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## IMPROVING THE DESIGN QUALITY OF HOUSING BUILDINGS

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### Abstract

Design quality is essential to improve the standards of living and is progressively being accepted as critical to successful new housing developments. A better design quality provides attractive and sensitively planned homes that form communities, and assists in creating a healthier and advanced fellowship. As new housing growth in Egypt has missed reaching the universal rules and guidelines of design quality, this research reviews several experiences of foreign offices and governmental programs that deal with amending the design character of housing buildings. Using these Guidelines enables commissioning high performance housing facilities that improve the general standards of a better design of the housing buildings. This paper encompasses the principles of the design's quality of housing projects as guidelines for improving the design quality of housing. This research embraces simpler framework for housing design principles that can facilitate new housing buildings achieve a positive contribution to the residents' quality of life, helps developers generate values from their strategies, guides them to a number of design's general features and recommends that attention should be paid to the tradeoffs between performance and monetary values.

### Keywords

Architecture, design quality, housing, building, development

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## **INTRODUCTION**

Quality in architecture appears to be subjective; well designed buildings are essential to the country's economic health and the welfare of its citizenry as they do provide safe and productive environments for them and their activities. A better architecture design is the key starting point in accomplishing that goal.

A better design must have high quality; "Design" and "Quality" are words of important significance to architects nowadays.

New housing should be designed and built in a sustainable manner through products and processes that minimise environmental impact, good adaptation to climate changes, while cutting down the carrying costs and incorporating features that enhance wellness and prosperity.

The design quality does not generate design solutions, merely it does offer guidelines to render an ideal design. Improving the quality of housing adds to the physical and social attractiveness of the area, increases property values, pride in the neighbourhood for everyone and it is less expensive for both the developer and the community in the long run. The Guidelines promote both policies and technical schemes for city authorities, architects and builders. They lay out common sense targets for housing building's performance, the means to achieve those objectives, in addition to the necessary tools and references.

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## GOALS

This research aims to achieve the following:

- Study the nature and value of architectural design quality and design quality phases.
- Investigate and learn how do the foreign organizations, agencies and governmental programs deal with improving the design housing buildings' quality.
- Improve and ensure high quality of Egyptian housing design through findings and recommended approaches.

## RESEARCH METHODOLOGY

The below illustration shows the research methodology framework, (Fig. 1).

