

Investigating the Relationship Between Density and Social Sustainability in Informal Settlements, Case Study: *Khezr* District of Hamadan

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Abstract

Social sustainability has focused on the type of development that promotes social interaction and inclusion. It gives emphasis to inclusive community, social cohesions, quality of life, social equity and diversity. In fact, as one of the three domains of sustainability social sustainability plays a vital role in enhancing the community by the means of giving delivering equal opportunities, creating vibrant, diverse and inclusive environment and fulfill the social needs of the inhabitants. Informal settlement is not a physical problem, but it is resulted from macrostructure factors on the national level. It is actually a type of settlement in urban space which marks a significant difference with other types of settlements. In this study, a considerable attention to relationship between density and social sustainability in most populated informal settlement of Hamedan, *Khezr* district. The variables of social sustainability were examined through 367 questionnaires in accordance with the district population using SPSS (v.20) to analyze the data. The findings confirm that there are not significance relationships between all indicators of social sustainability and density.

Keywords: Density, Informal settlement, Social sustainability, Sustainable city

1. Introduction

From the beginnings of industrialization in the 18th up to the middle of the 20th century development of societies was mainly determined by economic and social issues.

The three pillars of sustainability i.e. social, economic and environmental, together contribute to a healthy and productive present and future community. Sustainability is related to creating and maintaining the quality of the life in a community. A community cannot exist without people and their interaction. The inhabitants influence development when they choose where to live, work and play. Social aspect has major capacities to enable immediate and positive change for sustainability but then also the social dimension of sustainability has traditionally received less attention than the environment and economic dimensions because of the difficulty in defining and measuring social sustainability (Richmond, 2012).

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. Both density and sustainable development play very essential roles in creating the built environment. However, density itself cannot create ads 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).

This research aims to investigate relationships between density and social sustainability in most populated informal settlement in Hamadan, *Khezr* district.

2. Research Method

Methodology is one of the most important components which influence the results of research, greatly dependent on the aim, nature and tools of research and the assumptions. This research was carried out in an applied developmental format based on a descriptive analytic method. Library, interview, photo, urban projects information bank and the internet were used to gather data along with field observation and the data were analyzed by SPSS, Excel, T-test, and cronbach α . The population of the research consists of 8533 households. Cuckran formula was used to make sampling based on which the volume was determined to be 367 with 5% error level.

To find the responses, we devised a questionnaire of open, closed questions in likert spectrum to be distributed randomly among 367 households. The content and number of questions were validated by experts.

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$$n = \frac{\frac{t^2 qp}{d^2}}{1 + \frac{1}{N} (\frac{t^2 qp}{d^2} - 1)}$$

- n: Sample size
- N: size of populace
- p: Percentage distribution of traits in the percentage of individuals with traits that
- q: percentage of people who do not have that trait in the population
- t: constant factor
- d: The difference between the actual proportion of the trait in the population to estimate the amount researchers attribute to its existence in society (Hafeznia, 2010).

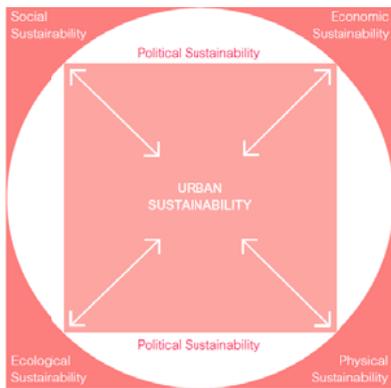


Fig. 1. The Five Dimensions of Urban Sustainability, from Allen, Adriana (2001)

3. Fundamental Concepts of the Research Sustainability

The concept of “sustainable development”, which in 1987 first entered into political debates after the World Commission on Environment and Development (WCED) – also named the Brundtland Commission after its chairperson – had released a report on “Our Common Future” (Alexander, 1993).

The Commission, with technology and the social organization as the main drivers for development, focused very much on the needs to manage economic growth in a way, so as to better protect the environmental resources.

Towards Sustainable City

There has been a considerable amount of research that defines and characterises the form of the sustainable city, and which urban forms may most affect sustainability. It is a complex issue. The physical dimensions of urban form may include its size, shape, land uses, configuration and distribution of open space a compositions multitude of characteristics, including a city’s transportation system and urban design features (e.g. Handy, 1996; Llewelyn-Davies, 2000). However, its sustainability depends on more abstract issues – environmental (including transport), social and economic. Research suggests that, not one, but a number of urban forms may be sustainable (Williams et al., 2000).

