ASSESSMENT OF SOCIAL SUSTAINABILITY VALUES AT NEW COMMUNITIES IN CAIRO - A CASE STUDY OF "NEW MAADI" DISTRICT

Hossam Eldin Moustafa ElNour Saleh
Department of Architecture, Faculty of Engineering
Menofia University, Egypt

ABSTRACT

Planning for social sustainability can prevent or at least mitigate the likelihood of future social problems. This research attempts to examine the domains of sense of community, which is the main approach of social sustainability at the neighborhood scale, by evaluating these domains in terms of urban planning to understand residents' perception of their neighborhood. The study aims to answer the following two questions: Do the new neighborhoods that have been built in Cairo attain the social sustainability concepts? And what are the neighborhood characteristics that contribute in achieving these concepts? The study utilizes the case study method through selecting four identical neighborhoods at "New Maadi" district, which is one of the new zones that includes a reasonable part of the urban extension of Cairo.

The key findings of this paper reveal that there is a fair degree of residents' perception of sense of community domains at the study site level. Thus, the new neighborhoods which have recently been built in "New Maadi," have achieved a reasonable degree of social sustainability. Also, the essential characteristics that have positively affected the sense of community values have been the availability and efficiency of services and facilities, and age of the neighborhood. On the other hand, the essential characteristic that has had negative affect on the sense of community has been the residential density.

KEY WORDS: social sustainability - sense of community - neighborhood - New Maadi.

الملخص

تُعد قيم الاستدامة الاجتماعية من القيم الهامة التى تستطيع معالجة العديد من المشاكل المجتمعية داخل البيئة المبنية، وتتمثل مشكلة البحث فى تقييم مدى تواجد هذه القيم فى المجتمعات العمرانية الجديدة بمدينة القاهرة، وذلك من خلال تقييم مستوى إدراك السكان بمكونات قيم الإحساس بالمجتمع على مستوى المجاورة السكنية، وتحديد العلاقة بين هذه القيم والخصائص التخطيطية للمجاورة السكنية. وتتضح أهمية الدراسة مع التزايد المستمر لحركة العمران بمصر، حيث يصبح من الضرورى فهم العوامل المؤثرة على إحساس السكان بالرضا من عدمه داخل البيئة المبنية والعمرانية.

ويطرح البحث سؤالين هما: هل تتواجد قيم الاستدامة الاجتماعية فى المجتمعات العمرانية الجديدة التى شيدت مؤخراً بمدينة القاهرة؟ وما هى الخصائص التخطيطية للمجاورة السكنية المؤثرة على تحقيق هذه القيم؟ وقد ارتكزت منهجية البحث على منهج دراسة الحالة من خلال اختيار أربع مجاورات سكنية كحالات للدراسة بمنطقة "المعادى الجديدة"، حيث تضم هذه المنطقة العديد من المجاورات السكنية التى تم تشييدها ضمن الامتداد العمرانى الجنوبى لمدينة القاهرة. وتمثلت النتائج أن المجاورات المختارة قد حققت درجة متوسطة من إحساس السكان بقيم الاستدامة الاجتماعية، وأن العوامل الرئيسية المؤثرة على تحقيق قيم الاستدامة الاجتماعية فى المجاورة السكنية هى: توافر الخدمات وكفاءتها، وعمر المجاورة، والكثافة السكنية.

الكلمات المفتاحية: المجاورة – الاستدامة الاجتماعية – الإحساس بالمجتمع - المعادى الجديدة.

1 INTRODUCTION

An impressive body of literature on sustainability and related concepts has accumulated over the past three decades. However, most studies, researches and even green building codes such as: LEED and BREAM are primarily concerned with resources, environment and economy. Limited attention has been given to social sustainability in architectural and urban research, especially at the local level in Egypt and the Arab Region. Meanwhile, the Egyptian cities are currently witnessing rapid growth. Nearly about 43% of Egyptian population live in 223 cities, and 19.5% are concentrated in Greater Cairo alone (GOPP and UN Habitat-Egypt, 2013). This rapid urbanization represents one of the serious challenges that face Egypt's urban development. However, the targeting sustainable cities can turn these challenges into opportunities because urbanization acts mostly as a driver of development. Cities can be engines of growth, if they are planned and managed well.

Despite all the criticism directed at it, the residential neighborhood remains to be the basic unit of the city and urban development. Without the neighborhood concept, urban growth in developing countries may turn to slums. Consequently, to meet the challenges which face the city, it should overcome the challenges facing the neighborhood. One of these main challenges is the residents' satisfaction inside their neighborhood or minor built environment. Therefore, thinking about the long-term success of social sustainability in neighborhoods of new communities is important as physical, environmental and economic sustainability.

1.1 The Problem Statement

This paper attempts to examine the domains of sense of community, which is considered one of the principal approaches to social sustainability at the neighborhood scale, by evaluating these domains in terms of urban planning, to understand residents' perception of their neighborhood. The study objectives can be achieved by addressing the following two research questions: -

RQ. 1: How much the new neighborhoods that have been built in Cairo outskirts in the recent decades close or far from attaining the social sustainability concepts?

RQ. 2: What are neighborhood characteristics that contribute in achieving social sustainability concepts in the Egyptian communities?

It is crucial to further study social sustainability inside the neighborhood to address current knowledge gaps due to the scarcity of local studies in this field, and to maximize the future efforts of improving quality of life and promoting the psychological adjustment of residents. There is a need of better understanding of how to create socially successful communities and how to use planning, development and stewardship functions to achieve this goal. This is imperative, particularly in the present atmosphere of political support from the Egyptian government, which is planning to build a new administrative capital and abundant communities to face the rapid increase of urbanization. The government is adopting an enormous project to build about 1.5 million residential units of which nearly 80% will be built by private sector (Ministry of Housing, 2016). Hence, the findings of this study will be helpful in producing indicators to policymakers for assessing city societal changes that may occur throughout the 21st century.

1.2 Methodology

The study focuses on social sustainability in the neighborhood scale. Hence, the study relies on relatively modern zones for the following reasons: (i) The residential neighborhood concept was not being revealed throughout the Egyptian urban policy until the 1960s, with the establishment of "Madinat Nasr" district. The neighborhood concept had not been crystallized with the public, cooperative or private sectors until the 1980s. (ii) The old zones in existing cities have a high degree of place attachment. This will harden the verification of the sense of community and the results may be misleading. (iii) The study does not choose new Egyptian cities for the inability of most of these cities so far to attract residents, due to the shortage and insufficiency of services and facilities (ElKholy, et al., 2014).

