
- Society

1. Environmental sustainability is defined as the quality of being in a place (neighbourhood) where the physical arrangement/design and ecological attributes are capable of providing for and supporting the existence of a healthy environment for the society and surrounding habitat.

2. Economic sustainability is defined as the quality of being in a place (neighbourhood) where resources are efficiently used, economic capital is provided and maintained, and human capital is utilized

3. Social sustainability is defined as the quality of being in a place (neighbourhood) that is capable of providing and maintaining, for social capital, quality of life (equity of access to key services), safety, cohesion and cultural integration, and participation of citizens. (Teriman et al, 2010).

It is clear, that there are critical questions that need to be addressed towards achieving sustainability and reached to all dimensions of sustainable development in city at the same time.

Thus, it can be seen that social indicators are the major part of the sustainable development. Hence, in this research, aspects of social sustainable development were studied. To City Form research, social sustainability was considered to be underpinned by two broad concepts: social equity and sustainability of community (Dempsey et al, 2012). Social sustainability is improvement and maintenance of current and future well-being and it reduces social inequality and improves quality of life (Chan and Lee, 2007). It refers to maintenance and improvement of wellbeing of current and future generations (Chiu, 2003, quoted in Kavanagh, 2009). In sum,social sustainability is: a life-enhancing condition within communities, and aprocess within communities that can achieve that condition. Social sustainability occurs when the formal and informal processes,systems, structures and relationships actively support the capacity ofcurrent and future generations to create healthy and liveablecommunities. Socially sustainable communities are equitable,diverse, connected and democratic and provide a good quality oflife (McKenzie, 2004).

2.3. Social Sustainability Indicators (SSI)

There are many sets of urban sustainability indicators (SIs) but none has emerged so far as having universal appeal (Mitchell, 1996, quoted in Turcu, 2012). Greene (1992) argued despite great concerns for creating sustainable and lively neighbourhoods, there is not a unique framework for both planners and public. Even though there are many definitions of sustainability, it is generally agreed that the economy, environment and social equity are three prime values of sustainability. Some researchers provided sets of indicators for universal studies (Masnavi, 2007;Teriman et al, 2010). Others provided and used some indicators in city and in smaller scales like neighbourhood (Azizi, 2006; Chan and Lee, 2009; Dave, 2011). The literature suggests that social sustainability includes two main dimensions, social equity and sustainability of communities (Bramley et al, 2009). Social equity includes access to services and opportunities, while sustainability of communities includes various sub-dimensions such as attachment to the neighbourhood, social interaction and safety within the neighbourhood, perceived quality of the local environment, satisfaction with home, stability and participation in collective civic activities. These two main dimensions of social sustainability link or overlap with other terms, which are widely used as concepts of social sustainability: social cohesion, social capital and social exclusion and inclusion (Bramley et al, 2009 as cited in Dave 2011). Some of the SSIs that were studied in previous were shown in Table 1.

2.4. Relationship between density and Social sustainable development

Both density and sustainable development plays very essential roles in creating built environment. However, density itself cannot create ad or reverse environment because density is only a measurement, not an independent factor that could create good or bad urban fabric/built environment (Alexander, 1993; Forsyth, 2003).Since the 1990s,

sustainable development has become interlinked with the term 'sustainable cities'. The latter has increasingly been used within the sustainable development discourse and has generated a debate on whether cities contribute to the achievement of sustainable development goals in light of their specific characteristics, or whether sustainability can be achieved in urban environments more easily than in non-urban areas (Colantonio and Dixon, 2011).

It has been agreed that the current patterns of urban development and human activity have led to environmental degradation, and have created serious problems for natural resources and the quality of life particularly in urban areas (Masnavi, 2007).Indeed, in the processes of urban development, sustainability has become a very important element. The important part of the urban sustainability discussion has revolved around spatial, ecological, and to a lesser extent, social issues. Most part of the work has emphasized on the 'compact city' instead 'urban sprawl' debate, and several studies have claimed that the higher density of compact cities can improve and enhance public transport systems, improve access to facilities and services and also can reduce social segregation (Burton, 2000; Jenks et al, 1996; Jenks and Burgess, 2000). Compact cities can also entail shorter travel to work and fewer car journeys, which in turn reduce pollution, congestion and noise levels. From a sociological perspective, density has impact on social interactions amongst city dwellers with uncertain results on the social sustainability of urban areas.

The review of literature shows a wide range of claims related to the effects of high density on various aspects of sustainable development. Many claims are conflicting and contradictory. Many urban analysts have supported more compact urban living and high density as a sustainable form (Masnavi, 2007; Clark, 2005; Holden and Norland, 2005; Burton, 2000; Hall, 1996).

