



THE ASIAN BULLETIN OF GREEN MANAGEMENT AND CIRCULAR ECONOMY

<http://abgmce.com/10.62019/abgmce.v4i2.119>

ISSN (online): 2959-0035

ISSN (Print): 2959-0027

Government Strategies, Economic Influences and Resident Comfort in Sustainable Housing: A Case of Swabi in Pakistan

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Chronicle

Abstract

Article history

Received: Dec 02, 2024

Received in the revised format: Dec 17, 2024

Accepted: Dec 23, 2024

Available online: Dec 28, 2024

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Keywords: Sustainable housing in Pakistan, Government policies for sustainable housing, housing economy, housing cost-efficiency, residents' comfort in sustainable housing, environmental safety

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This research explores the concept of sustainable housing, focusing on Swabi, Pakistan, as a case study for its development. It considers the role that government planning and design can play in fostering sustainable housing, as well as economic factors and cost-efficiency. Additionally, the study investigates how sustainable housing impacts residents' comfort. Data was collected through a self-designed survey targeting professionals in construction and development such as architects, planners, and designers. The respondents were selected through random sampling, and the survey was administered online through Google Forms. Hypothesis: Sustainable housing is highly influenced by government policies in terms of housing plans and design and economic considerations. In turn, sustainable housing significantly affects the improvement of comfort for the residents and ensures environmental safety. A one-sample t-test was conducted to analyze the perspectives of the surveyed population regarding different aspects of sustainable housing. The statistical analysis indicated that the government's role, economic factors, and cost efficiency all are significantly related to promoting sustainable housing in Pakistan. It also points out that sustainable housing is positive for comfort improvement for residents and environmental protection.

INTRODUCTION

This research illustrates the background of the study that will facilitate the researcher to understand the origin and historical background of sustainable living. This study will emphasize the sustainable housing system that would help unveil better methods of architecture for contribution to the betterment of society. After determining the background of the study, the research study will focus on the problem statement that will highlight the research gap that needs to be filled in the context of Pakistan. Brief literature is mentioned in the research study to understand previous research and articles' efforts to highlight sustainable housing (Abdou et.al, 2016). This research study will also explain the research questions, objectives, and hypotheses essential to this study, clarifying why the present study is being conducted. The research study will also discuss the research methodology briefly. In the later section, the research study will

determine the significance of the study along with the limitations that would help future researchers work on this study's new dimensions. The research framework will also be discussed at the end of the research study. The growth and prosperity of a country depend upon its stable economy, which positively impacts various areas of the country's development. Housing improvement and sustainability are among the most critical determinants of the economic growth of a country that are not only associated with the country's well-being but also linked with residents' comfort and healthy environment. Sustainable housing is a system that must be economically feasible, socially tolerable, technically convenient, and environmentally favourable. This system provides required quality housing structures to people that can be efficiently used for current and future needs. This is suggested that sustainable housing should add features that can make this system socially appreciable with more significant opportunities for socialization and tendencies for environmental enhancement and growth (Ibem and Aduwo, 2015). Sustainable housing is achieved through the collaboration of the construction and housing industry worldwide, which needs advancement in technology and human resources (Rahman et al., 2018). Housing is one of the basic needs to survive to gain shelter that determines a person's quality of life and depicts society's welfare.

How the homes are designed and built considering the dignity of social, cultural, environmental, and economic features represents people's way of life, living standards, well-being, physical and emotional health, and sense of security. Sustainable housing commits not to provide shelter only but strives to adopt the best system that can contribute to the environment and other areas that crucially affect the health and well-being of residents and the growth of the country (Abdul-Rahman et.al, 2015; Watson and Zetter, 2016). Numerous meanings of sustainable housing have been understood and discussed to date, and many authors described it differently. Previously, many different characteristics of sustainable housing have been discussed instead of its definition; such sustainable housing can be a good resource for poor people who cannot afford to buy homes with all facilities because sustainable houses can provide all basic features that are correlated with good health and affordability (Smets and van Lindert, 2016). Sustainable housing promotes the concept of self-reliance in terms of development without interfering the nature and damaging it (ACA, 2018; Adabre and Chan, 2019). This concept is characterized by a cost-effective feature that helps maintain environmental serenity and provides long-term productivity.