The paper has employed the case study method through selecting four neighborhoods at "New Maadi" zone in south of Cairo, which is one of the new zones that includes a reasonable part of the urban extension of Cairo. Most of this extension has been implemented by the private sector in the last three decades. Also, it will be more appropriate to select case studies from one district to stabilize the impacts of the demographic characteristics and facilities availability at district level. The urban characteristics of each neighborhood have been studied by assessing the layout planning elements. Interviews with residents have been conducted based on a structured questionnaire to evaluate their perception towards the sense of community domains. Then, the correlation between these domains and neighborhood characteristics have been measured statistically with SPSS software.

2 LITERATURE REVIEW

2.1 Social Sustainability

Sustainable design aims to fulfil the needs of today without damaging the resources of future generations. From this perspective, sustainable communities are places where people want to live and work, now and in the future (Agyeman, 2005). There are several approaches to social sustainability. The first posits a triad of environmental, economic and social sustainability. It is the most widely accepted model for addressing sustainability (Lang, 1987). The second, more recent approach suggests that all domains of sustainability are social including ecological, economic, political and cultural sustainability. In these terms, social sustainability encompasses all human activities (James, et al., 2015). Social sustainability in urban field could be defined as: a process for creating sustainable, successful places that promote wellbeing, by understanding what people need from the places they live and work in (Woodcraft, et al., 2011). This occurs when the formal and informal processes actively support the capacity of current and future generations to create healthy and livable communities (Adams, 2006). Therefore, social sustainability needs to be integrated with professional practice across all the disciplines involved in the creation of new communities, much like how standards of environmental sustainability have become widely acknowledged in recent years.

2.2 Sense of Community

Socially sustainable communities are equitable, diverse, connected, democratic and provide a decent quality of life. The social sustainability in this approach encompasses such topics as: livability, quality of life and social capital. However, the appropriate approach to deal with the social sustainability concept at the neighborhood scale is through sense of community

(James, et al., 2015), which this study adopted. Sense of community is a concept in urban sociology, which focuses on the experience of community rather than its planning, formation or other features. It is the residents' feelings, perception and attitudes about community and others (Magrab, 1999; Talen, 1999). Sense of community can be defined as: the feeling that members have of belonging, other members in the community, and a shared faith that members' needs will be met through their commitment to be together (McMillan, et al., 1986). Buckner conceptualizes sense of community as a collective-level attribute, equivalent to "social sustainability," which has three dimensions: place attachment, social interaction and community identity (Buckner, 1988). The sense of community literature has not generally focused on the urban area. However, Kim has proposed an effective framework to address this gap between sense of community domains and neighborhood design (Kim, 2001). The proposed framework of this paper has been based on Kim's framework with some adaptations to fit the local case in Egypt. The study framework has identified three domains; *Place attachment*, *Social interaction* and *Community identity*. Each of these domains consists of a group of components that have been examined through a series of suggested relating questions and will be fully described in the following sections.

2.2.1 Place attachment

One of the principal dimensions of social sustainability is place attachment or neighborhood cohesion among residents. Place attachment is claimed in theory and policy to contribute to strong, fair and just societies for present and future communities (Lister, 2000). Place attachment concept refers to residents' emotional bonding or ties to their community. The sense of feeling at home in one's community. Place attachment can be defined as: the effective positive bond between a person and a place that embodies an emotional content. More specifically, place attachment refers to a strong tendency of that person to maintain closeness to such a place (Hidalgo, et al., 2001). A positive sense of attachment to a place is considered a dimension of social sustainability because it is an integral component of people's enjoyment of the neighborhood in which they live (Christie, et al., 2003). Accordingly, place attachment can be expressed through four components illustrated in the following subsections.

2.2.1.1 Sense of connectedness: Residents feel attached to their community when they feel it is "their home" not just a place to live, when they have strong ties to their community (Lalli, 1992). These feelings about attachment and bonding to the neighborhood could be examined by three questions: *Q. 1-Do you think of this neighborhood as your "home" or just a place to live? Q. 2-Do you have strong ties to your neighborhood? Q. 3-Do you intend to leave this neighborhood in the near future?*

2.2.1.2 Sense of ownership: When residents feel, they have a sense of control over their homes or community. A sense of ownership can increase place attachment (Hummon, 1992). The home ownership is positively related to attachment feelings. Home owners are more attached to their neighborhoods than renters. This sense could be examined by a single question: "*Q. 4-Do you own your residential unit, or you rent it?*".

2.2.1.3 Long-term integration: Long-term residence leads to long-term social integration into the local area. Such integration creates an emotional bond between residents and their homes and community (Hummon, 1992). This could be examined by this question: "*Q. 5-How long have you been living in this neighborhood?*".

2.2.1.4 Community satisfaction: Satisfaction with housing environment is a significant indicator of quality of life. This satisfaction affects positively the overall feelings toward residents' life (Schumaker, et al., 1990). Community satisfaction can be approached when residents find their homes and community are satisfactory. In this case, residents are likely to experience a strong community attachment (Zaff, et al., 1998; Mesch, et al., 1998). This satisfaction could be measured by a direct question: "*Q. 6-How satisfied or dissatisfied are you with this neighborhood as a place to live?*" (Kim, et al., 2004).

2.2.2 Social interaction

Social interaction and social networks are consistently described as integral aspects of social sustainability. Without social interaction, people living in a given area can only be described as a group of individuals living separate lives (Forrest, et al., 2001; Dempsey, 2006). Social network could be defined as: a specific set of linkages among a defined community. The characteristics of these linkages could explain the social behavior of the involved persons. Social interaction analysis looks at the overall structure of ties, and the content of transactions regarding the spatial scale. Integration with neighbors, residents living in the neighborhood are the main social features which affecting the neighborhood quality (Miller, et al., 1980). Through social interactions residents get to know each other, and gain a sense of belonging in the community (Bridge, 2002). The relationship between neighborhood and social network has two points of view: (i) Neighborhood fosters the development of social networks through interaction in local public space, which network supports the importance of location and neighborhood (Fischer, 1982); (ii) Social networks are liberated from neighborhood. The local ties create only a small minority of people's active social networks. The neighborhood is not very important in terms of social networks. (Wellman, 1979). Thus, social interaction as a domain of sense of community consists of three components illustrated in the following subsections.

