Resilience Strategies in Neighborhoods

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Abstract. Today, cities and neighborhoods are subjected to unexpected events and crises that reach the neighborhood or the city to a limit with which it is difficult to return. The research addresses the resilience aspect in neighborhoods considering the measurement of the neighborhood is the effective measurement to build the resilience. The research problem about the emerged from the cognitive need to discover resilience strategies in neighborhood. Several previous literatures are shown and resilience strategies in neighborhood were reached in a general manner. Crises affect neighborhoods in various methods, and the response of neighborhoods to these crises depends on their especial abilities. The research assumed that the Iraqi neighborhoods have their own strategies that where verified through previous studies that addressed the changes and the alterations of Iraqi neighborhoods after year 2003. Where a theoretical frame that illustrated the most distinguished items and indexes of resilience strategies in the Iraqi neighborhoods, they are represented with three strategies: the response strategy, the adaptation strategy through the changes by adding exterior spaces for the housing unit or dividing them into smaller units, or perform functional changes on them. And the third strategy is transformation through bigger changes by destruction and reconstruction.

1. Introduction
Resilience, nowadays, became the new logo of our era, a complementary to the work of sustainability, which is through planning to long-term goals and specify the desired results. This is applied through resilience methods by certain strategies aim to preserve the performance of system function during pressure time and afterwards to achieve the results of sustainable development.

Residential neighborhoods are the intersection of social and economic life in a city, and its resilience is closely related to the people who form a community and a built environment in which they interact. The effects of shocks and stress appear sharply at the neighborhood level, which represents the smallest and most effective range in the city, it is also considered the best measure to shape the feeling of society, where the neighborhood community interacts with the place to be able to intervene and solve its local problems and implement diverse solutions, which may sometimes be innovative, transformative and inspirational in an appropriate manner.

Although crises affect residential neighborhoods in very differently, they respond within their own capabilities, which also depend on several factors, such as time and place. Previous proposals and literature addressed how residential neighborhoods respond to crises and pressure. Accordingly, the research problem showed that there is a knowledge gap about resilience strategies in residential neighborhoods and how to achieve them locally.
The research aims to develop a comprehensive theoretical framework for resilience strategies in Iraqi neighborhoods.

Therefore, the research methodology will be as follows:
- Defining the concept of resilience the adaptive preference.
- Clarify resilience strategies in general and resilience strategies in residential neighborhoods in particular.
- Review previous studies that addressed the changes and modifications in the Iraqi residential neighborhoods after 2003.
- Set a theoretical framework for resilience strategies in Iraqi neighborhoods after 2003.
- Conduct results, conclusions and recommendations.

2. Resilience

This item is organized as follows: first: clarify the history of resilience term through offering a brief description to its origin and the changed nature and range of this term along years. Second: present a linguistic and idiomatic definition for the resilience term.

2.1. The history of resilience term

The term of resilience has a long history. In his book On the Origin of Resilience, David Alexander showed that the origin of the concept is from the Latin (resilire) i.e. “to bounce”, The term evolved over time from literature and law in the seventeenth century to mechanics and child psychology in the nineteenth century. In general, the concept retained its original meaning "bounce". However, it reached its final form in the second half of the twentieth century when the concept of resilience in the social environmental sciences was established.

The turning point came in 1973 when the scientist CS Holling defined resilience in his paper as "a measure of the continuity of systems and their ability to absorb change and turbulence while maintaining the same relationships between populations or state variables." Later on, the idea of (dynamic balance) became clear due to its conceptual integration with social sciences and climate studies.

Holing's ecological paper 1973 about resilience of the ecosystems is the root of modern resilience by recognizing ecosystems as dynamic with multiple stable states where Holing used resilience to describe the ability of an ecosystem to continue functioning with the change. Then the resilience theory was expanded into a "way of thinking." [1] [2].

Later the term transformed when the relationship between social and environmental resilience developed into a wider understanding of community resistance. A resilient approach is a concept that deals with new requirements and uncertainties by "adopting the changes."