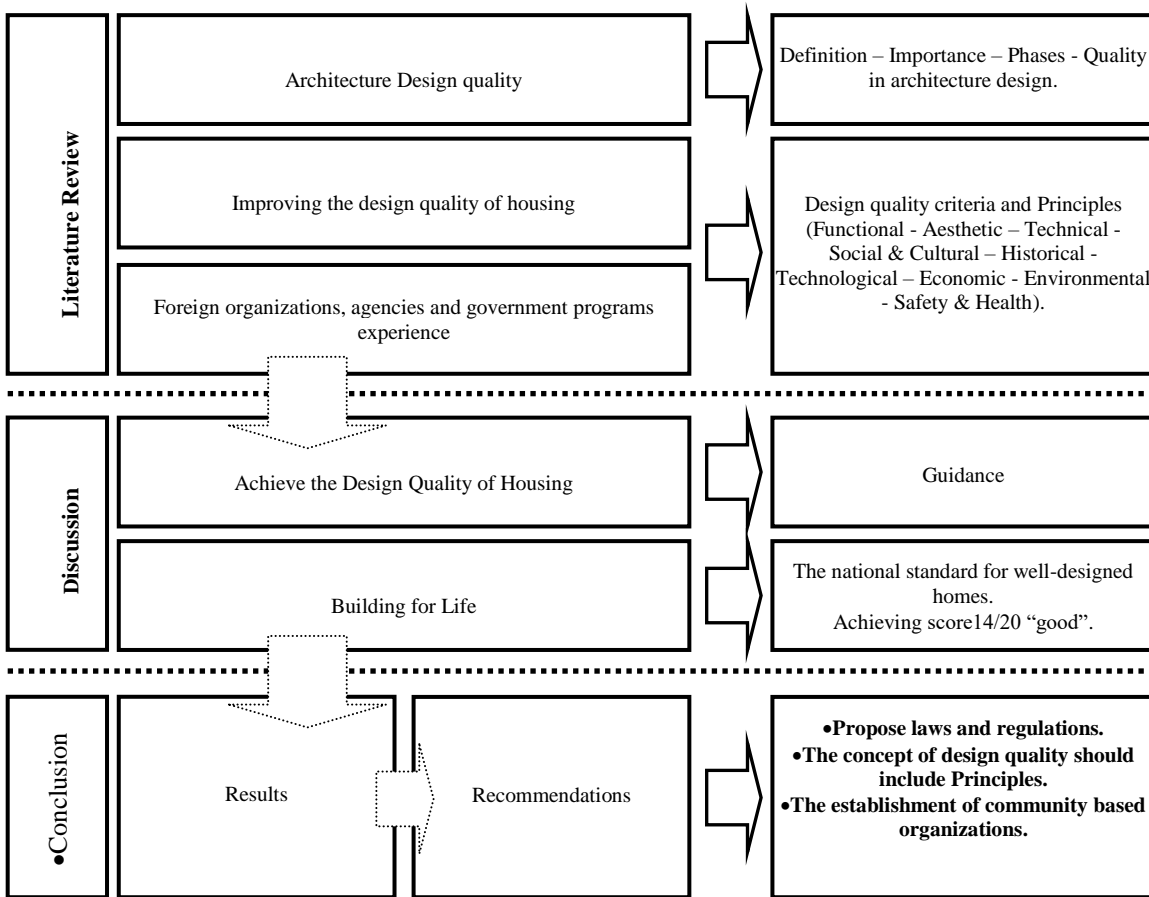


Figure 1: Research Methodology. Source: Author

### Architectural Design Quality

According to the dictionaries, “Quality” signifies “a point of excellence”. Another definition is “the degree to which a set of inherent characteristics fulfils stated or obligatory needs or expectations” (Kaderlan, 1991).

“Obligatory” is defined as compliance with all laws, statutes, codes and regulations. “Expectations” is defined by those requirements of the ‘Customer’, which in architecture means, besides the client and the end users, the public and sometimes even financial institutions. In general, there are two patterns of quality, and therefore two definitions and two sorts of measurement (Quality digest, 2001).

- Objective quality: The degree of compliance of a process or its outcome with a predetermined set of criteria, which are presumed essential to the ultimate value it provides.
- Subjective quality: The level of perceived value reported by the person who benefits from a process or its outcome. It may subsume various intermediate quality measures, both objective and subjective.

Quality in architecture means improving the degree to which design fulfils needs and expectations, design quality is oftentimes understood as ‘design excellence’ (Charles Nelson, 2006).

Architect's quality is a concept that is interpreted with the help of value-charged criteria which includes opinions, values, ideals and notations of desirable characteristics. It also includes values such as wholeness, durability, genuineness, aesthetic honesty, beauty, readability, usefulness and professionalism besides originality, (Magnus Rönn, 2011).

Architectural quality is the combination of elements that form a whole. Quality in architecture is seen as a holistic vision among professionals. Here, quality is viewed upon as an overlapping summary; a composite entity of aesthetic dimensions and technical aspects, along with requirements for economic, environmental friendliness and social conditions. According to this view, it is a combination of aesthetics, technology, economy and environment in a working entity that characterizes the quality concept in the area of invention and design.

For many people, quality design means good design; design quality is a value term that encourages buildings whose characteristics create an environment where the occupant or user can accomplish his purpose effectively, efficiently and comfortably. Implied in this definition are factors of economics, social and psychological characteristics of users, flexibility to accommodate changes in users and uses, aesthetics, community standards of safety and health, building technology and environmental concerns (Building Research Council, 1989).

### *The importance of applying quality in architectural design*

Designers cannot know when to stop designing and that greatly impacts completing the project on time (Magnus Rönn, 2011). Quality is visualized and identified by observation, comparison and interpretation. Quality is a knowledge based on designated good examples, instructive cases, architectural reviews, critiques and reflections of ideal solutions to design problems.

- Managing the environmental quality of design – including buildings, engineering works, interiors and landscape architecture – and in the provision of all the services that these activities.
- Quality is used to clarify concepts, helps to define appropriate quality criteria for the design, assessment of projects and enables the jury to pose clear quality questions to the participants (Magnus Rönn, 2011).
- Architects measure the value of their solutions by the effect they will have on the client's business. (Solution seeking, a hallmark of the ‘High Quality Practice’, reduces errors and risk, increases client satisfaction and profitability) (Fig. 2).
- Error-free documents, checking cross-references and interdisciplinary coordination. This view of quality is appropriate for a manufacturing view of architecture, which examines the results of the design as a product, such as a building, a bridge or a park.
- This research will concentrate on setting standards for the design quality of housing projects as an instrument and guidelines in society to improve those buildings' design.