2.2.2.1 Neighboring: Interactions with residents who live in the same building (Glynn, 1986). Neighboring could be examined by three questions: *Q. 7-To what extent do you have a social contact with your neighbors? Q. 8-To what extent do you have some friendly relations with your neighbors? Q. 9-How often do you visit or host your neighbors?*

2.2.2.2 Casual social encounters: Informal social contact between residents who live in the neighborhood and are not neighbors. Such social networks can range from weak, such as recognizing someone by sight, to strong, including close friendship. Weak networks or ties can be as important as strong ties, particularly in relation to the size and nature of a neighborhood (Khermouch, 1995; Skjaeveland, et al., 1996). This interaction could be examined by the following question: "*Q. 10-To what extent do you have a social contact with neighborhood residents who are not living in the same building?"*

2.2.2.3 Community participation: Interactions about community issues or engagement in community problems and related activities (Zaff, et al., 1998). The network of family and neighbors up to participate in wider networks, such as associations and voluntary groups. This participation includes the interaction of the individual and community groups to engage in self-determination, and influence decision-making processes concerning public affairs. Participation in organized activities is widely considered to contribute positively to community sustainability (Mousavi, 2006). This interaction could be examined by answering the following questions: *Q. 11-How much do you care about solving your building or neighborhood problems? Q. 12-To what extent would you like to be a manager of your*

building? Q. 13-Have you or been a member of boards, association trustees or parents council of your children school?

2.2.3 Community identity

Community identity could be defined as: the public identification of a specific physically bounded community with its own characters. The local features of built and natural environment characterize the physical identity of the place, which affects residents' feeling towards this place. The built environment and the sense of place attachment are shared by residents of a particular neighborhood, and together create its 'own order, its special ensemble, which distinguishes it from the other places (Reed, 1983; Davidson, et al., 1986). The sense of community identity often turns the residents' attitudes toward positive actions such as sense of responsibility and involvement for the care of the common environment (Lewicka, 2010). It is hypothesized that community identity engenders by three components illustrated in the following subsections.

2.2.3.1 Sense of congruence: Congruence or compatibility means a "good" fit (i.e., this is my kind of community). This sense exists when the neighborhood facilitates people's lifestyle (Kaplan, et al., 2004). Congruence could be expressed by a sense of homogeneity, intimacy and compactness (Robinson, et al., 1995). This sense could be examined by the following question: "*Q. 14-Do you feel that your neighborhood is compatible with your life style?*"

2.2.3.2 Sense of uniqueness: Uniqueness or distinctiveness means the community is "being different" from others through associating with a group or a place (Twigger-Ross, et al., 1996). This sense could be examined by two questions: *Q. 15-Do you feel that your neighborhood is unique or different? Q. 16-Are you proud with living in this neighborhood?*

2.2.3.3 Sense of continuity: Physical properties of community maintain a link between residents' past and present. Residents feel attached to their community when it reminds them of their traditions and familiar environmental characteristics (Giuliani, 1991; Lalli, 1992). This sense could be examined by answering this question: "*Q. 17-Do you feel this neighborhood corresponds with your familiar environment?*"

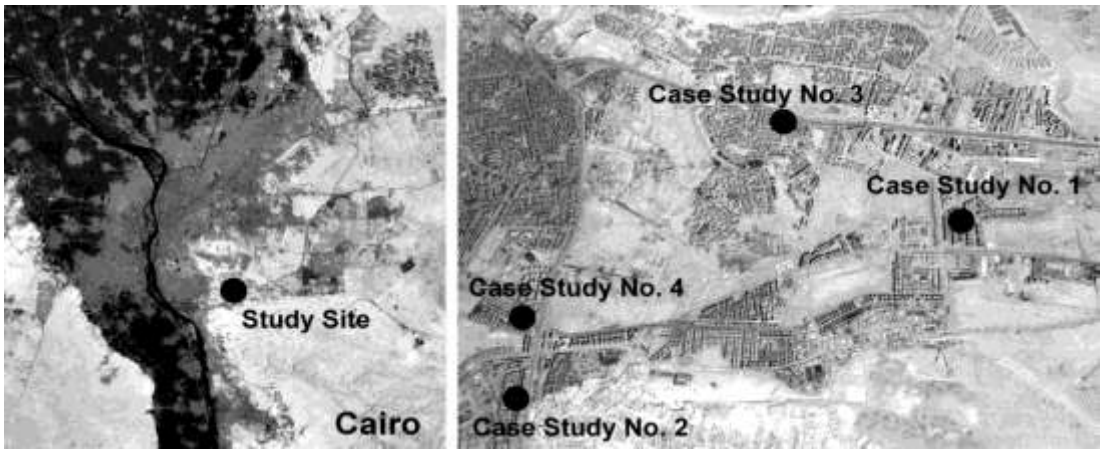
3 METHOD

3.1 Study Site: New Maadi

Maadi or *Al-Ma'adi* is a suburban district located in south of Cairo, on the east bank of the Nile, about 12 km from downtown Cairo. The total area of the district with its extensions is about 26 km^2. Maadi was Planned in 1905 by Alexander J. Adams. It was residence of wealthy elite Egyptians in addition to the British community in Cairo (Beattie, 2005). The demographic structure had changed during the fifties as most of residents were belonging to the middle class. The district extended slightly to south and northern west. With rapid population growth, Maadi extended significantly during the eighties to the east towards the desert. This extension known as *"New Maadi", although it belongs to three administrative divisions: Maadi, El-Khaleafah and El-Basatean*. The extension plan relied on establishing residential neighborhoods integrated with services, In addition of setting commercial, administrative, recreational facilities and light industry zone. Consequently, the urban fabric has consisted of multiple and diverse residential neighborhoods. Although further away from the center of Cairo, Maadi with its extensions is oversize of services, and it is home for more sufficient of various facilities.