In light of the brief description of the origins of the resilience term, it is clear that:
- The term itself has moved among different disciplines, from literature and law to mechanics and psychology, then engineering, environment, to environmental and social sciences.
- The change of the nature of its understanding, from bouncing to the original state and focus on one state of stability and balance to the dynamic character and the continuation of function with balance, reaching to the resistance of society.

2.2 The concept of resilience

There are many methods to understand the term of resilience and its definition, where it was addressed from different aspects that led to a group of convergent and interrelated terms with it and as follows:

First - The term “resilience” appears according to Arabic and English dictionaries in several meanings. In Arabic dictionaries, the definition and meaning of resilience is from: folded an object, i.e. became flexible in solidity.

Resilience: [nature and physics]: the ability of the body to change its shape and size after removing the reason for the change has disappeared, or the body's ability to bend or bounce. As for the limit of
resilience in [nature and physics], it is the higher stress limit of what a flexible body can withstand without creating a permanent change in its shape. [3]

Resilience is the ability to recover from change or easily adapt to it [4], the ability to quickly recover from difficulties, and return to the original form [5], a property of materials that enables them to regain their original shape or position after bending, stretching, compression and softness [6].

**Resilience linguistically is determined by the ability to tolerate stress and the resulted change and the ability to recover by returning to the original shape.**

**Second** - this term has many meanings. Therefore, the interpretation used is often dependent on the field in which it is applied and it has been applied in many contexts and standards such as individuals or society, psychology, material engineering, safety systems, environmental systems, disaster risk management at the scale of settlements, cities and economies with their most modern meaning related to social-ecological systems. Due to that, the definitions of resilience varied, including:

- On the level of countries, the UNDP have defined resilience as the ability of state to face and recover the shock; the ability to absorb and confront the effect of the shock [7]
- At regimes level and their reaction to sudden events and shocks, the Resilience Alliance organization has defined it as the ability of the regime to absorb the disruption and reorganization while making change in order to maintain the same function, structure, identity and feedback [7]. The Intergovernmental Panel on Climate Change said: it is the "ability of the regime and its component parts to anticipate / absorb / accommodate / recover from the effects of a serious event in an effective and timely manner” [8].

It is “the ability of regimes to deal with a serious event, disturbance, responses or reorganization in such methods that keep their origin function, identity and structure, while also maintaining the capacity to adapt, learn and transform”. It is the regimes ability to reduce the chances of a trauma occurrence, or absorb the shock if it occurs [a sudden decrease in performance] and recover quickly after the shock (normal re-performance)[9].

The ability to deal with the effects of negative changes and shocks, therefore, this ability includes features such as mitigating a shock, returning to a pre-shock condition, evolving, adaptation and even transformation [8]. It is also the ability to absorb disturbances and impacts, such as severe weather events, and the ability to self-adapt to changes; it is the ability of the regime to withstand major disturbances and enables the general recovery implicitly when the system fails. However, in recovery the regime may or may not restore its original configuration. Rather, the regime can take on an entirely new arrangement, which may also be acceptable to stakeholders. It is the amount of disturbance that a regime can absorb while keeps the same attractive state or field. The ability of the system to adapt to changes, whether they were sudden or gradual, in the biophysical environment, social processes and contexts, drivers and economic resources [10].

**2. Resilience strategies in neighborhoods**

Resilience is actually a neutral feature that is not good or bad on itself, families can be very poor and very resilient, in order to survive. Resilience is not necessarily positively related to welfare, some families may be able to enhance their resilience but only at the expense of their welfare [8]. This point relates to the issue of “adaptive preference”.

**2.1 The concept of Adaptive Preference**

It is the dependent and reflexive process that people undertake to control their expectations and aspirations, as they attempt to overcome the deteriorating changes in living conditions . Resilience enhancement may occur with adaptive preference. A good example is when the head of the family moves his family to a little less expensive but less secure residential neighborhood in a city
(where the cost of rent is lower but the level of safety is lower as well), in order to cope with his recent job loss. Moving a family to a less expensive place increases their ability to cope with their new financial situation (which is considered a sign of resilience), but at expense of some elements of the family's welfare. Community as a whole (or most of its members) may become more flexible due to some project interventions but it is possible that within the society there will be some winners and some losers [8].