Moreover, some people focus on its more relevant characteristics, such as sustainable housing can control viruses and diseases by utilizing efficient technologies, availability of fresh food and water, and proper shelter. The participation of people is also a classical feature of sustainable housing that encourages people to cooperate and participate in making the product sustainable through their actions (Schwartz et.al, 2021). Figure 1 indicates that development in any sector of a country is always favourable for humans as it generates opportunities to grow by creating job vacancies for people that ultimately give advancement and more development to the country. The development of the housing sector is also creating benefits for people but at the same time, the consumption of energy increases along with a rise in pollution. Those buildings that provide us shelter against severe weather conditions can also cause many diseases and harm due to their structure and building materials (Diwedi, 2017). This type of architecture utilizes old technology with intellectual means and aims to secure the environment from unfavorable consequences of construction. Figure 3 below shows the basic meaning of sustainable architecture. The primary pitfall of

sustainable architecture is its utmost concern with protecting the environment and not paying much attention to economic and social features. At the same time, it is evident that sustainability can only be achieved by working on all these three areas simultaneously, as they are interconnected.

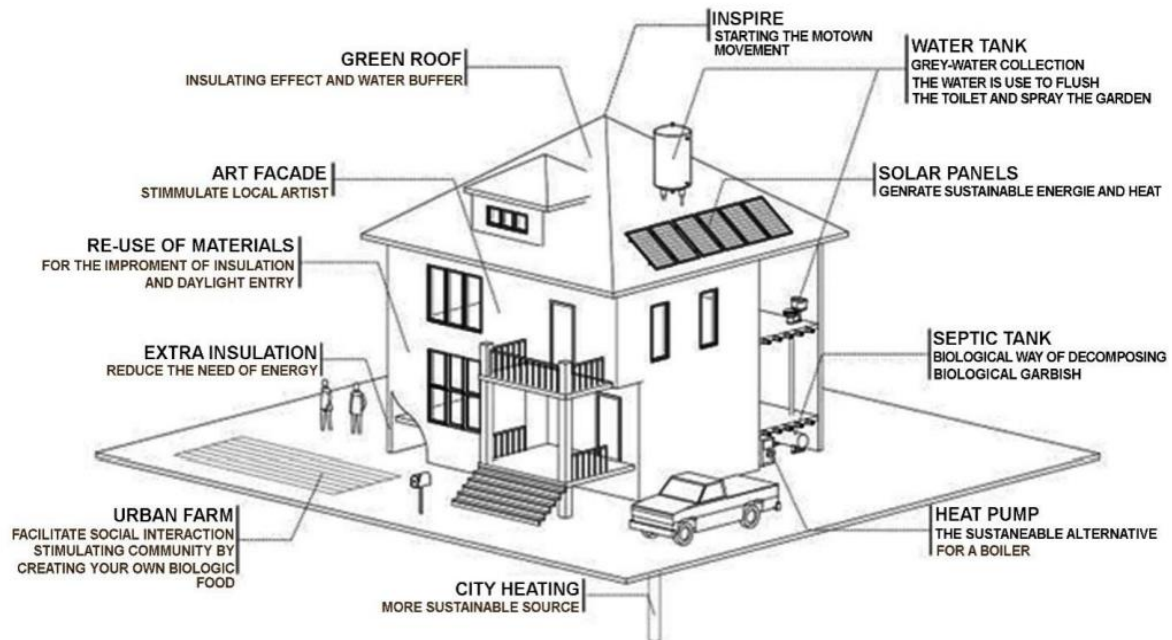


Figure 1.
Features of Sustainable Houses (Fujihira, 2019)