Campoli and MacLean (2007) argues that, for many people, density is associated with ugliness, congestion and crowding, even if it can be shown that well-designed higher density can achieve well-built environment and could save land, energy, infrastructure cost and the overall cost of the housing development. They argue that people have a problem of distinguishing quantitative and qualitative character of density. Cramer et al. (2004) found that as the population density increased, global quality of life decreased. Regarding the neighbourhood, higher population density was related to an increase in negative life events and a reduced perception of neighbourhood quality.

Higher density neighbourhoods with higher populations could negatively impact the sense of belonging and sense of safety (Taylor and Harrell, 1996). High density neighbourhoods are often associated with poor maintenance due to overcrowded and complex built forms (Dave, 2001). Bramley et al (2009) argued residential satisfaction, stability, neighbourhood environment, and safety are all shown to be lower in higher density/central places.Higher density can facilitate social interactions (Talen, 1999).

With respect to previous studies, in this research, researchers had tried to find effects of increasing density and social sustainable development onchosen neighbourhoods of Tabriz city, Iran.

2.5.Neighborhood

There are many definitions on neighborhood such as: the term neighbourhood has been in the urban dweller's vocabulary for a very long time, with many of the same characteristics regardless of the culture to which one is referring (Choguill, 2008). The neighborhood is a residential area with homogeneous characteristic, of a size comparable to that usually served by an elementary school. A typically ideal neighborhood for planning purposes would be an area ¾ to 1 mile square and containing about 6000 to 8000 people (De Chiaraet al, 1995).Mumford(1954) argues Neighbourhoods, in some primitive, inchoate fashion exist wherever human beings congregate, in permanent family dwellings; and many of the functions of the city tend to be distributed naturally—that is, without any theoretical preoccupation or political direction—into neighbourhoods. "Neighbourhoods are physical areas within which people organize their lives, base a significant portion of their social time and therefore connect with the world outside the home. Urban neighbourhoods usually cover around 2000 homes, 5000 people, a typical primary school catchment. Neighbourhoods often have sharp boundaries, either physical or atmospheric, but the layers of neighbourhood life are like an onion with a tight core and a loose outer skin" (Power and Wilson, 2000).Neighbourhood is the bundle of spatially based attributes associated with clusters of residences, sometimes in conjunction with other land uses (Galster, 2001).Jenks and Dempsey (2007) discussed a neighbourhood as including both the social and physical elements: a district, representing an area where people live, and a community, representing the people themselves, who live in that particular area.The Centre of the neighbourhood provides facilities for transit stops, work places, retail, community events, and leisure activities. The streets provide alternate routes to most destinations at an equitable manner for both vehicles and pedestrians.

In this research, neighbourhood was defined the sub-divisions of urbanwith distinct of boundary and population. Maydan-e gotb (Gotb) and Golbad neighborhoods, two neighborhoods of Tabriz City -the largest metropolis in North West of Iran - were chosen and studied. It should be noted thatGotb is a traditional and Golbad is a newly and pre-designed neighborhood (Figure 2).

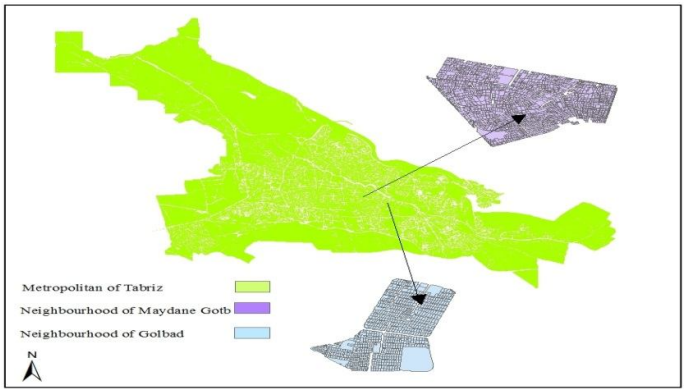

Figure 3: Location of case study neighborhoods

3. METHOD

3.1. Case study: Tabriz, Iran

Iran, as a developing country, is a highly urbanized country in the world. According to latest census, Iran has more than 75million population and more than 71 percent of people living in urban areas(Statistical Center of Iran, 2012). Tabrizis a metropolis with an estimated population of 1.7 million in 2012. Tabriz metropolitan area is spread over 240 $km^2$with average population density of7069 per square kilometer.Currently, Tabriz, with a robust historical background in urbanism,faceschallengesfor rapid growth population. Thisgrowth forces authorities and people to build higher density.Gotb and Golbad neighborhoods are not exception of this process. Advantages and disadvantages of this growth are well appearing on physical and social dimensions of neighborhoods.