Change is for reducing the effects of shocks on the population in terms of their livelihoods and basic needs. This process reflects expanding the concept of resilience system from its relatively narrow focus on the ability of the system to rebound or return to balance after turbulence [confrontation or recovery], which was referred by Holling (1973) as “engineering resilience”. It means increasing absorptive capacity or continuity of individuals or families [i.e. coping strategy] that enables them to reduce the effects of external conditions on them to a more detailed concept that embraces the ability not only to bounce back but also to adapt and transform.

Therefore, in addition to the concept of absorptive capacity or continuity, adaptive capacity and transformational capacity are added to it. As indicated by Béné et al. (2012): as they are the three elements of resilience: absorptive, adaptive and transformative capacity as the three structural elements of an analytical framework that aims to a better understanding of what “resilience enhancement” exactly is, as shown in Figure [1]

![Intensity of change / transaction costs](image)

**Figure [1] Resilience strategies in neighborhoods [8]**

The outstanding point of the framework is the fact that resilience appears as a result of these three capacities not each individual capacity, and each of these capacities leads to different outcomes and responses: stability, progressive modification or transformative responses. The figure [1] suggests that these different responses can related [at least conceptually] with the different severity of the shock or change. The lower the severity of the initial shock, the more the family [individual, community or system] can resist it effectively, that is, absorb its effects without the consequences of its function, status or condition. The ideal outcome after the crisis is resistance, which means that resources have effectively disrupted stress, and therefore there is no functional defect, no matter how temporary it was. Individuals or systems benefit from resistance strategies on a daily basis, from the human immune system as one of the most effective resistance strategies known to exist, to pressure resistance strategies on a larger scale. Earthquake and fire-resistant buildings, for example, or redundant energy sources are just a few examples of measures that help individuals, communities or larger systems to prevent or resist disasters and the environment. [8].

Population coping strategies may include preventative measures to reduce the impact of the crisis or post-crisis measures, all of which aim to reduce vulnerability through various mechanisms using technology, social organization, economic relations and cultural arrangements.
However when absorptive capacity is exceeded the individual will practice his/her ability to resilient adaptation. This adaptation refers to various modification (additional changes) that people undergo in order to continue working without major qualitative changes in the function or identity of the structure. These additional modifications and changes can take many forms (such as adopting new lifestyles, changing practices, varying rules of livelihood, engaging in new social networks, etc.). These modifications can be single or as a group, and can take place at multiple levels (within the family, groups of individuals / households, society, etc.). These notations are significant since they lead to a series of effects. First, this means that adaptation at one level can affect or reduce an adaptation in another. However, this also means that adaptation is a continuous progressive process that is difficult to track or measure. In fact, although people make conscious decisions to adapt to their lives in many other cases some of these modifications are not deliberate or calculated.

This means that people may not be aware of how to adapt to varied circumstances or how to improve their work skills, people do not adapt to one specific pressure, but rather to a wide range of changes. The possibility to separate the multiple changes to which people respond is rare, and it unreasonable to try to do so. To further complicate the situation, as the adaptation of one household may be considered part of the adaptation strategy of the another one.

As in coping and resistance strategies of the poor people in the Korkal district of Dhaka who are exposed to the double vulnerability by climate change and poverty they are fanatical and social strategies as follows:

1. Modifications to the constricted physical environment: These may include making modifications within the housing unit, or the structure of the housing unit, or neighborhood-wide modifications such as sanitation facilities or sandbags.
2. Establishing food stores or keeping valuable materials that can be used when needed.
3. Diversifying sources of income through work.
4. Developing, social, support, networks, within, the, family, families or at the neighborhood level, by providing financial, material and emotional support.

Coping and resistance strategies work at different levels: at the level of individuals such as family, society (neighborhood) or institutions (city level or outside). Usually, cooperation outside the family (community level) or institution is necessary for coping and resistance strategies at the neighborhood level. [11]

Kelly & Steed 2004 study indicated that in many cases communities have to launch their own strategies to survive economically and socially. Local communities respond differently to change. These societies were able to reduce vulnerability by managing the change with strategies of collective confrontation and adaptation that they used. The study concluded that these strategies implemented by the community depended on the collective evaluation of the change event, the nature of the event and the characteristics of the community. [12].