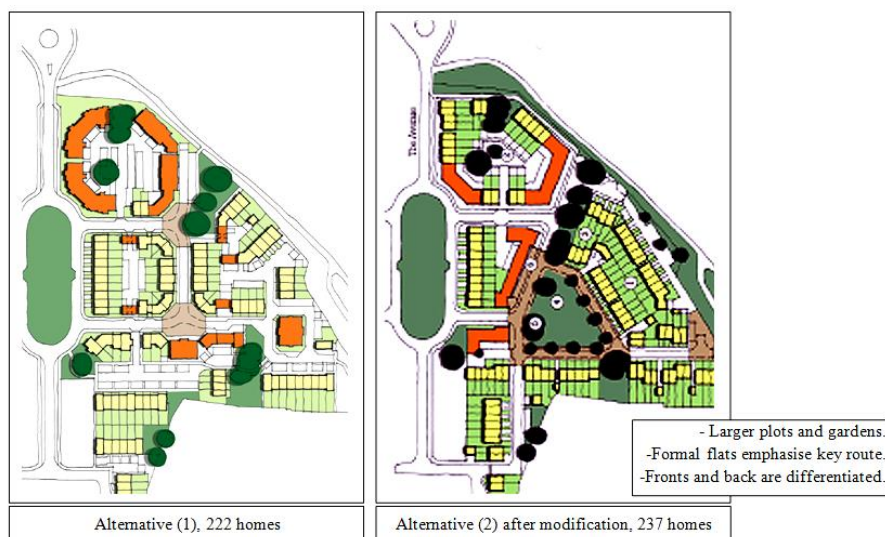


Figure 2: Architects measure the value of their solutions. Source: [www.cube.org.uk](http://www.cube.org.uk).

### ***Design Quality Phases***

To achieve quality in architectural design, this research suggests 6 phases of building practice to be considered as follows:

- Pre-design, planning and programming that determine the specific purpose and activities of the building project and the anticipated users, besides the relationships among users and functional needs. Strategic mission planning, resources allocation and budget development, environmental impact analysis, master planning and project programming (Building Research Council, 1989).
- Emphasis that designers are selected according to qualifications rather than price, and assuring that all the qualified Architects are given fair opportunities to undertake housing design projects.
- The architect must deal with the problems and opportunities that occur during the project's design development in a timely manner, and will continue through the construction phase.
- Interference of entrepreneurs and interest groups that can influence the pre-design planning and programming procedures and eventually the quality of the finished product.
- Design evaluation contributes in learning from experience and monitoring quality. Awards programs and post-occupancy evaluation of buildings are examples of activities that can be used effectively to influence the design quality.
- Building approval and general management practices of new urban communities' authorities along with the municipalities that include interactions with the ministry of housing.

### ***The Design Quality Of Housing***

It is hard to find anyone in the housing development process who will say that design quality is not important to them, yet new housing remains decidedly uninspiring (Commission for Architecture, 2006). People agreed with the statement 'better quality buildings and public spaces improve the quality of people's lives', and thought that the built environment quality made a difference to the way they felt. People's productivity and happiness depend on the healthfulness, safety and aesthetic qualities of their environment, which depends on the design.

### **Improving the Quality of Housing Building**

The UN Habitat (United Nations Human Settlements Programme) states (UN-Habitat, 2006):

"By the beginning of the third millennium, it is estimated that 1.1 billion people live in inadequate housing conditions in urban areas alone. In many cities of developing countries, more than half of the population's life in informal settlements, without security of tenure and in conditions that can be described as life and health threatening". These statistics point to the urgent need for quality housing worldwide.

Improving the quality of housing simply means making certain that everyone can obtain a safe, decent, tidy, affordable housing to create a residential area where everyone has a safe place to live and involves environmental considerations.

Improving the quality of housing isn't limited to affordability only, but livability, design, environmental responsibility and social effects are all equally significant.

### **Design Quality Criteria of Housing**

There are four basic measures that can be summarized as follows: (Improving the quality of housing, 2013) & (HUD, 2011).