3.2. Data collection and analysis

Based on methodology and style, this paper is a descriptive - analytic research. To this end, the research framework of this study is based on a literature review, questionnaire survey, descriptive analysis and employees land use map of neighborhoods (Figure 5).In order to perform this, itstarts with comprehensive literature review which helps to develop a framework for this study and prepare questionnaire survey. Considering social's aspects,some previous studies use below indicators for social sustainable development in urban planning (Table 1):

Table 1: Indicators for social sustainable development in some previous studies

Researchers	List of indicators
Azizi (2006)	- Identity and livable - Diversity - Accessibility - Mobility and Amenity
Masnavi (2007)	- Social Interaction: Social contact in the neighborhood, Visiting friends and family and Walking activities/ strolling - Neighbourhood satisfaction: Safety and security, Accessibility to the facilities and Privacy and communal aspects
Chan and lee (2009)	- Convenience, efficiency and safety for pedestrian and public transport users - Provision of public facilities e.g., school, health care services, sports facilities - Provisions for basic needs of disabled, elderly or children with proper access - Provision of open spaces e.g., parks, seating areas and promenade - Preserving and facilitating social network - Community involvement in public decision making - Sense of belongings on community - Security against crimes
Teriman et al(2010)	- Quality of life - Social capital - Public safety and security
Dave (2011)	- Access to facilities and Amenities: - Amount of living space: - Health of the Inhabitants: - Community spirit and social interaction: - Sense of safety: - Neighbourhood as a place to live in
Turcu (2012)	- Moving patterns: People moving in and out of an area - Sense of community: Levels of local social contact and community activity - Crime and safety: General safety of the area; fear of being a victim of crime; walking around the area (during day and at night) - Tenure mix: Levels of home owners/social tenants/private tenants - Income mix: 'Better-off' people moving in the area - Ethnic mix: Levels of white/non-white people living in the area

Becauseof the homogeneity in statistical population (i.e. having the same language, race, etc.), the questionnaires inquestionnaire survey were filled by233 members of two neighbourhoods that had been chosen by random sampling.The form of questions was closely designed to survey attitudes and views of settlements about effects of increasing density on social sustainable development indicators in the present situation.

It is worth noting that, the respondents were given self-administered questionnaires and they were asked to express their points of views. The main questions were as follow:

- Is the access to parks and green space, health care, centers, education facilities and etc. easy in neighbourhoods?
- Dose the increasing density encourages the using of public transport and walking activity in neighbourhoods?
- Does the increasing density have a good effect on quality of life and has bad effects on image of neighborhoods?
- Dose the increasing density lead to the increase in the public open space in neighbourhoods?
- Do you agree with increasing density on yourself neighborhood?
- Dose the increasing density have a negative impact on safety and security in neighborhoods?

It should be noted that according to a 5-point Likert scale (‘‘1’’ = very low, ‘‘2’’ =low, ‘‘3’’ = partly, ‘‘4’’ = much, ‘‘5’’ = too much) the above questions were answered to achieve the effects of urban density on social sustainable development in neighborhoods. In fact, the researchers examine the effect of increasing density policy on sustaining our community and neighborhood. It is obvious; Likert scale helps to convert qualitative data like views and attitudes to quantitative data for analysis. In this study, researchers haddirect access to respondents (Figure 3).

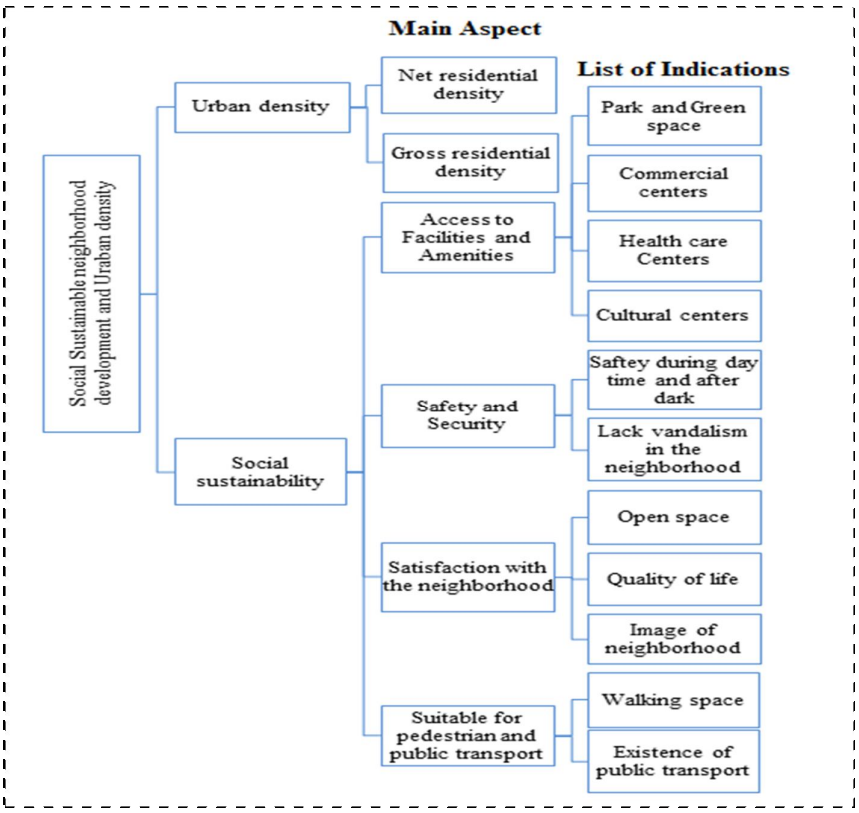

Figure 3: The Framework of the current research and data analysis

Inorder to estimating the size of a samplein this research,Cochran formula was used.This formulais one of the statistical methods that are commonly associated with the study of qualitative variables that are used to determine the sample size (Cochran, W. G., 1977).

$$N_0 = \frac{(t)^2 * (p)(q)}{d^2}$$

where:

−t = value for selected alpha level of 0.025 in each tail =1.96.