Bouzarovski 2016 called it retrofit modifications that occur at the base level over long periods, which are largely creative and informal strategies that arise through the relationship between families and housing units inside the city neighborhoods as housing improvements and modifications to the residential location. They take the form of alternative urban practices from bottom to top by means of material changes as additions to the apartments over time, which are adaptations of the building structures of residential units in line with the daily needs of different family members. The change here takes gradual and deep-rooted processes.

Many inner city regions in Central and Eastern Europe host disproportionately a large number of low-income and poor individuals and families. The degree of transformation of residential buildings through
various types of adjustments depends on the internal characteristics of families such as income or education, in addition to the constructed environment structures: technical characteristics that facilitate or prevent the transformation of residential buildings. It has also been shown that families and individuals appreciate resilience differently, and may not necessarily behave in reasonably predictable ways when it comes to transforming their residential environment in response to externally generated pressures [13].

As for Crabtree and Kapoor 2012, they called it self-improvement processes carried out by the low-income population in a district in Mumbai, India, to cope with the housing crisis and adapt to it. The process of improvement will be through adding a new third level (upper floor) above the original housing unit block, to provide additional space for the growth of the residents’ families, or a little privacy from neighbors by providing a few sums every month. Dozens of such similar projects can be found which are supervised by teams of low-trained contractors. These neighborhoods were called vertical neighborhoods. This approach has begun to spread around the world as an upgrading of poor neighborhoods as a potential alternative to demolitions and redevelopments processes, with the smart use of space. Some experts and activists described these attempts as pioneering and socially supportive of population. The best option is for the government to focus on providing the basic infrastructure as water, sanitation, etc., and then allow the people themselves to invest in developing their own homes [14]

If the required change is significant that it overwhelms the adaptive capacity of a family, community or ecosystem, the transformation must take place. In this case, the changes are not incremental. Rather, they are transformations, which lead to changes in basic structure and function. These transformational changes often involve shifts in the nature of the system, and introducing new variables of the case. The main challenges associated with transformation are not of a technical or technological nature only, they might include a set of technological innovations, institutional reforms, behavioral shifts and cultural changes, they often involve values interrogation, challenging the assumptions and the ability to closely examine firm beliefs, identities and stereotypes. In order to succeed, these transformative changes usually require changes in established systems that are maintained and protected by strong interests. Consequently, there are enormous barriers in front of transformation, rooted in culture and perception [8].

The more we move from absorptive capacity to adaptive capacity and finally to transformative capacity, the more transaction costs and risks associated with these changes grow. The basic idea is that "the more change is made, the higher the transaction costs". In other words, it costs more to transform a system than to maintain it as it is or reconstruct it as before. For example, the constructed expansions of apartments in multi-storey buildings in neighborhoods of cities, specifically in the Macedonian capital Skopje and the Georgian capital Tbilisi. Where both cities contain a large group of expansions built from multi-storey apartment buildings in neighborhoods, which their concrete structures compete with the host buildings in term of size and function [15].

These forms are part of a larger group of housing changes that neighborhood residents make as a complementary or alternative to housing mobility, and are a form of social and technical transformation that helps social resilience of the local population in the two cities. The practice of closing balconies with walls in buildings and converting them into rooms without official planning permission has been widespread since the 1960s, this became more widespread and residents began adding new residential space outside the external space of the buildings, through various technical means.

These practices fed the reduced housing shortage during this period (that is caused by continued household growth and rural-to-urban migration, as well as reduced affordability of new housing due to poor housing development and lack of availability, mortgages at competitive prices and low-income levels of the population as a whole).