Yet much of the debate about the sustainability of cities and 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 – often characterized as the concept of a ‘compact city’ (see Jenks et al., 1996; Jenks and Dempsey, 2005). In the UK, government policy embodies such principles through its Urban White Paper (DETR, 2000a; DCLG, 2006a), mostly based on the report of the Urban Task Force (1999). Thus in the UK, a dominant paradigm is being implemented in many towns and cities. It is for more compact, high-density and mixed use urban forms, and the belief is that they will be sustainable. This book will take this type of urban form as its starting point and will test the claims made for it.

Table 1
Dimension of sustainable urban development

Dimension of sustainable urban development	Elements Necessary for Sustainable Urban Development
Social Wellbeing	Health Safety Local or civic identity/Sence of place Access to decent – affordable – housing and services Access to public recreation and open space Access to a variety of transportation options
Economic Opportunity	A diversified and competitive local and regional economy Transportation and other infrastructure coordinated with land use Growth plans that leverage existing assets Access to capital and credit& Access to education, jobs, and training
Environmental Quality	Efficient Land use Efficient resource use Waste/pollution minimization and management Climate change and natural disaster mitigation, adaptation, and resilience Carbon efficient, environmentally sound, transportation A diverse natural environment and functional ecological systems

Social sustainability

Social sustainability focuses on the type of development that promotes social interaction, social inclusion and cultural enrichment. It gives emphasis to inclusive community, social cohesion, quality of life, social equity and diversity which are integral to the long-term sustainability of communities (Bahadure & Kotharkar, 2012). Social sustainability refers to the fairness, inclusiveness and cultural adequacy of an intervention to promote equal rights over the natural, physical and economic capital that supports the livelihoods and lives of local communities, with particular emphasis on the poor and traditionally marginalised groups. Cultural adequacy means, in this context, the extent to which a practice respects cultural heritage and cultural diversity (Allen and et al, 2007).

Informal settlement

The term informal section was first introduced by Reynolds in 1996 for a part of the city in which some trades such as retailing and shoe polishing are carried out (Iranost 2008). Informal settlement is the place in cities with physical texture which is commonly spontaneous, consisting of residential units which are built without technical principles. Most residents are from low income people acting in informal market (Sarafi, 2003). Informal textures appear due to different reasons which make different typologies. Regarding the issue of informal settlements and addressing them, there are put forward different views. In the structural approaches, the structure and roots of informal settlement have been paid attention to and the strategy is to change the structure governing the work, production, distribution, consumption and in general economic structure of the society (Salehi, Amiri et al. 2011).

Problem-oriented approach introduces informal settlement as a natural procedure of human being life as an urban problem and describes the adverse effects on spatial abnormalities, social corruption, crime and other social, economic and physical damages (Sheikh 2001).

The liberal approaches assumes informal settlement as a fact and seeks for solutions of optimization of life conditions and improvement of marginal centers. In political economy approach, the aim is to discover the spatial patterns of production, distribution and consumption process and the role of government, group and social classes informing these patterns (Piran, 1987). In the socialist approaches, informal settlement is the result of social-economic inequalities and heterogeneous urbanization and transfer of poverty from villages to cities (Hajiyousefi, 2002).

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 al 2007; 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) argues Population density in a development field might not be a practical measurement because it will be lower with small households 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, neighborhood density and city density Alexander 1993; Churchman 1999; Forsyth 2003).

Relationship between density and Social sustainable development

Both density and sustainable development play very essential roles in creating the built environments. However, density itself cannot create ads 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). 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 the complexes 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).

4. Conceptual Framework

These Conceptual framework According to studies are expressed.