The study chose New Maadi district as a study site because it has many features that distinguish it from other urban extensions of Cairo. These features can be summarized as follows: (i) New Maadi is a major planned zone. No unplanned or unsafe areas have been detected. Also, the district includes plenty of residential neighborhoods, which were built from the eighties till now, by public or private sectors. Thus, it is mostly an illuminating zone that could represent the concept of neighborhood evaluation. (ii) The district is considered as a one of most developed zones in Cairo, with a population about 224 thousand per 2017 Census (CAPMAS, 2018), and urbanization rate of 80%. Also, it is the least densely populated district in Cairo. with a population density 8350 inhabitants/km^2, compared with nearly 16 thousand of Greater Cairo (Ministry of Housing, 2016; GOPP and UN Habitat-Egypt, 2013). (iii) The residents' characteristics such as; social, economic, or cultural aspects are almost uniform for the whole district. Most residents are affiliated to the middle class, which is more aware of dealing with the surrounding environment. (iv) The existence of sufficient and diversified services and facilities in the district fixes the impact of district services availability for the whole study site. Neighborhoods of the four case studies were deliberately chosen so that they are clearly different from each other in development periods and physical characteristics.

Figure 1. Satellite image for study site and location of the case studies



3.1.1 Case study No. 1: Bitcho American city

The neighborhood was built in 2008 by the private sector as an investment residential project. The project was characterized by its low prices, which is reflected negatively on some facilities availability. The layout design is weak and lacks creativity, as well as the internal roads network. For the facilities, the neighborhood is located close to a schools' compound with walking distance no more than one km. There is an excessive availability of commercial services due to full utilization of the residential buildings' ground floor as small retail stores and cafés. Also, the neighborhood is close to a large mall (Carrefour), which includes multiple commercial and recreational facilities. There is no common green or children's play areas in the neighborhood.

Figure 2. Layout and general view of case study No. 1: Bitcho American city

3.1.2 Case study No 2: Emtedad Al-Amal

The neighborhood was built in 2001 by the public sector as a cooperative housing project for police officers' families. The project was characterized by its low prices as the previous case study. The layout design is acceptable, as well as the internal roads network design. The shape of residential groups is clear through the layout, but it is not reflected on the ground. For the facilities, the neighborhood lacks to educational services significantly. There are no schools in the neighborhood, and the nearest school located within walking distance about 1.7 km. The commercial facilities are more sufficient due to the utilization half of the ground floor of residential buildings as small retail stores and cafés. The neighborhood includes some common green areas, but there are no children's play areas.

Figure 3. Layout and general view of case study No. 2: Emtedad Al-Amal

3.1.3 Case study No 3: Al-Mearag

The neighborhood is a part of large group of neighborhoods, which was built in 2000 by the public sector as an investment residential project. The layout design is good and have some creativity, as well as the internal roads network. The shape of residential group is not clear through the layout. For the facilities, there are three schools distributed around the neighborhood with walking distance no more than 600m. The commercial facilities are sufficient through a central shopping center. The recreational facilities are available through some scattered cafés. Also, the neighborhood is next to a large mall (Carrefour), which includes multiple commercial and recreational facilities. The neighborhood includes many common green areas, but there are no children's play areas.

Figure 4. Layout and general view of case study No. 3: Al-Mearag

3.1.4 Case study No 4: Nerco

The neighborhood was built in 1993 by the public sector as an investment residential project. The layout design is good and have some of creativity, as well as the internal roads network. The shape of residential groups is clear through the layout, but it is not reflected on the ground. For the facilities, the neighborhood includes a central school with walking distance no more than 300m. The commercial facilities are available well in the neighborhood through a central shopping center. The recreational facilities are available through some scattered cafés. The neighborhood includes many green areas, but there are no children's play areas.

Figure 5. Layout and general view of case study No. 4: Nerco

3.2 Survey Method

The field surveys were conducted in autumn of 2016. The study adopted two simultaneous procedures, the first is examining physical characteristics of the neighborhood through observation and field studies. These characteristics were evaluated and assessed through the following features: (i) *Neighborhood size*: neighborhood area, total number of residents and residential density; (ii) *Land uses*; (iii) *Facilities evaluation* based on availability, proper location and walking distance, through the researcher perspective using descriptive method which relies on a Likert scale[1]; (iv) *Residential building size*: average number of building inhabitants.

The second procedure is evaluation of inhabitants' perception of the sense of community domains. This is accomplished through personal interview with sample of residents. Information and feedback from many individuals were incorporated in the design and tuning of the survey. Access to the residents at study sites was gained over an extended period involving visits and debates with members of the boards of trustees, and property management personnel at the sites. A reasonable proportion of the interviews were conducted in the participants' apartments. The rest of interviews were conducted in the cafés or beside mosques after Friday prayer. The interviews lasted between 30 to 60 minutes.

The interview technique using a structured questionnaire, which is divided into four sections, the first section is related to the demographic data of residents. The other three sections are initially related to sense of community domains with seventeen questions. To avoid bias resulting from questionnaire design, the questions were constructed to be direct, simple and familiar to the respondents. Most questions begin with an inception phrase "To what extent". Nevertheless, some explanations by the interviewers were expected to clarify certain points. Each questionnaire was recorded through SPSS software, which generated frequencies and percentages of respondents' characteristics and mean scores of their satisfactions.

3.3 Study Participants

1 - The quality level evaluation was measured on a five-point scale, ranged from 1 = very weak, 2 = weak, 3 = neutral or acceptable, 4 = good and 5 = excellent.

The population sample has been selected randomly using the systematic selection of adult inhabitants, who live in the four neighborhoods for a period not less than one year. The sample size was 174 families, which were sampled with varying numbers in each case study, in proportion to the neighborhood residents. The demographic study of the four cases showed that there is no significant difference between the residents, which conforms with the study hypothesis in constancy of residents' characteristics (See Table 1).

Table 1. Demographic characteristics of the four case studies

Characteristics	Case Study No. 1 Bitcho	Case Study No. 2 E. Al-Amal	Case Study No. 3 Al-Mearag	Case Study No. 4 Nerco	General Mean
Mean of family's members	4.3	4.2	4.2	4.1	4.2
Mean of parents' age	39.5	43.1	41.5	44.7	42.2
Mean of children' age	9.3	9.7	9.6	10.2	9.7
Mean of residents' age	22.4	23	22.4	24	23

4 DATA ANALYSIS AND DISCUSSION

4.1 Neighborhood Characteristics

The results of neighborhoods characteristics were obtained as shown in Table 2. The inhabiting date of case studies varied from 1993 to 2008, which ranged neighborhoods age from 9 to 24 years, with an average age of 16.5 years. This figure agrees with the study hypothesis of selecting new established neighborhoods. The establishment conditions for each neighborhood differed from cooperative housing, investment or low-cost housing. The neighborhoods area varied from 132 to 197 thousand m^2 with an average about 162 thousand m^2, without significant variation between areas. The approximate total residents of the four cases ranged from 5700 to 20 thousand, which contradicts the principles of Perry's unit that determine the neighborhood size between 5,000 to 9,000 residents (Perry, 1998). The residential density ranged from 37 to 102 inhabitants/km^2, which gave a significant classification of cases, to high and low-density neighborhoods, and reflects the lack of specific planning policy that deal with urban extensions.