The role of sustainable architecture is very crucial in maintaining sustainable housing. Sustainable architecture, due to its many nature-friendly characteristics, is also known as “environmentally friendly architecture” or “green architecture” that aims to create a housing system that contributes to the betterment of humanity. Sustainable architecture enhances sustainability in almost all kinds of construction and buildings. It is essential to look at the social factor of a country after putting efforts into developing environmentally friendly buildings as it's evident that construction causes a high level of energy consumption which results in environmental change (Nainggolan, Dewi, and Panjaitan, 2020). It is believed that it is not challenging to develop eco-friendly buildings as ancient buildings and architectural designs represent the best examples of environmentally friendly construction and development. In ancient times, people used to utilize local materials that were not harmful to the environment and nature.

The construction, material, and architectural designs were thoughtful to sustain ecology. Hundreds of years old buildings in the world, including Pakistan, reflect architects' hard work, the best choice of material, and long-term sustainability. Those ancient buildings show the living standards and space protection of older people, and the excellent health of buildings depicts the quality of chosen material, choice of land and its organization, zoning, and climate considerations (Keskin and Erbay, 2016). Over time, advancement in different aspects of life and the arrival of digital technologies and architectural methods and designs are also being seen. The modernization and variations in housing designs are not troublesome. However, innovation only considering better designs, use of space unthinkingly, construction of significant land portions, and loss of forests and other natural resources are creating havoc and a big challenge for nature and human health and wellbeing. Architects are more focused

these days on the aesthetics of buildings rather than capturing residents' needs and the impact of construction on their mental and physical health. Residential buildings need more attention than commercial buildings, as housing symbolizes lifestyle and comfort. Residential buildings need to be built considering everyday challenges and needs of human life to enhance convenience and comfort (Anderson, 2016).

Sustainable housing and development are not only the architectural force's responsibility but also related to everyone involved in it. This sustainability assists us in examining our role in maintaining the ecosystem and all our actions and behaviours that impact the environment, as sustainable housing is all based upon human-centred concepts. In this era, more and more industries are being developed to fulfil the aim of being globalized and advanced. The construction of industries has crossed a dangerous limit that is devastating the natural resources and climate worldwide. The world is moving towards economic growth by establishing industries and utilizing modern machinery but causing so much damage to a healthy environment and nature (Rahman, Alam, and Velayutham, 2021). However, developing countries understand sustainable housing differently due to the limited natural resources compared to developed countries, which have natural resources and financial assets for their growth and development.

PROPOSED METHODOLOGY

The Concept of Sustainable Housing

This research study will discuss the concept of sustainable housing in light of previous literature and relevant studies. The topic of sustainability house and housing has been gaining the attention of researchers for many years. Many researchers have been published to promote sustainable living to strengthen the lifestyle of human beings and protect the natural environment. The studies focusing on the impact of different crucial factors on sustainable living will be added to this research study. The contribution of sustainable houses and housing will also be described in detail regarding the relevance of its impact on residents' physical and mental health and the quality of the surrounding environment. The research study will illustrate the theoretical framework that is the backbone of this study. The framework will help readers understand this study's concept through a visual diagram. The research study will discuss all the hypotheses and assumptions in light of previous studies in the section on hypotheses development.

Levels of Sustainable Housing

Housing is a basic need of human beings that shelters them. The housing process is highly affected by environmental, social, and political circumstances. The housing process is initiated by the "identification of need" stage. The need for housing emerges to improve living standards and fulfil the basic need for housing (Golubchikov and Badyina, 2012). The literature explains that the underlying need to move from one home to another is an improved lifestyle and better health. A study was done on residents of different areas willing to move to another house, and results suggested that most of them complained of respiratory diseases and school absences of children due to poor health situations (Prochorskaite and Maliene 2013). Another study claimed that people are more willing to move to a new place when they find a lack of social contacts, neighbours, and friends in their area to seek new relationships to fulfil their social needs (Karuppannan and Sivam, 2011). Another study suggested that people seek another residence to improve their family life more than to enhance their lifestyle.