− (p) (q) = estimate of variance =0.05.

−d = acceptable margin of error for proportion being estimated = .09 (error researcher is willing to except.Using this formula the number of sample size for Golbad and the number of sample size for Maydan-e gotb were determined 116 and 117, respectively.

Data collected from the questionnaire survey were converted into code before being entered into a database created in Statistical Package for Social Science (SPSS) version 15 for analysis. Also, land use map of neighborhoods were studied for more analysis about per capita, population density and local facilities and amenities (Figure 4).

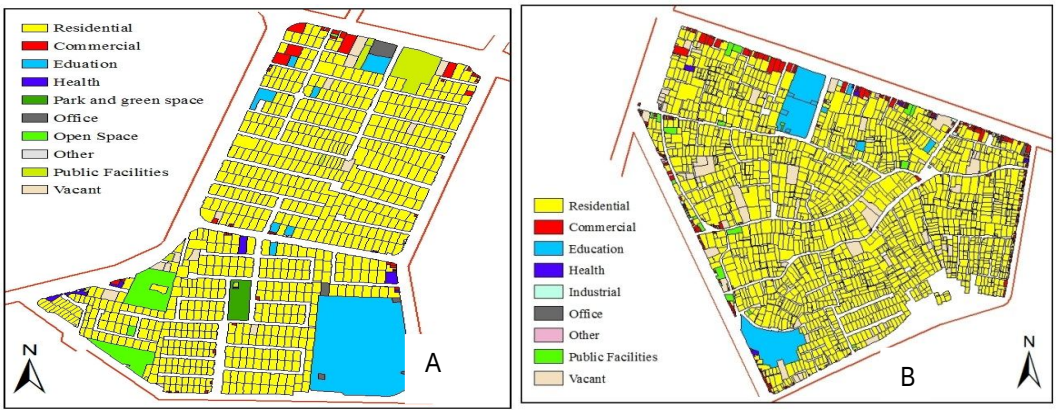

Figure 4: land use of Golbad (A) and Maydane Gotb (B) neighbourhoods

4. Findings and Discussions

Golbad is a predesignedwhileMaydan-e gotb (Gotb)is a historical and traditionalneighborhood. According to the latest census, theirpopulation is about 13760(Statistical Center of Iran, 2012). Gross density (DU/ha) ofGolbad is 129/8 and Maydan-e gotb is200/1 (Table 2).

Table 2: Some information about case studied neighborhoods

Neighbourhood	population	Gross Density (DU /ha)	Net Density (DU /ha)	Per capita of residential
Golbad	5040	129/8	213	46/8
Gotb	8627	200/1	282	35/4

Tabriz municipality has planned to increase density in these neighborhoods. Meanwhile, their population is also enhancedwithout considering the aspect of sustainable development neighborhood. Whereasin this study, researchersare willing to investigatethe effects of density on social indicators of sustainable development, thus the follow findings are noticeable:

Access to facilities and amenities: Researches in developed countries suggest that higher density areas support more facilities and a broader range of services per capita than most lower density, suburban areas. Although cities in developing countries may suffer from a lack of infrastructure, they could benefit from higher densities compared to those found in cities of developed countries, creating good accessibility to facilities within walking distances, especially due to their vibrant mixed use patterns of development (Burgess, 2000)

In these aspects,indicators such as: access to park and green space, parking space, health care, cultural and commercial centers,facilities of educational and sports and etc. were reviewed and analyzed.As before mentioned, Respondents were asked; is the access to parks and green space, health care, centers, education facilities and etc. easy in neighbourhoods?

Review of the literature suggested that higher density have positive impact on accessibility to daily–use facilities. But in this research, the findings shows, there are different results between two case studies in some aspects.For example,inindicator of access to park and green spaceonGolbad result shows significant difference ($P<0.05$ and $t= 2.97$). It shows, most of respondents confirmed with increasing density, access to basic facilities is improved.But onGotb result is revers ($P<0.05$ and $t= -13.84$). Moreover residents suffer from a lack of spaces for sport and parking space. Assessing the land use map in neighborhoods study shows, thatnow there is no park and green space in Gotb and there is not adequate vacant space for providing these facilities in the future.Indeed most of land area in this neighbourhood were built and occupied by houses and other urban land uses.In fact, percent of responses that they have very low and lowaccess to park, green space, culture centersin Gotb is very high (Tables 3 and 4). And this is in contradiction with the principles of sustainable development neighborhood.Although, it is necessary the minimum levels of density to support local service and facilities but, it is too necessary to provideinfrastructure and facilities before increasing density in these neighborhoods (Figures5 and 6).