Table 2. Neighborhood characteristics of the four case studies

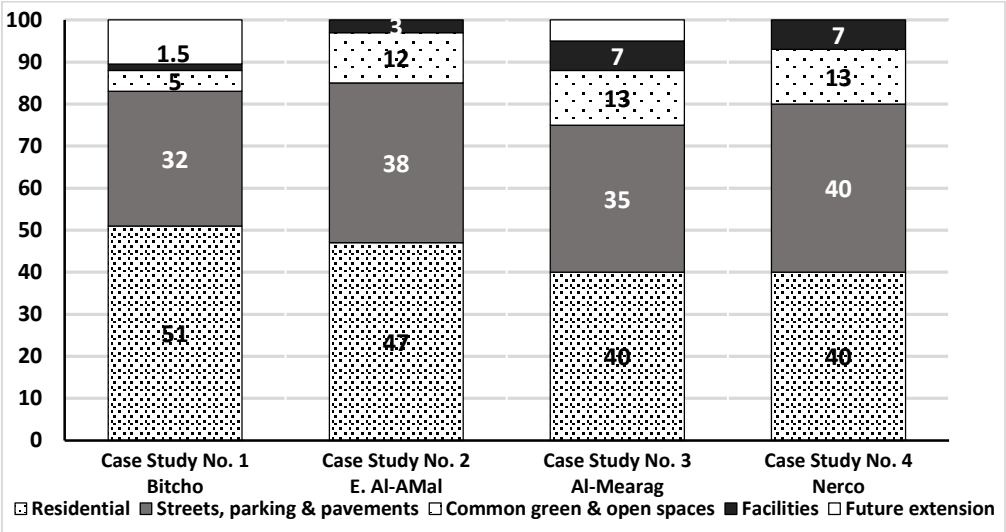
Neighborhood characteristics	Case Study No. 1 Bitcho	Case Study No. 2 E. Al-Amal	Case Study No. 3 Al-Mearag	Case Study No. 4 Nerco
Neighborhood size				
Date of Inhabiting	2008	2001	2000	1993
Age of neighborhood in 2017	9	16	17	24
Area of the neighborhood (1000 m^2)	197	170	132	150
Approximate total of residents	20000	15000	5700	6000
Residential density (inhabitants/km^2)	102	88	43	37
Area of land uses (1000 m^2)				
Residential area	100	80	53	60

Streets, parking and pavements area	63	65	46	60
Common green and open spaces area	10	20	17	20
Facilities and services area	3	5	10	10
Future extension	21	0	6	0
Facilities evaluation				
Educational facilities	2	1	4	4
Commercial facilities	4	3	4	4
Amenities and recreational facilities	1	1	3	2
Residential building characteristics				
Total of residential buildings	148	114	154	70
Average number of building stories	11	7.1	6	5
Mean of residential units at building	45	32.5	11	19
Residential building size: Mean of building residents	189	136	45	80

The land uses percentage were clearly mostly similar in the case studies (See Figure 6) as follows: Residential area ranged from 40% to 51% with an average of 44%. Streets, parking and pavements area ranged from 32% to 40% with an average of 36%. Common green and open spaces area ranged from 12% to 13% for three cases, but in case No.1 the percentage was 5% with a significant disparity with other cases. The percentage average of facilities and services area was about 7% for case No. (3) and (4), and about 2% for cases No. (1) and (2) with a significant disparity with the former two cases. Because many services are within the scope of residential buildings, such as stores and cafés which are in the ground floors, or schools that are located outside the neighborhood boundaries. The disparity percentage of the common green and services areas are reasonable because increasing in residential area always occur deduction from these uses.

The neighborhood facilities assessment based on availability, proper location and walking distance, had a significant disparity related to the residential density (See Table 2). The low-density neighborhoods always have a school within acceptable walking distance. The high-density cases have no schools at all, depending on closeness of near schools regardless of the walking distance. The commercial facilities were characterized by availability and good distribution in all cases. The recreational facilities were very weak in most cases, except in case study No. 3 which is next to a mall that includes multiple commercial and recreational facilities. The residential group concept is unclear, either in layout or on the ground, which means it was not taken in consideration while planning. Also, all the cases had not any children's play areas. Whereas the residential groups and children's play areas are key factors to achieve effective communication and social sustainability among the residents.

Figure 6. Percentage of land uses of the four cases studies



The residential buildings characteristics had a significant discrepancy between the case studies in all results. The total residential buildings in the neighborhood ranged from 70 to 148 buildings. The mean of residential units in the building ranged from 19 to 45 units. The average number of building stories ranged from 5 to 11. The residential building size which could be expressed by the mean of building residents ranged from 80 to 189, with a significant margin between high and low-density neighborhoods. The average of building size in the high-density neighborhoods was 162.5 residents, compared with 62.5 residents in low-density neighborhoods.

4.2 Residents' Perception to Sense of Community

To measure the sense of community through its three domains, a survey is conducted using the questionnaire of seventeen questions. Thirteen questions were answered through Likert scale[1]. The answers are analyzed depending on central tendency through the mean scores. The dispersion is measured by the standard deviation to deduce the strength and significance of the answers. Four questions (Q. 1, Q. 3, Q. 4 and Q. 13) have a special nature, where their answers do not exceed two replies. Hence, they need different techniques in the expression through Likert scale. Thus, the dispersion rated through the frequency to deduce the strength and significance of the answers (See Table 3 and Appendix A).

Table 3. Values of sense of community domains and components of the four case studies

Domains and components	Case Study No. 1 Bitcho	Case Study No. 2 E. Al-Amal	Case Study No. 3 Al-Mearag	Case Study No. 4 Nerco	General Mean
Sense of connectedness	2.25	2.68	3.58	4.03	**3.14**
Sense of ownership	3.20	2.80	3.40	4.40	**3.45**
Long-term integration	3.65	4.60	4.90	4.90	**4.51**
Community satisfaction	3.05	3.25	3.90	4.70	**3.73**
Place attachment	**3.04**	**3.33**	**3.95**	**4.51**	**3.71**
Neighboring	1.32	1.53	3.02	3.30	**2.29**

1 - The level of approval or satisfaction is measured on a five-point, ranging from 1 = strongly disagree or very unsatisfied, 2 = disagree or unsatisfied, 3 = neutral, 4 = agree or satisfied and 5 = strongly agree or very satisfied.