Another study with the same objective of understanding residents' need to change houses explains that people find houses in a place that resembles their cultural norms. Cultural norms are followed by living in a house depicting residents' culture and social norms, such as separate rooms for parents and children, a garden for relaxation, and a praying area (Zingoni et.al, 2018). Housing needs are associated with social class and income status. Literature highlights that people strive to find houses similar to their social status as housing has become a great sign of social status and living standard. The size of the family also determines the housing needs and the size of the house required (Dimuna, 2018). Another predominant step at the beginning of sustainable housing is the "ability to pay" correlated with the country's economy. An increase in inflation causes a rise in housing prices that affects dwellers. Along with inflation, issues of supply and demand also create difficulties for the construction industry that hinder the material and technological availability to develop sustainable houses.

People who seek sustainable houses seek residence in those areas that are less populated and industrial-free zones to avoid unhealthy atmosphere that creates fewer options for them related to the availability of houses. Racial discrimination is counted as one of the barriers to making housing sustainable because it makes people uncomfortable and dissatisfied with the neighborhood. However, the beginning of the housing process depends upon the intensity of need and demand of the person who wants a house to live in. Too many demands and criteria can cause hindrances in seeking an appropriate house. Hence, a house that can provide a healthy environment to survive and fulfil necessary human needs, such as socialization and readily available facilities, can create a sense of satisfaction and well-being amongst residents as shown in Figure 2.

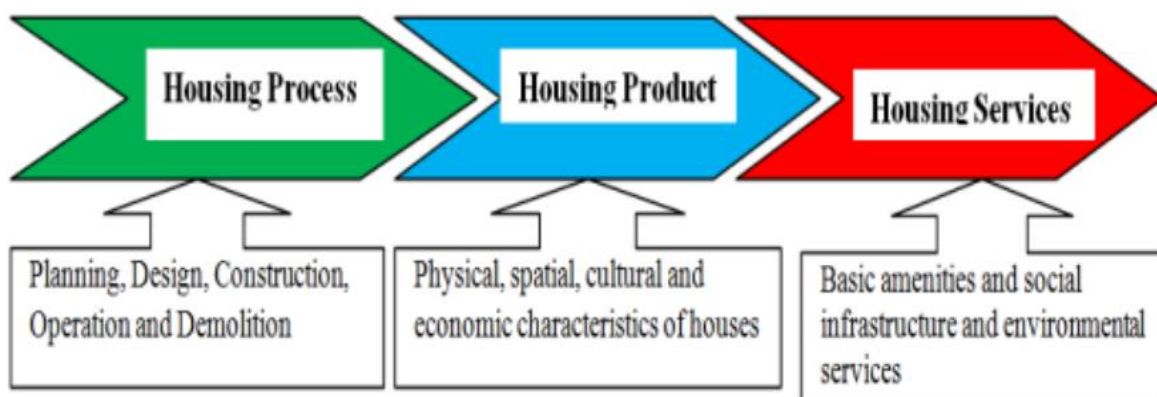


Figure 2.
Housing Process (Ibem and Aduwo, 2015)

Housing Process

The housing process involves planning, design, construction, operation, and demolition. This stage is mainly about the technological aspect of the housing process. The planning of the housing measures the cultural and social needs of residents, motivating them to choose a house at their preferred location. The cultural and social likeness with others creates a sense of belongingness and gives an identity to the person that makes it easy to mingle and develop relationships with neighbors. The planning phase also considers the resident's affordability criteria, which helps the management process the remaining stages under the described cost (Mulliner, Smallbone, and Maliene, 2013). Planning a housing scheme drives the management to think about the climate of the specific area or region that is critical in development