- Housing should meet the needs of its users.
- Housing should understand and respond to its context.
- Housing should enhance its neighbourhood.
- Trapping should be constructed to last.

### **Housing should meet the needs of its users**

Some of the criteria to be considered for meeting the needs include:

- *Size:* Units should be spacious enough to match the number of people who will be occupying it.
- *Layout:* Space should be used efficiently (lots of storage under and behind counters, closets, etc...), rooms or spaces should be arranged in a logical manner (i.e. Dining area is adjacent to the kitchen); traffic patterns should be easy and natural. Units should be easily accessible.

- *Public spaces:* Ideally, there should be an outdoor space where children can play safely and places for adults to sit under the sunshine or in the shade as shown in (Fig. 3). If budgets allow indoor common space, it should be comfortable and adaptable. Hallways and walkways should be maintained and well-lit.
- *Location:* Housing should be close to, or allows access to, transportation, shopping, and refreshment. Housing should not be assigned specifically to areas where no one particularly would prefer to dwell (i.e. Next door to a chemical plant or in a dangerous locality).

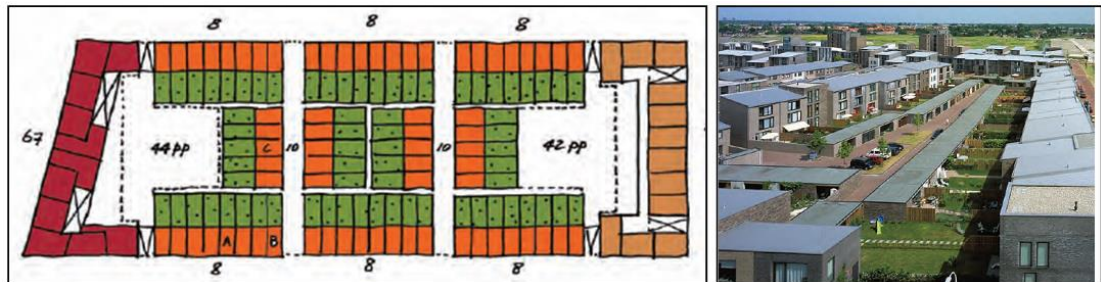


Figure 3: Good design quality represented in the outdoor space, Germany. Source: (Design Quality in New Housing, 2009).

### Housing should understand and respond to its context

This is true in the physical, historical and social context of its site and area. For example:

- Intelligent utilization of the site. It should be constructed facing the appropriate direction (towards the northward and the sun), as indicated in (Fig. 4), and take advantage of the site features in order to produce an attractive space while controlling the extremes of climate.
- It should fit with other nearby buildings. It doesn't have to look exactly the same as other buildings nearby in the area, instead similar building materials should be used, such as windows, roof heights and the likewise. That will make it blend in well and increases the appeal of the neighbourhood.
- It should reflect the history and style of its neighbourhood or community, thus acknowledging the community's character as shown in (Fig.5).

### Housing should enhance its neighbourhood

There are a number of ways in which housing can add value and enhance its neighbourhood:

- It can add to the neighbourhood's attractiveness. Well-designed housing with colourful or particularly attractive and fine details can make the whole neighbourhood look better
- It can add to the foot traffic and street life. Activities that draw people out for shopping and socializing help in developing a desirable neighbourhood community. The more people recognize and speak to one another on the street, the safer and more pleasant the street becomes.
- It can change people's attitudes. Those who don't live in the new housing may start to observe themselves and their neighbours differently; since a developer chose to put this nice building here, then this area is satisfactory. Therefore, people will be paying more attention on holding on to their own buildings and houses which raises the property values and community pride.



Figure 4: Using renewable energy & passive cooling and solar shading. Source: (Design Quality in New Housing, 2009).

## Housing Should be Built to last

The expected lifespan of many houses is relatively short – not much more than 50 years or so – yet many houses over 200 years old are standing still. To produce housing that can last for several centuries, the following should be considered:

- Usage of good-quality and durable materials suiting climate changes. Some materials rot or corrode in wet conditions while others may deteriorate in high temperature and direct sunshine. Using the proper materials can make a huge difference as to how long a building will remain firm.
- Choosing materials and construction techniques that have low-maintenance cost. There are many processes that will enhance construction materials durability against diverse weather conditions. Using materials that are naturally weather and insect resistant *cuts* down the possibility of damage. Although truly durable, low-maintenance materials may be more expensive to buy, but they often save money in the long run because of low maintenance costs.