As in a residential building in Karposh IV in Skopje where residents closed the previous balconies of the building, and added an iron structure along the apartments as an extension to the area of the apartment, in addition to changing residential use to a medical practice on the ground floor, and adding another upper
These changes are directed more towards improving the quality of life of its residents, rather than the market value of the apartments. Thus, they are much more than a tool that helps the social adaptation of the city, since they played an important role in raising the standard of living and helping to popularize venture capital [15]

3. Stability and change

The literature review shows that the growing tendency to reach stability and consistency as negative, and rather focuses on change. For example, Norris et al. 2008 emphasized that resilience is “the best perception in terms of the adaptive capacity of stability” [16], while Béné et al. 2012 asserts that “the challenge is learning to live with change and develop the ability to deal with it, rather than trying to prevent it.”

The ability to maintain stability is as important as adaptive or transformative capacity. Moreover, stability is an important dimension of resilience (stability, adaptation and transformation), since the role of stability is a necessary condition for creating or accumulating savings and capitals (financial but also human, institutional and social). The accumulation of savings in the period of stability (political, economic and institutional) is critical for adaptive and transformative capacity of buildings, which enables families and societies to collect savings, create wealth and enhance human welfare. Stability is not only a prerequisite for property accumulation; it is also an effective tool for the emergence of coordinated procedures, which are in essential conditions for adaptation. In the light of this, stability is an essential component of adaptive capacity, without stability, the social and institutional resources and assets needed to develop resilience cannot be built, where adaptation depends on the presence of resources [8]. From above, resilience strategies are retrofits that occur at the base level over long periods. They arise through the relationship between families and housing within the residential neighborhoods of a city, such as residential improvements and modifications to the residential location. They take the form of alternative urban practices from bottom to top by material changes in the form of building structures for residential units in line with the daily needs of different family members. The change takes on gradual and deep-rooted processes over time.

4. Crises and pressures on neighborhoods in Iraq and in Baghdad Governorate, especially after the year 2003

In the 1990s, the economic blockade was imposed on Iraq, which formed the beginning of economic crises and the development of the housing crisis, after the year 2003 new pressures appeared on the residential neighborhoods in Iraq, including: [17]

- Political change made through transforming and moving from the central of political decision to a decentralized, multi-authority system.
- Social change resulted from increased immigration between the governorates towards the Baghdad in a consensual manner due to economic factors, and the abolition of legislations that previously prevented migration. In addition to the forced displacement witnessed by Baghdadi community between residential neighborhoods, especially for the period 2006-2008 that resulted from sectarian violence and social movement when individuals moved from one location to another in society, up and down the social ladder with the high population growth that the Iraqi society witnessed.
- Economic change: the deterioration of economy, the turbulence of the Iraqi market, its total openness to international markets, and the clear emergence of the investment phenomenon, which led to doubling the previous housing crisis, with high rental fees, the costs of construction materials, the cost of building housing unit with no legal controls. This type of pressure is a continuous pressure that gradually affected the context of residential neighborhoods in Iraq. The pressures on Baghdad governorate, in particular, are more severe than other provinces as it is the capital.
5. Resilience strategies in Iraqi neighborhoods after 2003

In general, the effects of political, social and economic pressures on Iraqi neighborhoods appeared clearly in the context of the residential environment in form of buildings changes (multi-storey apartment buildings and individual residential homes), as adaptive attempts by residents with the new conditions imposed on them. Many re-partitions, additions and functional transformations cases have appeared in order to provide more housing units, to add new spaces or for the purpose of investment. [17] [18].

6. Previous Local studies on residential neighborhoods in the city of Baghdad after 2003

In response to the obvious changes in the context of the residential environment, some local studies emerged describing these adaptive aspects of the population, which formed clear changes in neighborhoods, these studies considered them as distinct phenomena that characterize each Iraqi house [especially in the city of Baghdad] have their pros and cons. Following are some of these studies in city of Baghdad:

6.1 Sanaa and Farah Study 2010

An analytical study of residential neighborhoods in the Palestine Street area for the period 2006-2010 was prepared in which they described the changes took place in residential neighborhoods, identifying them by the phenomenon of re-secretion. [18]

The study showed that:
- The phenomenon of re-secretion after 2003 did not pay attention to the dimensions of the residential plots and their areas; it also neglected the laws and instructions. Rather these changes occurred according to the remaining areas of the original residential plot, or according to the shares of the joint ownership deed, which led to the emergence of residential plots that are less than the schematically accepted criteria.
- Residential plots that could not be divided by their owners due to their small area, according to local laws and regulations, parts have been added to them, which have led to an increase in building density.
- The process of residential re-dividing is a good phenomenon to full the housing shortage, increase the pressure on housing demand and preventing the horizontal expansion of a city. However, at the same time, it leads to increase the housing, population and building densities in the residential site, as well as it increases the pressure on social and technical infrastructure services.