Figure 5: Increasing density without considering infrastructureFigure 6: Alone Place for park and green space in Golbad

Pedestrian and public transport: According to Newman and Kenworthy(1999), the low density cities of North America and Australia have high levels of car dependency and these results in higher levels of energy consumption as compared with higher density cities of Western Europe. With considering previous studies,in this research the respondents were asked: Whether increasing urban density has positive effects on access to public transportation and encourages pedestrian activity on neighborhood or not? Observing self –reported participants' shows that, there are different results on these indicators.About access and use public transport, In Golbad, most of respondents, (%50), believe that access to public transport is easy and people prefer to use public transport. But, on the Gotb,percent of answers that implicate to using of public transport is low, (%34). Thus, the effects of density and using of public transport has significant deference in Golbad (P<0.05 and t=5.255), and in Gotbhas non-significant deference (P>0.05 and t=-.66). Aboutof relation between increasing density andencourage pedestrian activity, most of respondents especially in Gotb(more than %80 with sig=.000 and t= -17.19) believe that increasing density has no effect on walking activity. There is not significant deference in the relation of increasing density and waking activity.This result confirms the result of Forsyth et al (2007); that high densities have many benefits in terms of efficient use of infrastructure, housing affordability, etc. But it alone does not appear to be the silver bullet in the public health campaign to increase physical activity (Tables3 and 4).

Satisfaction with the neighborhood: Literature review suggests that in both developed and developing countries higher density is likely to have negative impacts on amount of living space (Dave, 2011). It is obvious, per capita living space is critical in assessing neighbourhood quality of life and sustainability of neighbourhood because, it can effect on satisfaction of residents. Bertaud (2004) argues in the general, the average size of houses in many cities of developing countries is much smaller than in developed countries cities. Therefore, both of density and sustainability in processes of development play an important role in creating desirable and pleasure environment in cities. In this aspect, indices such as quality of life, effect of density on image of neighborhood and public open space were studied. Indeed respondents were asked; Does the increasing density have a good effect on quality of life and has bad effects on image of neighborhoods? And dose the increasing density lead to the increase in the public open space in neighbourhoods?

The findings showed that increasing density has negative effects on satisfaction with the neighborhood. More than 50 percent of respondents (with sig=0.000) in Gotb and 40 percent in Golbad (with sig=0.002) confirm the increasing density do not leads to increasing quality of life. Indeed, in both case studied, most of respondents were believed that increasing density do not leads to increasing quality of life and Residents' satisfaction had significant difference(P< 0.05). These results confirm the studies of Cramer et al (2004); that higher population density was related to an increase in negative life events and a reduced perception of neighbourhood quality. In the end of this part, the respondents were asked; do you agree with increasing density on yourself neighborhood? The answers were a little different in two cases. Although in the general, answers shows a little interest to increasing density (more than %50). But in Gotb, the number of respondents that were agreeing with increasing density was more than Golbad. Because of old urban context on Gotb, residents are more interesting in renovating and constructing higher apartments (Tables 3 and 4).

Safety and security:literature review showswith increasing density in neighbourhood sense of safety and security decreases. For example, Dave (2011) argues that increasing density in neighborhood had negative effects on neighborhood and decreased safe and security sense. In fact, increasing density and building high rise apartment had lower safe and security's sense during daytime and after darkness compared to low raise neighborhood. In this research to find relation between density and safety and security in neighbourhood, the respondents were asked: Dose the increasing density have a negative impact on safety and security in neighborhood or not?The results obtained show a little deferent result with literature review (Tables 3 and 4). Most of respondents in both case study believe the increasing density has a very low and low effects on safety and security of neighbourhoods more than %40 in Golbad with Significance 0.025 (P< 0.05) and more than% 45 in Gotb with Significance 0.001(P< 0.05). The main reason for

this result, return to state of increasing density. As previously mentioned increasing density in neighbourhood had started newly in Tabriz city and it takes the time to appear the result of that.