Figure 5: Reflecting the history and style of its neighbourhood or community. Source:

( <http://www.cabe.org.uk/news/building-for-life-2010.html>).

- Current technology has produced a number of different building materials and methods, often cheaper than traditional ones that can keep buildings healthier longer.
- Caution must be taken when selecting materials that last, ensuring they don't contain harmful chemicals that can be dangerous, or which turn out to be toxic or especially dangerous when they burn.
- Employs high-quality construction techniques. It's worth it not to skimp on a construction in order to save money that will be spent on repairs later.

## *The Architecture Design Quality Principles*

Good design serves the public interest and includes appropriate innovation that responds to technical, social, aesthetic, economic and environmental challenges.

The architecture's design quality principles are general rules and guidelines. They do not generate design solutions, but provide a guide to achieving good design and the means of evaluating the eligibility of proposed solutions. According to the principles of the state environmental planning policy no. 65 - design quality of residential flat development, new south wales government, Australia (NSW, 2010), and The U.S. Department of Housing and Urban Development Principles (HUD, 2011), There are ten criteria that distinguish a good set of principles:

- **Context:** Good design responds and contributes to its context. Context can be defined as a key of natural and built in features of an area. New buildings will thereby contribute to the quality, identity of the area and the desired future character.
- **Scale:** Good design provides an appropriate scale in terms of volume and height that suits the scale of the street and the surrounding buildings. It is required to achieve the scale identified for the desired future character of the area.
- **Built form:** Good design achieves an appropriate built form for a site and the buildings' purposes, in terms of buildings' alignments, proportions, buildings' type, the building elements that contributes to the



streetscape and parks' character, including their views and vistas. In addition, it provides internal amenity and outlook.

- **Density:** Good design has a density that is appropriate for the site and its context, in terms of floor space yields (or number of units or residents). Appropriate densities have to be sustainable and consistent with the existing density of the area and consistent with the desired future density. Sustainable densities respond to the regional context, availability of infrastructure, public transportation, community facilities and environmental quality.
- **Environmental:** An ideal design makes effective use of natural resources such as Solar energy and water throughout its entire life cycle including construction. Sustainability is integrated with the design process. Various aspects include materials' recycling, selection of appropriate and sustainable materials, adaptability, layouts and built form, passive solar design principles, efficient appliances and mechanical services, soil zones for the vegetation and reuse of water.
- **Landscape:** Good design recognizes that together landscape and buildings operate as an integrated and sustainable system, results in greater amenity and aesthetic quality. The landscape design has to rely on the existing site's natural and cultural features in responsible and creative ways. It enhances the development of natural environmental performance by co-ordinating water and soil management, solar access, micro-climate, tree canopy and habitat values. It contributes to the positive image and contextual fit of development in respect to streetscape and neighbourhood character. The landscape design should optimize usability, privacy and social opportunity, equitable access and respect for neighbour amenity.
- **Amenity:** Good design provides amenity through physical, spatial and environmental quality of the development. Optimising amenity requires appropriate room dimensions and shapes, access to sunlight, natural ventilation, visual and acoustic privacy, storage, indoor and outdoor space, efficient layouts and service areas, outlook and ease of access for all age groups.
- **Safety and security:** Good design optimizes safety and security internally and for the public domain. This is achieved by avoiding dark and dimmed areas, increasing activity on the streets, providing clear and safe access points, quality public spaces with innovating utilization. It also provides appropriate lighting to the location and desired activities with clear distinguish between public and private spaces.
- **Social dimensions and housing affordability:** Good design responds to the social context and the needs of the local community in terms of lifestyles, affordability and access to social facilities. New developments should optimize the provision of housing to suit the social mix, the neighbourhood's needs and provide a mix of housing types that cater for different budgets and housing needs.
- **Aesthetics:** Quality aesthetics requires the appropriate integration of building elements, textures, materials and colours. They reflect the use of the internal design and structure of the development. Aesthetics should respond to the environment and context, particularly to the desirable elements of the existing streetscape and contribute to the desired future character of the area.

### ***How to achieve the Design Quality of Housing***

The Design translates the program into a design that reflects the owner's requirements and consistent with the budget. Critical issues are: (Charles Nelson, 2006).