and construction. The material and architecture should be chosen wisely to tolerate the changing weather and climate harshness (Nguyen et al., 2011). Geographical features are also valuable for deciding the house's structure by considering the area's environment and geological attributes. Moreover, when planning, all necessities such as water supply, electricity, gas, transport, and communication networks are kept in mind to make the project successful by making them available readily (Dong, 2016). The planning phase is followed by the designing of the house, which requires the client's active involvement. According to his needs, the client's input plays a significant role in constructing a quality house. The design of the house requires government guidance and conformity with the law under construction theme. The documentation at the designing stage is essential for written proof to work smoothly in the later stages of the process (Hansson, 2017). The literature emphasizes that the poor quality of a project can result from lacking documentation. More factors, such as short time and low cost, can also diminish the quality of the project. Poor material and limited construction knowledge can hinder quality outcomes (Jonathan and Simone, 2017).

The relationship with the client and understanding of his needs can positively impact the quality of the project by making him satisfied. The expression of clients' needs and actual design can be expressed with the help of drawings that should be focused and represent the structural developments, electrical network, plumbing routes, and joints to avoid any uncertainty and misperceptions. Literature states that most errors and mistakes occur at the design stage that, if not seen carefully, can cause profound implications later. The next step in the housing process is called construction, one of the most essential tasks in housing. The idea of construction originated from the communal system, which was interested in constructing buildings for their community, explicitly using natural materials. The idea was modified to fulfil the clients' modern needs by providing luxurious designs and attractive architecture (Bibik and Dril 2017). Using human labour to develop unique and complicated designs became a culture in the construction industry that came into control with the arrival of the latest technologies and types of machinery to work efficiently by reducing human labour.

The conversion of human social, cultural, and financial needs modified their living standard, which became a more advanced way of constructing residential and commercial buildings (Remali et al., 2016). The ancient Roman architects and engineers focused on all aspects; beauty, strength, and benefits while constructing the buildings in their classic styles. Modern construction focuses on materials and technology to fulfil clients' shelter needs by developing multistory buildings without keeping track of environmental safety (Jokilehto, 2017). The next step in the process is the stage of the operation when all primary and secondary construction takes place and is examined. This step does not merely relate to the building structure, but other internal operations such as plumbing and wiring are done in this step. All construction is operated in this step by residents and utilized is later converted into the step of demolition to reestablish the building for make it more solid and modern by consuming modern technology.

Housing Product

Housing product refers to the outcome of the housing process that takes months and sometimes years to come into existence. The final product is a place that provides the client with an opportunity to live. Stay for an extended period; the physical features of the house play a critical role (Krokfors, 2017). The physical characteristics of a house represent the house as it looks. The height, design, and size of doors and windows,

entrance, walls, and other visible features. Physical features also reflect the type of housing by its structure and architectural style. The physical features of housing are very significant in changing temperatures and can be analyzed carefully according to the locations' temperament. An Iranian study explained different types of physical housing features in different country locations and related the infrastructure to temperament. According to the study, some houses are introverted, which means only having a few windows open in the private yards, but some houses are extroverted, with multiple windows open in private yards and public spaces. Some houses are open, with many doors facing alleys and vast porches that give outside a clear view. On the other hand, some houses are big and possess large spaces but do not have an outside view due to closed infrastructure. Some houses have high ceilings, and others have low ones that also make the appearance different from houses as shown in Figure 3 to Figure 6.