It is noticed that the changes that are taking place are re-partitioning the plot, or adding construction to the existing housing unit.

6.2 Ghada and Ban's Study 2011

it described the changes in residential neighborhoods as physical phenomena in the form of modifications carried out by the residents, and that these modifications came in three forms:

first: implicit modifications, that is, the change inside the building without affecting the total area of the house, and the modification is at the level of the plans or interfaces.

The second: addition modifications, which were in two classes: - Growth by adding space to the inhabited house by inserting some external spaces into the interior, and reproduction by converting the inhabited house into several residential houses.

Third: desertion, abandonment and demolition. As a result of leaving the houses by their owners or rent them, so that the demolition is the default result of the age of the house.

The study also confirmed that the increased division of single houses led to many problems.
The most important problem is the visual chaos resulting from the limited area of the facade that was subjected to dividing. In addition, an infrastructure problem emerged, where they were designed to provide services for a studied number of residents, doubling that number lead to an additional load on health services and infrastructure, which resulted a deficit in them and consequently a decline in the visual and functional level of this residential region [19].

6.3 (Fadaa and Al-Saadi 2010) and (Rasha and Al-Saadi 2013) studies
The two studies summarized the changes occurred in residential neighborhoods in the city of Al-Kadhimiya in terms of: usage, ownership, occupancy rates, quality and ownership. As for the changes of the housing unit, they include: division of old housing units by re-sorting, reconstructing and adding construction. The studies also emphasized that the results of the changes of the residential houses decreased privacy, increased overseeing other houses, decreased green areas and the natural lighting and ventilation [20] [21].

6.4 Mazel and Aalak Study 2016
The study determined the changes in the residential neighborhoods in the city of Al-Numaniya, which are re-division, dividing the housing unit and adding construction. [22]

6.5 Ghada and Amenah Study 2017
It examined the changes in the single Iraqi houses in Baghdad for the period 2003-2016. The study area was the residential neighborhoods in Sadr City and Palestine Street. The study determined the changes of these housing units by functional modification (division), structural addition, demolition and reconstruction. These changes were at two levels: at the level of the facades, through the varied heights between the new constructed houses after 2003 compared to the housing constructed before this period, similar methods that dealt with the new housing facades, which left a pattern characterized by repetition and diversity in treatments. As for the planning level, the changes are in the relationship between the housing block and the residential alley by signing the housing block with the boundaries of the plot or with regressions that did not exceed (5 m) with consoling the garden space and side paths, so that the housing blocks become attached to each other. The study considered that these changes in residential neighborhoods are negative phenomena and considered them as violations of the architectural design of the single housing units [23].

6.6 Ruqaya and Dhumad Study 2017
It addressed the changes of the increased construction density in the environment of housing unit due to addition and division operations. The study indicated that the gradual changes that performed on the housing units affected negatively the identity of modern residential construction and contributed to the production of an urban environment that is unfamiliar to its traditional identity. The urban residential scene is confused with a mixture of styles, shapes, materials and colors that are odd to the local reality, in which the individual and collective identity was lost [24].

7. The results
Resilience strategies in the Iraqi neighborhoods and in the city of Baghdad in particular can be summarized in the form of physical phenomena conducted by the residents to survive and sustain life in these neighborhoods. There are three strategies, as shown in the following Table [1]:
1. Coping strategy: through the implicit changes and modifications within the constructed area.
2. Adaptation strategy: by addition changes, through adding external spaces for the housing unit, dividing the housing unit into smaller units, or by changing the function.
3. Transformation strategy: by the greatest changes through demolition and reconstruction.