- All parties are involved and reachable throughout the process; deliverables are set at the beginning of the design.
- A design and scope contingency must be incorporated into the budget.
- Finding out a set of queries to be confirmed when meeting with the client would reduce the effort and time in any future client meetings. Architects would gain experience at those meetings when encountering the client needs, experiences and vision.

Documentation: In addition to those above, critical issues noteworthy:

- It is a paramount that the owner approves, in writing, the design and budget prior to starting the documentation.
- The design team members have worked together, know each other well and they produce full documentation; it is required both for quality control and budget control.

### ***Buildings for life***

Numerous housing building companies are now using Building for Life to formalize their commitment to design quality. The Western government asks all local authorities to use Building for Life to measure progress in improving design quality (Kashdan Brown.2013).

The Homes and Communities Agencies have now set out, in their proposed core housing design and sustainability standards, consultation plans to make achieving 14/20 “good” of the Building for Life criteria mandatory. Alongside this, many planning authorities have now embedded Building for Life in their planning policies - requiring that development proposals achieve a minimum score of “good” or higher. In the west, Building for Life is the national standard for well-designed homes and neighbourhoods.

Building for Life promotes design excellence and celebrates best practice in the housing building through the Building for Life awards (Fig. 6). Good quality housing design can improve social welfare and quality of life by reducing crime, improving public health, facilitating transportation problems and increasing property values.

Building for Life has a number of roles to play in delivering good quality design for homes.



**Figure 6: A simple palette of colours, textures and building materials defines the scheme’s different neighborhoods.**

Source: <http://www.cabe.org.uk/case-studies/water-colour.html>, 2010.

## **RESEARCH OUTCOMES**

### ***Design Quality of Architecture: Process and Patterns***

Design quality of architecture should be considered and perceived as a process and a facility towards achieving design quality of architecture development. This process is governed by a set of principles and patterns which forms a better comprehensive design matrix for architects and planners.

As discussed above, architectural design quality is all about how to make a place or a building “alive”. Culture and civilization are represented in the form and organization of buildings, thus, making architecture one of the most important aspects of human development.

It extends beyond the basic human needs and includes art. Architects' goal should be creating housing buildings and spaces that are functional and beautiful, in which people would feel alive at home.