Table 3: Analysis of descriptive statistics frequencies and percent of answers to questions according to Likert scale on case studies

Effects of increasing density on social sustainable indicators likes;	Answers (Percent)									
	Golbad					Gotb				
	1*	2	3	4	5	1	2	3	4	5
Access to park and green space	3/7	18/5	35/2	29/6	13	54/1	21/6	18/9	5/4	0/0
Access to health care centers	3/7	11/1	40/7	33/3	11/1	2/7	19/8	45/0	26/1	6/3
Access to commercial centers	9/3	24/1	38/9	22/2	5/6	2/7	11/7	26/1	38/7	20/7
Access to Facility of sports	29/6	40/7	18/5	11/1	0/0	34/2	43/2	15/3	3/6	3/6
Access to Parking Space	20/4	11/1	25/9	18/5	24/1	23/4	31/5	40/5	3/6	0/9
Access to educational facilities	5/6	24/1	55/6	14/8	0/0	1/8	4/5	43/2	39/6	9/0
Access to cultural centers	22/2	35/2	27/8	14/8	0/0	25/2	62/2	12/6	0/0	0/0
Access to public transport	1/9	11/1	37/0	40/7	9/3	13/5	21/6	30/6	27/0	7/2
Encourage walking activity	7/4	25/9	31/5	27/8	7/4	60/4	22/5	13/5	3/6	0/0
Open spaces	5/6	20/4	37/0	24/1	13/0	5/4	23/4	39/6	28/8	2/7
Image of neighbourhood	16/7	11/1	40/7	14/8	16/7	19/8	23/4	30/6	19/8	6/3
Quality of life	25/9	14/8	37/0	14/8	7/4	24/3	26/1	19/8	26/1	3/6
Amount of building density	31/5	25/9	14/8	16/7	11/1	29/7	18/9	24/3	25/2	1/8
Safety and security	20/4	22/2	29/6	18/5	9/3	15/3	29/7	28/8	26/1	0/0

*: 1= very low 2= low 3= partly 4= much 5= too much

Table 4: ANOVA effects of increasing urban density on level of social sustainable indicators on case studies by survey responses

List of Indicators	Golbad			Gotb		
	t	df	Sig. (2-tailed)	t	df	Sig. (2-tailed)
Access to park and green space	2.976	116	.004	-13.847	117	.000
Access to health care centers	4.039	116	.000	1.583	117	.116
Access to commercial centers	-.936	116	.351	6.474	117	.000
Access facility of sports	-9.620	116	.000	-10.779	117	.000
Access to Parking Space	1.070	116	.287	-8.601	117	.000
Access to educational facilities	-2.792	116	.006	-5.514	117	.000
Access to cultural spaces	-6.812	116	.000	-19.618	117	.000
Access to public transport	5.255	116	.000	-.660	117	.510
Encourage walking activity	.180	116	.857	-17.191	117	.000
Open spaces	1.786	116	.077	.000	117	1.000
Image of neighbourhood	.148	116	.883	-2.731	117	.007
Quality of life	-3.136	116	.002	-3.587	117	.000
Amount of building density	-3.772	116	.000	-4.355	117	.000
Safety and security	-2.266	116	.025	-3.497	117	.001

P < 0.05=Significant differences in T test value.
P > 0.05=Non- significant differences in T test value
Significance means statistical difference with reference number

5. CONCLUSIONS

In this study, the relationship between urban density and social sustainable development on neighborhoods ofMaydan-e gotb (Gotb)and Golbad,in Tabriz, Iran was investigated. Previous studies have emphases that high density development is socially sustainable development (Kavanagh, 2009; Dave, 2011; Masnavi 2007; Newman and Kenworthy 1999).In Iran, now the main aim of high rise development is to achieve higher density. Yet, main results that can be concludedfrom this study are that there is an essential need forchanging in methods in which we develop our neighborhoods by increasing urban density and building higher apartments to provide the housing needs of populationbut in this process, the paradigm of urban sustainable development should not be neglected. The increasing of urban density influences size and scale of city. This effect will change the social systems of our communities, and influencessustainable development in city, especially in urban neighborhoods. In Iran, construction regulations in cities encourage building higher apartment in neighborhood, whereas there are few attention paid to future sides of this development and their requirements from social's aspects. Choguill (2008) argued, In order to justify social sustainability, the neighbourhood population size should be small enough to allow free interchange among members of the local community. It is sufficient to form a pressure group for dealings with the municipality in terms of local neighbourhood facilities and services. Although increasing urban density is a policy indicated for sustainable development, especially from social's aspects, but, it is necessary to consider other factors like urban caring capacity, existent streets, infrastructures, access to facilities (park, health care centers andetc.). For instance,inGotb where there are not any spaces for parks or open spaces for recreation and other facilities,people are encouraged to increased urban density that effectson population density in neighborhoods and this is in contradiction with principles of urban sustainable development. The results also showed that the government and local municipalities need to undertake

concerted efforts to improve the neighborhood sustainable development,available services to residents, passage of appropriate legislation and regulations in line with the paradigm of urban sustainable development. Indeed to create lively and socially place in cities, especially in neighbourhoods, there is need to consider both technical and social dimension of density.

Overall, significant differences were found between densities for 9 out of 14 social sustainable development indicators in neighbourhood of Golbad and 12 outof 14 in Gotb. It shows that increasing density had some effectsthe on most of the social sustainable development aspects. The remarkable finding is that many of the respondents were opponent to increased density, and they like to live in low density areas. In addition, there were differences in respondents' attitudes of two case studies; about access to park and green space and walking activity. Hence, before making decision to increase the density,it is important to pay attention to social sustainable development indexes, especially for neighborhoods.However, this research has considered one pillar of sustainability,it is necessary to reach and prepare neighborhood sustainable development in cities. Also,other pillars of sustainable development, i.e. economy and environment, should be considered.