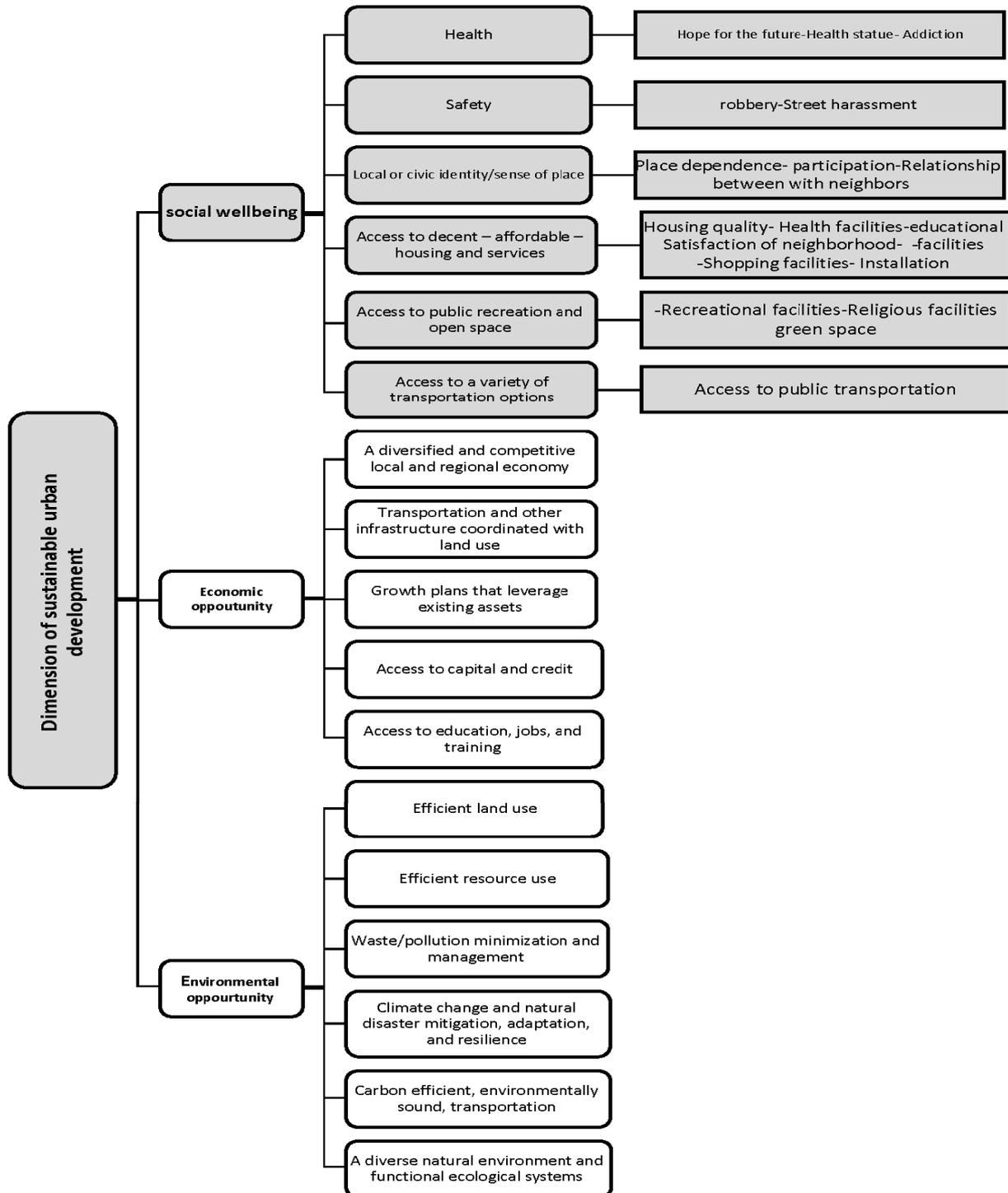


Fig. 2. Conceptual Framework

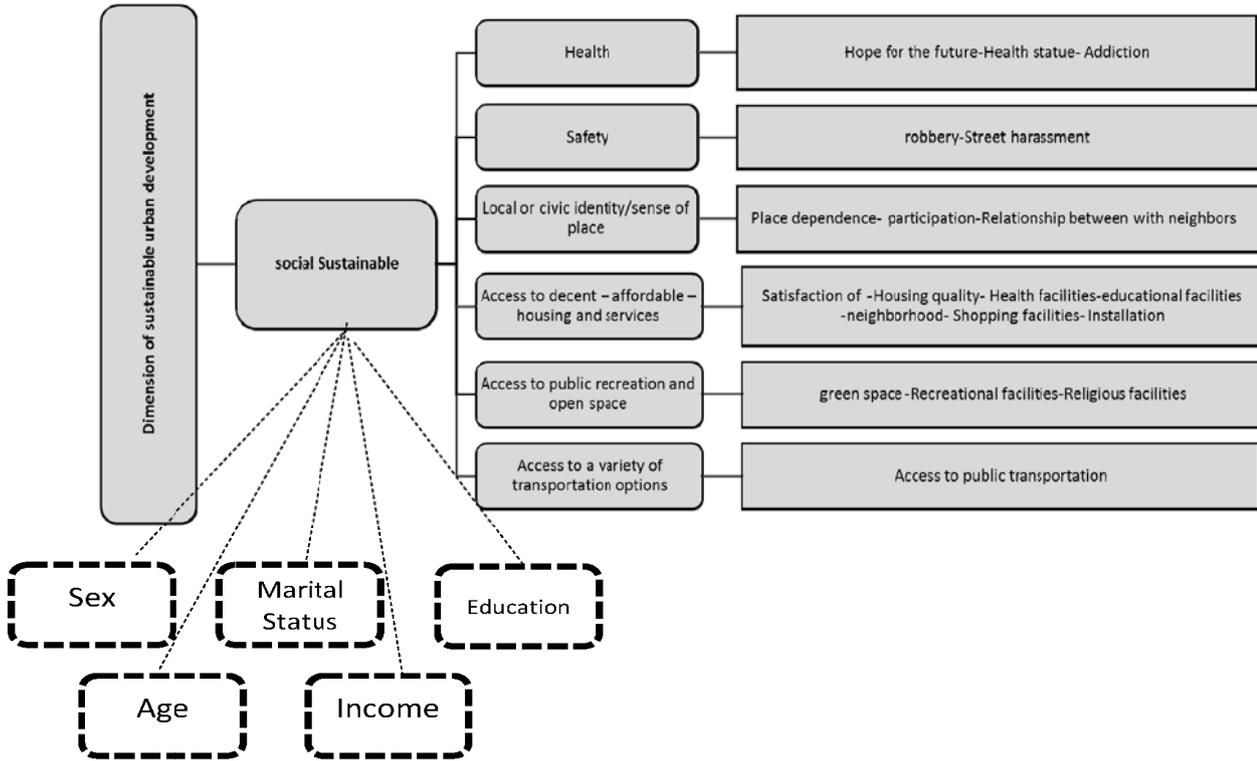


Fig. 3. Dimation of sustainable development

5. Discussion

Khezr district with an area of 150 hectares and population of 34000 is located at eastern part of Hamadan, at the border of the city regarded as the seventh zone. Khezr district is one of the biggest informal settlements in Hamedan originated from migration of simple workers. It is locus is based on farming lands of city margin. The morphology of the district obeys that of urban neighborhoods but it has compact textures with low width alleys and networks without open spaces, due to

unplanned formation. There are not found any civil services inside the district which makes it as a residential texture. The presence of residential units with small area, commonly one-floor, and low-width passage network are the main problems of the district. There is seen lack of health and sports uses and the district is at the low level of life standards.

Table 2
Characteristics of district

Site	population	Area (H)	Density
Khezr District	34000	150	267

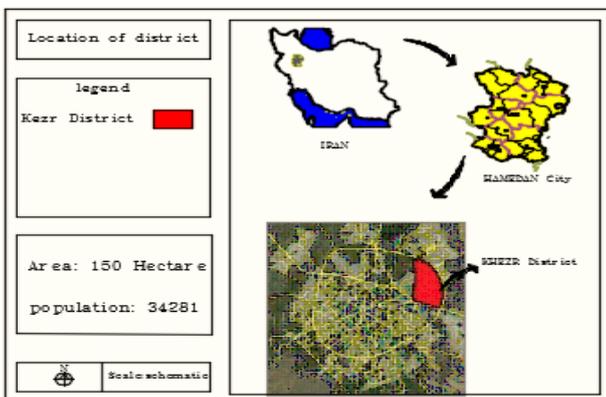


Fig 4. Location of district



Fig. 5. Khezr district

Table 3
Descriptive findings about respondents.