Casual social encounters	1.10	1.25	2.8	2.95	**2.03**
Community participation	1.18	1.27	1.93	2.25	**1.66**
Social interaction	**1.20**	**1.35**	**2.58**	**2.83**	**1.99**
Sense of congruence	2.15	2.35	3.15	3.65	**2.83**
Sense of uniqueness	1.75	1.65	2.90	3.98	**2.57**
Sense of continuity	1.75	1.85	1.75	2.35	**1.93**
Community identity	**1.88**	**1.95**	**2.60**	**3.33**	**2.44**
Sense of community	**2.04**	**2.22**	**3.04**	**3.58**	**2.72**

4.2.1 Measuring place attachment

Place attachment value was measured with its four components as follows: Sense of connectedness value through the three questions (Q. 1 to Q. 3) ranged from 2.25 to 4.03, with a general mean 3.14. The discussion with residents showed that the important ties bound them to the neighborhood are not emotional ties. They are close to work place, children's schools or the family and relatives.

Sense of ownership was measured by question (Q. 4). The mean value ranged from 3.2 to 4.4, with a general mean 3.45. It was expected that the residents will be more attached to the neighborhood when they own their residential units, but many residents determined that they prefer to rent the residential unit instead of owning it. This alternative gives them the relocating flexibility from place to another. When they feel satisfied with the built environment, they will decide to buy a residential unit in the neighborhood.

Sense of long-term integration was measured by question (Q. 5). The mean value ranged from 3.65 to 4.90, with a general mean 4.51. This value reveals that the selected participants are residents who have spent more than three years in the neighborhood.

Community satisfaction was measured by question (Q. 6). The mean value ranged from 3.05 to 4.7, with a general mean 3.73. Thus, satisfaction is the essential component which affect the place attachment. The residents are attached to their neighborhood when they are satisfied with their built and physical environment.

The values of place attachment through its four components ranged from 3.04 to 4.51, with a general mean 3.71. Place attachment comes at the first rank of sense of community domains which reflects satisfied residents' feeling. This domain is the most influential on the sense of community. It seems that it is the principal domain that could deal with the neighborhood scale.

4.2.2 Measuring social interaction

Social interaction value was measured by its three components as follows: The mean of neighboring value through the three questions (Q. 7 to Q. 9) ranged from 1.32 to 3.30, with a general mean 2.29. This value is an indicator that the residents do not have a social contact with others even on the residential building scale. some residents pointed that they do not know the names of their neighbors who live in the same floor, while others do not know their figures, while others do not know if the apartments in the same floor are occupied or not. The interviews showed lack of interest among residents to exchange visits

with their neighbors, due to the lack of time. However, there are some visits between neighbors usually occurs in the morning among unemployed women or house wives, especially the elderly. Although this component is affected by the neighborhood characteristics, but it is also negatively related to the residential building size. Thus, the basic factor affecting this component is the residential building size.

Casual social encounters value was measured by question (Q. 10). The mean ranged from 1.10 to 2.95, with a general mean 2.03. The interviews revealed that this component varies according to gender as follows: The males meet each other's at neighborhood mosque during Friday prayers, the cafes which located in the neighborhood especially during watching football games or during parking. For females while shopping at neighborhood shops, receiving their children from school or during waiting school buses.

Community participation was measured by three questions (Q. 11 to 13). The mean value ranged from 1.18 to 2.25, with a general mean 1.66. This component is one of the lowest values, which reflects a significant disinterest from the residents towards the community participation in general. Whether the occupants' association or school parents' council. Unfortunately, this could be one of the Egyptian contemporary society attributes that requires further social and psychological researches.

The value of social interaction through its three components ranged from 1.20 to 2.83, with a general mean 1.99. Social interaction comes at the last rank of sense of community domains which reflects unsatisfied residents' feeling. This domain is the less influential on the sense of community on the neighborhood scale. This result agrees with Wellman's (1979) vision which determines that social networks are liberated from neighborhood, and the neighborhood is not very important in terms of social networks. However, it seems that social interaction is the principal domain that could deal with the residential building scale more than the neighborhood.

4.2.3 Measuring community identity

Community identity value was measured with its three components as follows: Sense of congruence was measured by question (Q. 14). The mean ranged from 2.15 to 3.65, with a general mean was 2.83, which determines that the residents feel greatly that the neighborhood or district characteristics are generally compatible with their lifestyles, and matched with their cultural and social backgrounds.

Sense of uniqueness was measured through two questions (Q. 15 & 16). The mean value of ranged from 1.75 to 3.98, with a general mean 2.57. This determines that residents perceive their neighborhood or district to be different and unique. From their vision, they are proud to live in their neighborhood and district.

Sense of continuity was measured by question (Q. 17). The mean ranged from 1.75 to 2.35, with a general mean 1.93. This reveals that the neighborhood design does not reflect this sense.

The value of community identity through its three components ranged from 1.88 to 3.33, with a general mean 2.44, which reflects neutral residents' feeling. This domain is associated basically with residents' cultural aspects through their vision to urban community, and their

harmony with the neighborhood characteristics. It seems that this domain is related to the district or zone scale more than the neighborhood scale.