REFERENCES

[1]- Alexander, E. R. (1993). Density measures: a review and analysis, *Journal of Architectural and Planning Research*, Vol. 10 pp. 181-202.

[2]- Atkisson, A. (1999). Developing indicators of sustainable community: Lessons from sustainable Seattle. In D. Satterthwaite (Ed.), Sustainable cities. London: Earthscan

[3]- Azizi, M. M. (2006). Sustainable Residential Neighborhood: case study Narmak, Tehran. *Journal ofFine arts*, University of Tehran,No 27 pp. 35-46

[4]- Azizi, M. M (2002), the role of building density in urban development, Proceedings of the First Seminar on Construction in the capital, Tehran University.

[5]- Bertaud A. (2004). Mumbai FSI Conundrum: the Perfect Storm; the Four Factors Restricting the Construction of New Floor Space in Mumbai. HTTP://alain-bertaud.com:

[6]- Burton, E. (2000). The Compact City: Just or Just Compact? A Preliminary Analysis, *Urban* Studies, Vol. 37 (11) pp. 1969-2001.

[7]- Campoli, J. and MacLean, A. S. (2007). Visualizing Density, Lincoln Institute of Land Policy.

[8]- Chan, E. and Lee, G. K. L. (2007) Critical factors for improving social sustainability of urban renewal projects, Soc Indic Res, Vol. 85 pp. 243-246.

[9]- Chan, E. and Lee, G. K. L. (2009). Design considerations for environmental sustainability in high density development: a case study of Hong Kong, Environment Development and Sustainability, Vol. 11 pp. 359-374.

[10]- Choguill, C. L. (2008). Developing sustainable neighbourhoods, Habitat International, Vol. 32 pp. 41-48.

[11]- Churchman, A. (1999). Disentangling the Concept of Density, Journal of Planning Literature, Vol. 13 (4) pp. 389-411.

[12]- Clark, M. (2005). Editorial: The compact city: European ideal, global fix or myth. GBER, 4(3), 1–10.

[13]- Cochran, W. G. (1977). Sampling techniques (3rd Ed.). New York: John Wiley and Sons

[14]- Colantonio, Andrea and Tim Dixon, (2011). Urban Regeneration and Social Sustainability Best practice from European cities, A John Wiley and Sons, Ltd., Publication.

[15]- Cramer, V., Torgersen, S., and Kringlen, E. (2004). Quality of life in a city: The effect of population density.Social Indicators Research, 69(1), 103–116.

[16]- Cuthbert, A. R. (2006). The form of Cities, Carlton, Victoria: John Wiley.

[17]- Dempsey N, C. Brown, G. Bramley (2012). The key to sustainable urban development in UK cities? The influence of density on social sustainability Progress in Planning 77, 89–141

[18]- Dave, Seema (2011), Neighbourhood Density and Social Sustainability in Cities of Developing Countries, Sust. Dev 19. Wiley Online Library, 189–205

[19]- Forsyth, A. (2003). Measuring Density: Working Definition's for Residential Density and building Intensity, Design Centre for American Urban Landscape, University of Minnesota.

[20]- Forsyth, A., Oakes, J. M., Schmitz, K. H. and Hearst, M. (2007). Does Residential Density Increase Walking and Other Physical Activity? Urban Studies, Vol. 44 (4) pp. 679- 697.

[21]- Galster, George (2001) On the Nature of Neighbourhood Urban Studies, Vol. 38, No. 12, 2111–2124,

[22]- Greene, S. (1992) City shape: Communicating and Evaluating Community Design, Journal of the American Planning Association, Vol. 58 (2) pp. 177-189.

[23]- Holden, Erling and Ingrid T. Norland (2005) Three Challenges for the Compact City as a Sustainable Urban Form: Household Consumption of Energy and Transport in Eight Residential Areas in the Greater Oslo Region,*Urban Studies*, Vol. 42, No. 12, 2145–2166.

[24]- Jenks, M. and Burgess, R. (2000). Compact Cities: Sustainable Urban Forms for Developing Countries,Spon Press, London

[25]- Jenks, M., Burton, E. and Williams, K., eds. (1996). The Compact City: A Sustainable Urban Form? E and FN Spon, London.