Category		Frequency	Percent	Unanswered	Standard deviation	Average	Min	Max
Gender	Female	165	45					
	Male	202	55					
	Total	367	100	0				
Age	-30	135	37/2					
	31-41	110	30/3					
	+42	118	32/5					
	Total	363	100	4	13/90	37/41	16	76
Level of education	Uneducated	64	18/5					
		176	50/7					
		92	26/5					
		15	4/3					
	Total	347	100	20				
Duration of staying in Khezr district	-10	118	33/8					
	11-25	130	37/1					
	+26	102	29/1					
	Total	350	100	17	11/51	18/07	1	51
Birth place	Hamedan city	219	60/2					
	Out of Hamedan city	145	39/8					
	Total	364	100	3				
Occupation of household head	Unemployment	33	9/3					
	Employee	14	4					
	Labor	151	42/6					
	self-employment	156	44/1					
	Total	354	100	13				

Table 4
Analysis of descriptive statistics frequencies and percent of answers to questions according to Likert scale on case study

Items	Very low	Low	Average	High	Very high
Level of satisfaction of health status	20/1	13/3	45/1	15/3	6/2
Level of hope for the future	25/3	16/2	29/5	15/6	13/4
Rate of addiction	18/1	10/4	10/4	17/7	43/4
Level of sense of security	23/7	18/7	31/8	17	8/7
Rate of stealing	23/3	20/3	19/7	15/3	21/4
Level of street harassment	24/2	19/1	20/30	13/9	22/5
Level of trust to cities people	23/6	21/1	34/2	15/3	5/8
Level of sense of belonging to the district	16/9	22/9	32/7	15/8	11/7
Level of cooperation for district improvement	20/7	18/8	33/1	14	13/4
Level of relationship between neighbors	12/1	15/4	33/3	23/8	15/4
Level of satisfaction and happiness	20/6	21/2	41/5	12	4/7
Access to recreational facilities	27/1	18/7	41/1	9/5	3/6
Access to infrastructure	7	8/5	28/1	37/5	18/9
Access to green spaces	58/5	24/6	15	1/6	0/3
Level of satisfaction of social-cultural facilities	38/9	20/8	28/9	8/6	2/8
Level of satisfaction of quality of housing	15/2	14	35/8	25/6	9/4
Access to health-treatment facilities	18/6	18/1	42/6	16/1	4/6
Level of satisfaction of neighborhood	16/9	15/4	36	18/8	12/9
Access to shopping facilities	9/5	11/4	30/7	28/8	19/6
Access to religious facilities	41/1	25/1	24/6	6/7	2/5
Access to public transportation	27	25/8	34/8	8/7	3/7

Table 5
Investigating significant differences between density and social sustainability

Items	t	df	Sig.(2-tailed)
Level of satisfaction of health status	7.16	366	0.000
Level of hope for the future	-0.18	366	0.952
Rate of addiction	5.42	366	0.054
Level of sense of security	8.96	366	0.011
Rate of stealing	6.04	366	0.059
Level of street harassment	5.7	366	0.03
Level of sense of belonging to the district	0.03	366	0.82
Level of cooperation for district improvement	0.012	366	0.046
Level of relationship between neighbors	5.256	366	0.000
Level of satisfaction and happiness	0.023	366	0.734
Access to recreational facilities	12.01	366	0.023
Access to infrastructure	8.32	366	0.004
Access to green spaces	9.568	366	0.01
Level of satisfaction of social-cultural facilities	6.24	366	0.005
Level of satisfaction of quality of housing	0.146	366	0.878
Access to health-treatment facilities	3.136	366	0.26
Level of satisfaction of neighborhood	9.025	366	0.032
Access to shopping facilities	8.7	366	0.000
Access to religious facilities	15.81	366	0.000
Access to public transportation	0.298	366	0.652

5. Descriptive Findings

In the following table (Table 3), the distribution of respondents is seen in terms of sex, age, and education level, stay duration in the district, birth place, and household guardian's occupation.

6. Discussion and Conclusion

In table 5, significant differences between density and social sustainability were investigated. According to findings and results, there is not significant differences between density and all dimension of social sustainability. In fact, Deprivation of informal settlements from urban life facilities has reduced the Quality of life in all environmental, Social, economic and physical aspects compared with other urban areas, arising from managerial malfunction and inequalities at local and national level, making these settlements as the heart of complex issues and antihuman sustainable development.

Sustainability means beneficial change in access to services leading to corresponding lasting outcomes and impacts in people's lives. On the other hand, high rate of addiction, low satisfaction and trust to people and low social capital resulted low quality of life socially. As a result, if 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. Although, achieving sustainable development in all aspects especially in aspect of social sustainability is not possible, but, it is necessary to consider particular measures to reduce and control the related damages.

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