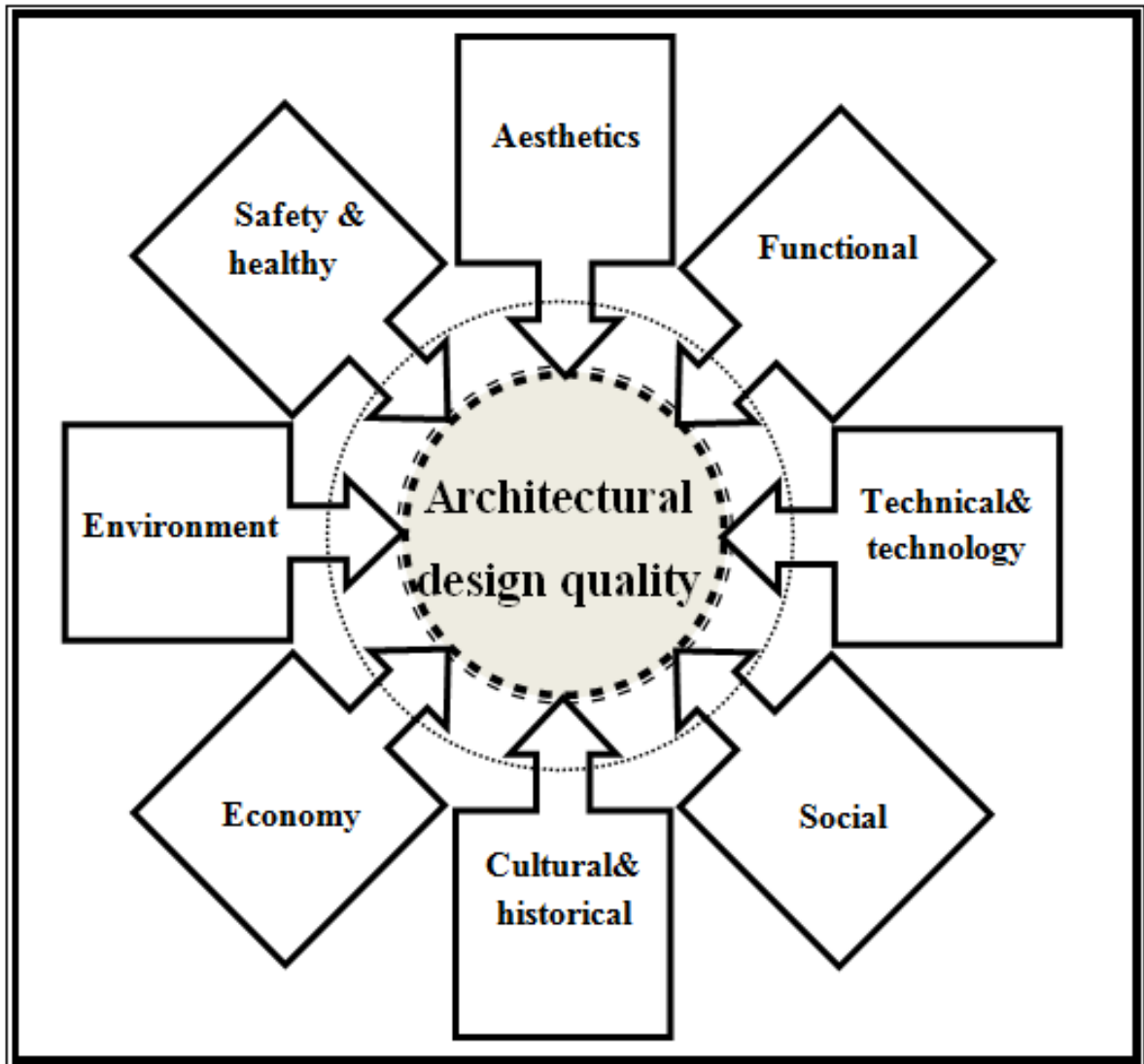


Figure 7: The eight common dimensions of architectural design

## CONCLUSIONS

This research has concluded the following:

- Architectural design quality is a combination of aesthetics, functional, technical, engineering, social, economical and environmental as a functioning entity that characterizes the quality concept in the field of architecture design. (Fig. 7) Shows eight common dimensions of architectural design quality.
- Architectural design quality is a goal that has a significant impact; thanks to its positive force and ability to define a general direction for architectural policy.
- Quality in architecture is not merely a necessity of modern animation, but the cultural status of a developed society.
- Good quality design of housing buildings improves the quality of people's lives and makes a difference to the way they feel.
- Several agencies and organizations focused on the preparation of principles and instructions necessary to achieve the quality design of architecture.
- Many planning authorities have now embedded Building for Life in their planning policies.

- The current system required by building regulations, planning policy and the builders failed to be delivered according to any of the national objectives. It has created a confused, overlapping and sometimes contradictory range of measures.
- The architecture design quality principles and criteria are general conventions and guidelines, and do not generate design solutions, but provide guidance to achieving good design and the evaluating the eligibility of proposed resolutions.
- The design quality of new housing underpins the success or failure of a community.
- Design quality is achieved when the balance between performance and costs reflects effectively the building's owners and users' needs.
- Better design quality increases social, environmental and future sales values.
- Building for Life is a measure of design quality.

## RECOMMENDATIONS

This research recommends:

- Propose laws and regulations of the organizations. Encourage the achievement of Architecture Design Quality through its design principles.
- The establishment of community-based organizations which stimulates the conversation between local communities, local authorities and developers about creating great housings to live.
- The research takes notice that high level advocate for housing buildings' design quality is needed, and that a governmental department (Council on Design Quality of Housing buildings) should be established to fulfil this role. The proposed Council would be responsible for advising the competent authority on legislative or executive actions that would enhance housing building design quality.
- Design thinking should be informed by the traditional efficiency methods and techniques employed by forms, building materials and means of achieving comfort response to local climate and acknowledge the sun orbit.
- Create a single set of measures by which developments can be designed, judged and evaluated through the planning system under the oversight of a committee of experts and pioneers of Architecture.
- The concept of design quality should include aesthetics, safety and health, cultural, historical, technical, technological, social, environmental and economic aspects.
- New developments should respect their context to enhance the local character.
- To achieve the maximum effectiveness of the building functions, users' needs and interests should be greatly considered within the building functional values which are determined in the project program.

This research embraces a simpler framework as expressed in (Fig. 8) for housing design principles that can aid new housing buildings designs in achieving a positive contribution to the residents' quality of life. In addition, it can aid developers in generating value from their schemes, and guides them to a number of general design features. Also, it recommends that attention should be given to the tradeoffs between performance and costs.