[26]- Jenks, M. and Dempsey, N. (2007). Defining the neighbourhood: Challenges for empirical research. Town Planning Review, 78(2): 154-177.
[27]- Jenks, Mike, Elizabeth Burton and Katie Williams. (2005). The Compact city: a sustainable form? Oxford Brookes University, Oxford, UK
[28]- Jepson, E. J. (2007). Sustainability and the Childe thesis – What are the effects of local characteristics and conditions on sustainable development policy?, Cities, Vol. 26 (6) pp. 434-447
[29]- Jones, C and MacDonald (2004). Sustainable urban form and Real Estate Markets, Milan.2- 5 June.
[30]- De Chiara Joseph, Panero, Julius, and Zelnik, Martin (1995). Time-Saver Standards for housing and residential development, Singapore. McGraw- hill.
[31]- Hall, P. (1996). The future of the metropolis and its form. Regional Studies, 31(3), 211–220.
[32]- McLaren, D. (1992) Compact or dispersed? Dilution is no solution, Built Environment, 18(4), pp. 268–284.
[33]- McKenzie, Stephen (2004). Social Sustainability: Toward Some Definitions, Hawke Research Institute University of South Australia Magill, South Australia ,Working Paper Series No 27
[34]- Lafferty, W. M. (2001). Introduction. In W. M. Lafferty (Ed.), Sustainable communities in Europe. London: Earthscan
[35]- Magri, S. (1994). Urban density definitions, Urban Futures, September, pp. 49- 3.
[36]- Mumford, Lewis (1954). The Neighborhood and the Neighborhood Unit. Town Planning Review 24:256–270, p. 258
[37]- Masnavi, M. R. (2007). Measuring Urban Sustainability: Developing a Conceptual Framework for Bridging the Gap Between theoretical Levels and the Operational Levels Int. J. Environ. Res., 1(2): 188-197
[38]- Matthew I. Slavin, (2011). Sustainability in America's Cities, Creating the Green Metropolis, Island Press
[39]- Montgomery, A. Saunders, A and Chortis, J. (2003). Density considerations in managing residential land provision in Perth, Western Australia, Presented at the State of Australian Cities Conference, 3-5 December, Perth.
[40]- Newman, P. and Kenworthy, J. (1999). Cities and Automobile Dependence: An International Sourcebook, Aldershot: Gower Publishing Company.
[41]- Pont, M. B. and Haupt, P. (2007). The relation between urban form and density, Viewpoints, Vol. 11 (1) pp. 1-3.
[42]- Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. (2007). World population prospects: The 2006 revision and world urbanization prospects: The 2007 revision. Viewed August 2010. http://esa.un.org/unup.
[43]- Power, Anne, and William Julius Wilson. (2000). Social Exclusion and the Future of Cities. CASE Paper 35. Centre for Analysis of Social Exclusion. London School of Economics.
[44]- Salat, W. G. M., and Majoor, S. (2005). Amsterdam zuidas European space. Rotterdam: 010 Publishers.
[45]- Sivam, A. and Karuppannan, S. (2009). Density Design and Sustainable Residential Development, Presented at the European Network for Housing Research Conference 2009, 28 June to 1 July, Prague, Czech Republic.
[46]- Statistical Center of Iran, (2012). common census of population and settlement, Tehran, Iran
[47]- Sung Heui Cho, Tae Kyung Lee, (2011). A study on building sustainable communities in high-rise and high-density apartments e Focused on living program Building and Environment 46 (2011) 1428e1435
[48]- Talen, E. (1999). Sense of community and neighbourhood form: An assessment of the social doctrine of new urbanism. Urban Studies, 36(8), 1361–1379
[49]- Taylor RB, and Harrell AV. (1996). Physical Environment and Crime. National Institute of Justice: Rockville, MD.
[50]- Teriman et al (2010). Sustainable urban development: formulation of indicator – based residential sustainability assessment framework for local level. In The 3rd Knowledge Cities World Summit, World Capital Institute, Melbourne Convention and Exhibition Centre, Melbourne, pp. 604-613.
[51]- Turcu, Catalina (2012) Local experiences of urban sustainability: Researching Housing Market Renewal interventions in three English neighbourhoods, journal of Progress in Planning 78 pp 101–150
[52]- UNCED, (1992). Earth Summit - Agenda 21, the United Nations Program of action from Rio, the U.N. Conference on Environment and Development.(UNCED) 3-14 June 1992, Rio de Janeiro,
[53]- World Commission for Environment and planning (1987). Our common future, Oxford: Oxford University Press.
[54]- Www. Cnu.org/charter. Charter of New Urbanism (Accessed 12 November 2012).
[55]- Yeh, A. G. O., and Li, X. (2000). The need for compact development in fast growing areas of China: The Pearl River delta. In M. Jenks and R. Burgess (Eds.), Compact cities: Sustainable urban forms for developing countries (pp. 73–90). London: EandFNSpon Press.
[56]- Yeh, Anthony G.O. and Belinda Yuen. (2011). High-Rise Living in Asian Cities: Springer Dordrecht Heidelberg London New York
[57]- Zeijl-Rozema, A., and Martens, P. (2010). An adaptive indicator framework for monitoring regional sustainable development: A case study of the INSURE project in Limburg, The Netherlands. Sustainability: Science, Practice and Policy, 6, 6– 17