| Main indicators | Sub-indicators | Detailed |
|-----------------|----------------|---------|
| **Coping strategy** | Coping Principles | Coping concept |
| | | the continuity / the capacity through which individuals / families can be established |
| | | the ability to rebound or return to balance after stresses |
| | Coping goals | Mitigate the effects of shocks on the population in terms of their livelihoods and basic needs |
| | Coping results | Constancy |
| | | keeping the function |
| | | structure preservation |
| | | Identity preservation |
| **Coping Mechanisms** | Coping strategies | Coping principles |
| | | Self-improvement processes through the relationship between families and their housing in neighborhoods |
| | | Retrofits that occur over long periods of time |
| **Adapting strategy** | Adaptation principles | Adaptation concept |
| | Adaptation goals | Upgrading residential neighborhoods as a possible alternative to demolition and regeneration |
| | | Mitigation with economic / social pressures |
| | | Providing adequate housing by adding new spaces |
| | | Take advantage of opportunities |
| | | Rent the residential unit |
| | | Facing new circumstances |
| | | Increased privacy |
| | | Noise reduction |
| | Levels of adaptation | Individual level [per family] |
| | | Community level [neighborhood] |
| | Factors affecting adaptation | Social / economic factors |
| | | The ability of the structural structure of the housing unit to be modified |
| | | Education level |
| | | Income level |
### Adaptation mechanisms

| Adaptation results | Gradual adjustment | The ability of the structural structure of the housing unit to be added |
|--------------------|--------------------|-------------------------------------------------------------------------|
| Maintain / change function | Preserving / changing the structure | Identity preservation |
| The physical aspect | | |
| Adaptations to the housing unit structure | Adding a room | |
| | Adding a floor | |
| Changes in the housing unit structure | Internal adjustments | Dividing integration |
| | External adjustments | Add spaces |
| | | Add an upper floor |
| Changes in the housing unit function | Change the function of some internal spaces. | |
| | | Changing the housing unit’s function into another use such as: commercial / medical / educational use. |

### The social aspect

| Coordination of decision-making | Individual decision-making |
|-------------------------------|-----------------------------|
| Teamwork | Individual decision-making |
| Encouraging innovation and experimentation | Collective decision-making |
| Exploiting new opportunities | Providing new job opportunities |
| | Providing new jobs |

### Transformation Strategy

| Transformation principles | Transformation results | Changes |
|---------------------------|------------------------|---------|
| Transformation concept | Create a new system radically | In function |
| Transformation mechanisms | | In structure |
| | | In identity |

### Demolition
- Removing part of the housing unit
- Completely remove the residential unit

### Reconstruction
- Reconstruction part of the housing unit
- Completely rebuilt the housing unit

### 8. Conclusions

The term of resilience has moved among different disciplines, from literature and law to mechanics and psychology, then engineering, environment, to environmental and social sciences.

- The change of the nature of its understanding, from bouncing to the original state and focus on one state of stability and balance to the dynamic character and the continuation of function with balance, reaching to the resistance of society.
- Resilience linguistically is determined by the ability to tolerate stress and the resulted change and the ability to recover by returning to the original shape.
- Resilience is the "ability of the system to maintain itself during the period of change [the period of stress and crisis] through certain strategies: coping, adaptation and transformation from time to time to ensure the achievement of sustainability goals.
- Resilience strategies are retrofits that occur at the base level over long periods. They arise through the relationship between families and housing within the residential neighborhoods of a city, such as residential improvements and modifications to the residential location.
- Resilience strategies take the form of alternative urban practices from bottom to top by material changes in the form of building structures for residential units in line with the daily needs of different family members. The change takes on gradual and deep-rooted processes over time.
- Resilience strategies in the Iraqi neighborhoods and in the city of Baghdad in particular can be summarized in the form of physical phenomena conducted by the residents to survive and sustain life in these neighborhoods. There are three strategies, Coping, Adaptation and Transformation strategy.
- Coping strategy in Iraqi neighborhoods through the implicit changes and modifications within the constructed area.
- Adaptation strategy in the Iraqi neighborhoods by addition changes, through adding external spaces for the housing unit, dividing the housing unit into smaller units, or by changing the function.
- Transformation strategy in the Iraqi neighborhoods by the greatest changes through demolition and reconstruction.

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