### *Future goals:*

- Attempting to achieve acceptable principles of performance at the lowest possible cost. There are difficulties in defining all the aspects of a building's desired performance in terms of acceptable principles.
- Finding a relationship between sustainable architecture and architecture's design quality.

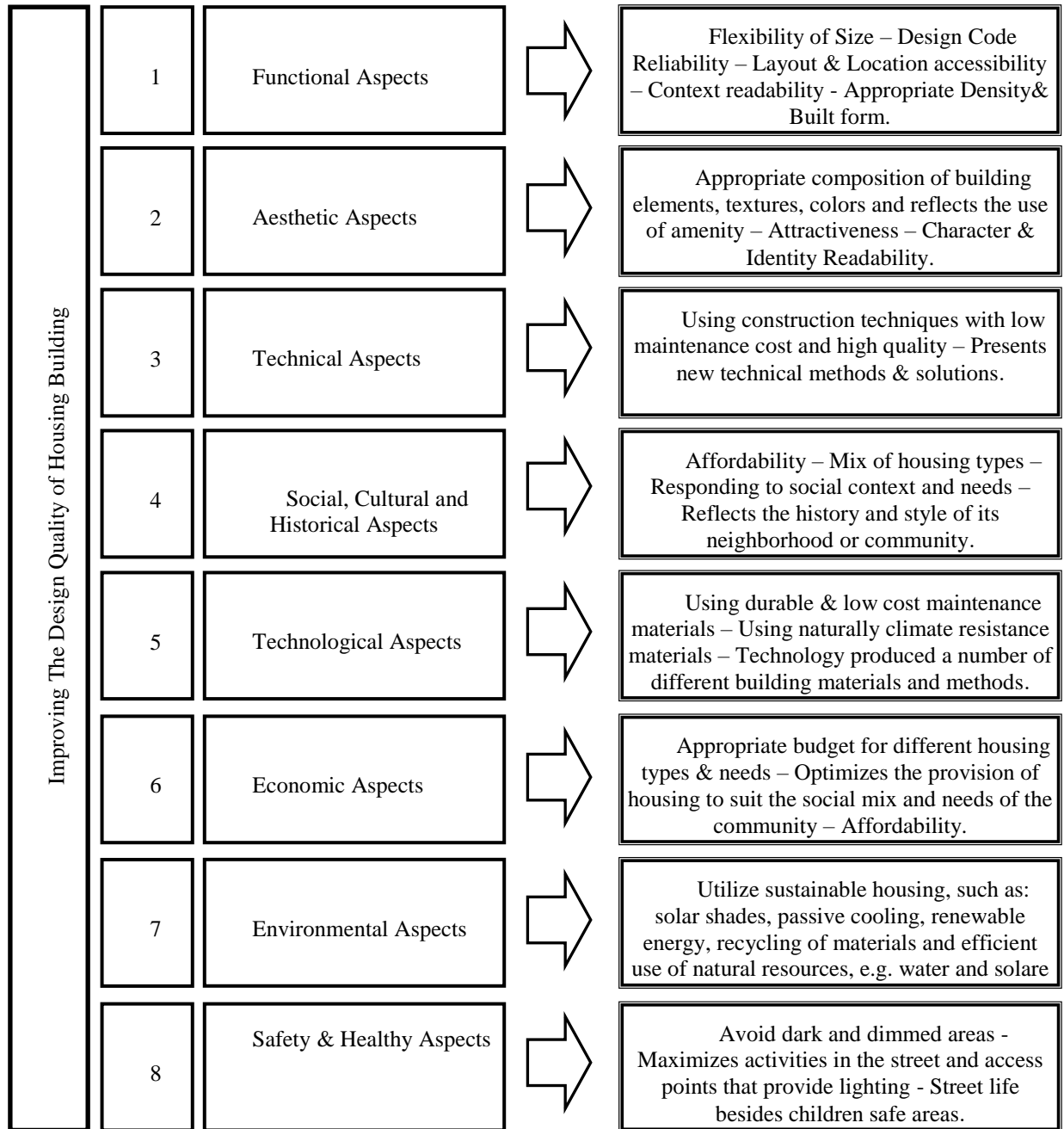


Figure 8: Framework for improving the design quality of housing building. Source: The Author.

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