4.2.4 Measuring the total value of sense of community

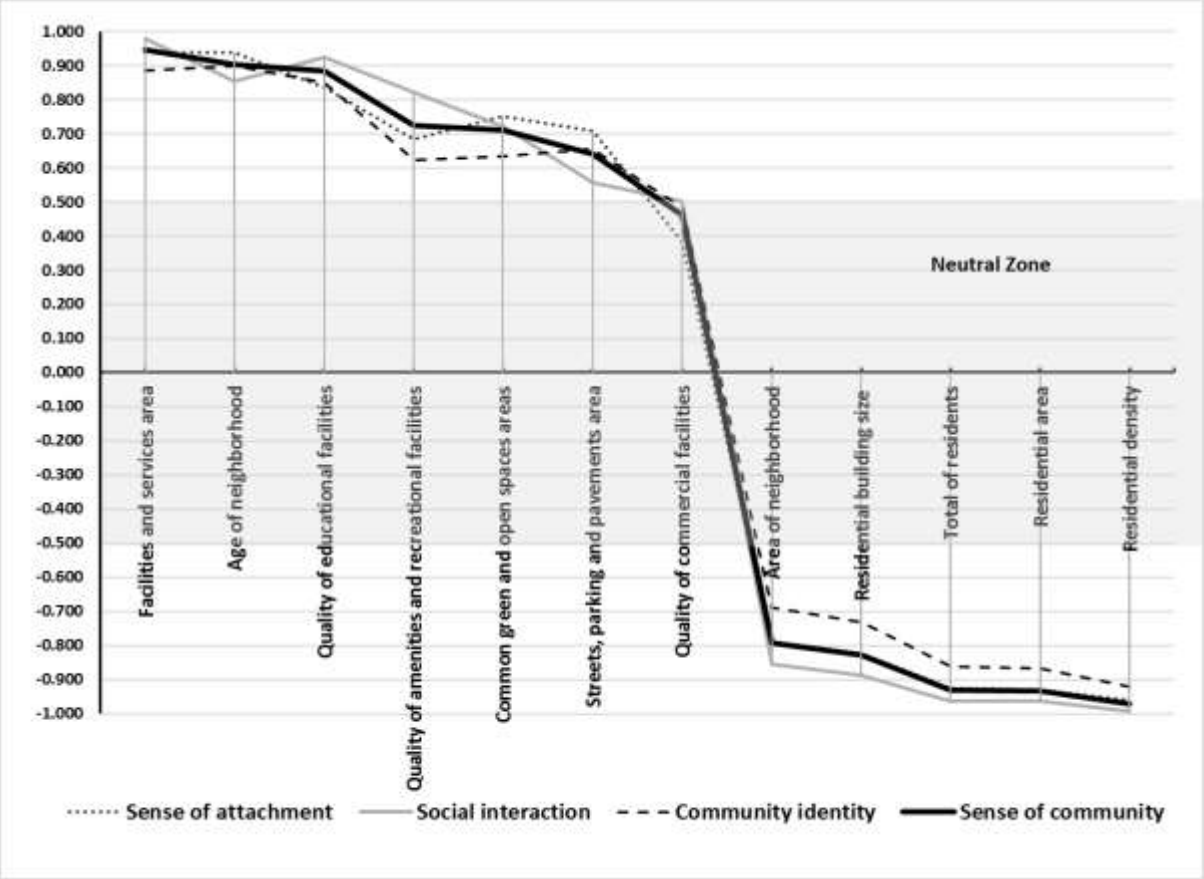
The value of sense of community was measured through the mean of its three domains. The value ranged from 2.04 to 3.58, with a general mean of the four cases 2.72. This reveals that the residents' feeling to sense of community is neutral concordant to Likert scale. The domains order related to general mean are: place attachment, community identity and finally social interaction.

4.3 Correlations Between Sense of Community and Neighborhood Characteristics

Correlation measures the degree of association between two variables. The correlation between sense of community domains and neighborhood characteristics is measured by Pearson's bivariate correlation coefficients and two-tailed significance test (See Figure 7 and Appendix B).

The neighborhood characteristics that positively influence the sense of community are six characteristics. One of them related with the neighborhood age with value 0.902. This is reasonable because whenever neighborhood age increase, its facilities and services will increase too. Thereafter, neighborhood social status will stabilize causing the residents to be attached more to their neighborhood. The rest of characteristics positively influence the sense of community are related to the quality of facilities and services as follows:

Figure 7. Relationship between sense of community domains and neighborhood characteristics



- Facilities and services area is estimated with value 0.946, which indicates that the facilities availability is one of the essential elements that lead to enhance sense of community.
- Quality of educational facilities assessment with value 0.883. Most of residents do not prefer to send their children to far schools, as it is a burden on them to deliver their children to and from the school, or depending on school bus which creates additional financial expenses.
- Quality of amenities and recreational facilities assessment is measured with value 0.726. Although the most recreational facilities in the case studies do not exceed a few scattered coffee shops and Internet cafés, many residents have demanded the necessity of availability for more recreational facilities. Also, common green and open spaces areas are estimated with value 0.712, which is consider as part of amenities and recreational facilities. Many residents have pointed for necessity to increase these areas.
- Streets and parking area is estimated by value 0.640. Most of case studies' residents have private cars. They need to find a parking space close to their houses. Especially with low capacity and weak design of the garages that could exist down the residential buildings. This confirms that the sustainability domains are generally integrated. The problem of overcrowding traffic and current terrible state of public transport are affecting someway the social sustainability.

Neighborhood characteristics negatively influencing the sense of community are five items. All of them could be combined in a single frame which is residential density. These items are

residential density with value -0.970, residential area with value -0.934, neighborhood area with value -0.792, number of residents with value -0.930 and residential building size with value -0.829. That means whenever the neighborhood residential density increased, the residents' perception of sense of community will decrease. This is clearly obvious in the high-density cases where the average value of sense of community is 2.13, while in low-density cases is 3.31.

The neighborhood characteristic that does not have any influence on the sense of community, as a neutral relationship is the commercial facilities with value 0.463. The evaluation of availability and distribution of commercial facilities in the four cases ranged from 3 to 4, which is a high evaluation rate. This is due to the direct link between the commercial services and the private sector, especially these services do not require large investments, and have a rapid capital rotation. Unlike the educational services that need massive capitals, its responsibility distributed between the governmental and private sectors.

The relationship between sense of community domains were extrusive close association, which is illustrated in Figure 7. The correlation values between the neighborhood characteristics and the three domains were very convergent to the correlation values between the neighborhood characteristics and total value of the sense of community, which means that the residents feel a sense of each domain with the presence of other domains of sense of community.

5 CONCLUSIONS

With the rapid growth of urbanization in Egypt, there is a pressing need to better understand which factors contribute to life satisfaction for people living in urban areas. This paper adds to our understanding of the approaches through which the neighborhood built environment can influence social sustainability, and demonstrates the importance of people's perceptions of their neighborhood. The study's key findings are stated in detail below: -

1. There is a fair degree of residents' perception of sense of community domains at the study site level. Thus, the new neighborhoods which have recently been built in "New Maadi," have achieved a reasonable degree of social sustainability.
2. The study determined residential neighborhood characteristics that contribute to the achievement of social sustainability in the Egyptian communities. The essential characteristics that have positively affected the sense of community values have been the availability and efficiency of services and facilities, and age of the neighborhood. On the other hand, the essential characteristic that has had negative affect on the sense of community has been the high residential density.