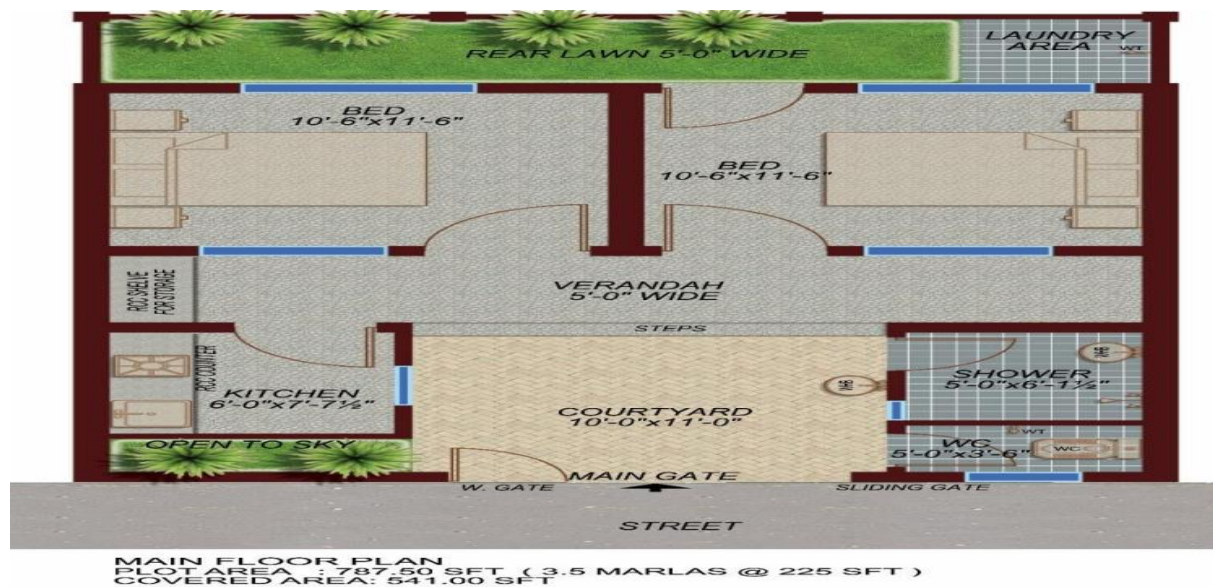


Figure 3.
House Operation Process



Figure 4.
House Operation Process

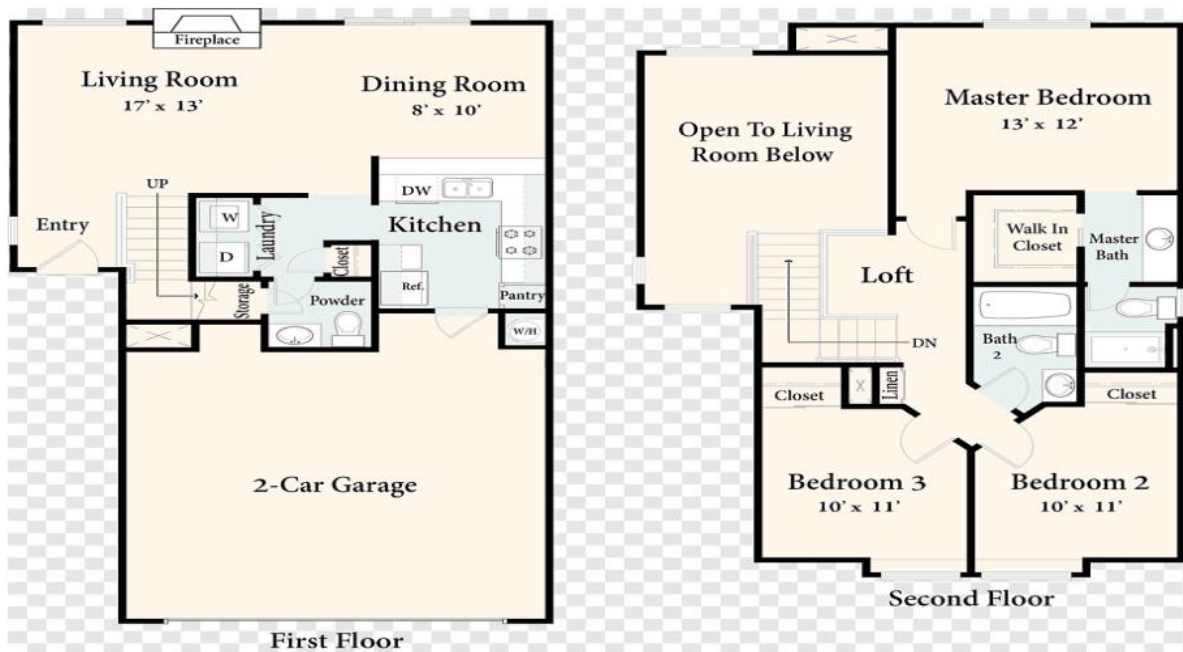


Figure 5.
Physical features of a house (Floor Plan)