6 RECOMMENDATIONS

Through the study findings, it could be determined that the lack of integration among urban development parties has been one of the main reasons that led to the numerous urban problems in Cairo, including absence of social sustainability concepts. Hence, the study suggests the following recommendations:

1. Local governments and authorities should determine the neighborhood size to not exceed 10,000 residents. Also, the residential density and land usage percentage must be carefully specified before permitting and authorizing any community or housing project, and the neighborhood must include a school and shopping center.
2. Social infrastructures like schools, shops, neighborhood parks, and local transport must be provided at an early stage in the life of the communities. New communities are often driven by private sector developers who depend on selling the residential units to provide the capital for amenities and other facilities. Therefore, the compromising between developers and local government is necessary to determine who should fund and provide local amenities. Despite contractual agreements and planning levies to fund the facilities, many new communities wait for several years before local authorities and developers meet commitments to provide schools and community spaces.
3. The planners and architects should realize that the best way to increase social sustainability in neighborhoods is by depending on the residential group, by improving the common areas between the residential buildings to afford social activities, and by planning well outdoor spaces to facilitate residents' daily informal contacts and appropriate space to interact.

Finally, this paper describes a social sustainability measurement framework that can be conducted at other local and regional communities.

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Appendix A. Questionnaire outputs of the four case studies

Question code	Case Study No. 1: Bitcho					Case Study No. 2: E. Al-Amal					Case Study No. 3: Al-Mearag					Case Study No. 4: Nerco				
	N	Mean	SD	Frequency		N	Mean	SD	Frequency		N	Mean	SD	Frequency		N	Mean	SD	Frequency	
				1	5				1	5				1	5				1	5
Q.01*	81	2.80		55	45	48	3.20		46	54	22	3.80		31	69	20	4.20		18	82
Q.02	79	2.15	0.671			47	2.65	0.489			23	3.15	0.366			21	3.50	0.688		
Q.03*	81	1.80		79	21	49	2.20		69	31	23	3.80		29	71	21	4.40		14	86
Q.04*	80	3.20		46	54	49	2.80		54	46	22	3.40		42	58	21	4.40		14	86
Q.05	79	3.65	0.875			48	4.60	0.681			23	4.90	0.308			19	4.90	0.428		
Q.06	81	3.05	0.510			47	3.25	0.444			22	3.90	0.641			20	4.70	0.571		
Q.07	80	1.55	0.510			49	1.75	0.716			23	3.15	0.813			19	3.35	0.489		
Q.08	81	1.25	0.444			49	1.50	0.513			23	3.05	0.394			21	3.25	0.444		
Q.09	78	1.15	0.366			49	1.35	0.489			23	2.85	0.484			21	3.30	0.571		
Q.10	80	1.10	0.328			47	1.25	0.445			23	2.80	0.410			20	2.95	0.394		
Q.11	77	1.15	0.366			49	1.35	0.587			22	2.90	0.641			19	3.25	0.639		
Q.12	79	1.20	0.523			48	1.25	0.639			22	1.10	0.308			20	1.50	0.761		
Q.13*	81	1.20		94	6	49	1.20		95	5	22	1.80		82	18	21	2.00		77	23
Q.14	81	2.15	0.366			48	2.35	0.813			23	3.15	0.745			19	3.65	0.875		
Q.15	81	1.45	0.510			47	1.35	0.419			21	2.55	0.887			20	3.85	0.489		
Q. 16	80	2.05	0.759			47	1.95	0.394			21	3.25	0.444			21	4.10	0.447		
Q. 17	77	1.75	0.412			46	1.85	0.366			20	1.75	0.472			19	2.35	0.489		

* (Q. 01) *Do you think this neighborhood as your home or just a place to live?* The answer: just a place to live = 1, home = 5.

* (Q. 03) *Do you intend to leave this neighborhood in near future*? The answer: yes = 1, no = 5.

* (Q. 04) *Do you own your residential unit, or you rent it*? The answer: rent = 1, own = 5.

* (Q. 13) *Are you or were a member of boards, association trustees or parents' council of your children school*?". The answer: no = 1, yes = 5.

Appendix B. Correlation between sense of community domains and neighborhood characteristics

Sense of community domains / Neighborhood characteristics		Place attachment	Social interaction	Community identity	**Sense of community**
Age of neighborhood	Correlation	0.939	0.853	0.900	**0.902**
	Sig. (2-tailed)	0.06	0.15	0.03	**0.04**
Area of neighborhood	Correlation	-0.789	-0.855	-0.690	**-0.792**
	Sig. (2-tailed)	0.11	0.15	0.17	**0.05**
Total of residents	Correlation	-0.926	-0.962	-0.862	**-0.930**
	Sig. (2-tailed)	0.07	0.04	0.14	**0.04**
Residential density	Correlation	-0.961	-0.992	-0.921	**-0.970**
	Sig. (2-tailed)	0.04	0.01	0.08	**0.03**
Residential area	Correlation	-0.932	-0.963	-0.868	**-0.934**
	Sig. (2-tailed)	0.07	0.04	0.13	**0.05**
Streets, parking and pavements area	Correlation	0.709	0.556	0.656	**0.640**
	Sig. (2-tailed)	0.29	0.44	0.34	**0.06**
Common green and open spaces areas	Correlation	0.752	0.721	0.634	**0.712**
	Sig. (2-tailed)	0.25	0.28	0.37	**0.03**
Facilities and services area	Correlation	0.937	0.978	0.884	**0.946**
	Sig. (2-tailed)	0.06	0.02	0.12	**0.05**
Quality of educational facilities	Correlation	0.836	0.924	0.851	**0.883**
	Sig. (2-tailed)	0.16	0.08	0.15	**0.05**
Quality of commercial facilities	Correlation	0.384	0.502	0.483	**0.463**
	Sig. (2-tailed)	0.62	0.50	0.52	**0.54**
Quality of amenities and recreational facilities	Correlation	0.683	0.821	0.623	**0.726**
	Sig. (2-tailed)	0.32	0.18	0.08	**0.02**
Residential building size	Correlation	-0.822	-0.888	-0.733	**-0.829**
	Sig. (2-tailed)	0.18	0.01	0.07	**0.04**

* Correlation is significant at the 0.05 level (2-tailed).