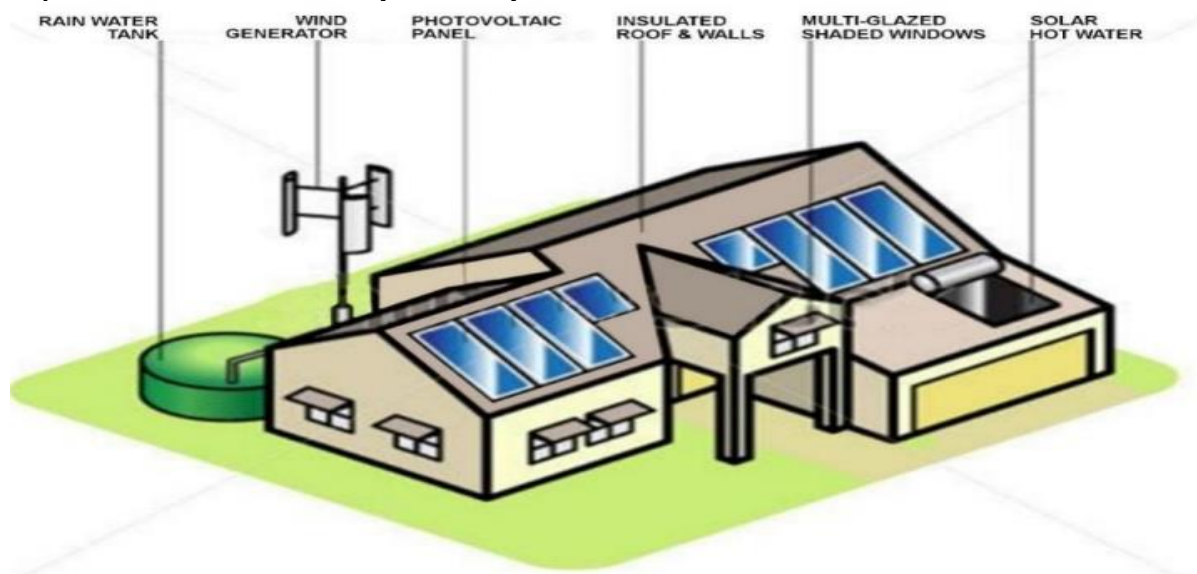


Figure 6.
Physical features of a sustainable house (Stoikov and Gassiy, 2018)

Literature suggests that the physical features of the housing can be classified into two categories. The first quality belongs to the construction quality that has earlier been discussed and has a principal value in the housing characteristics. This quality focuses mainly on the systems installed in housing during construction, such as energy covering systems, plumbing, and electric systems, and the material used during construction. Another quality refers to the physical features of housing, including the type of housing and its size and appearance. The research emphasized that the size of the house and structure predict the consumption of energy and other resources that increase as the size of the building increases. The number of rooms and their location also matters in the physical characteristics of housing associated with energy consumption and

resources (Gao and Asami, 2011). The age of the housing is another physical feature that interferes with the housing process. Literature shows conflicting views in this regard. Some studies believe old housing is more efficient and newer is prone to consume more energy and resources. While some authors discussed that new housing has the latest technology that consumes fewer resources and proves environmentally friendly (Palm, Raynor, and Warren-Myers, 2021), moreover, amongst all physical features, the type of housing is another topic of discussion. Type of housing describes the houses with a single story, multistory, apartments with two to four units, apartments with more than four units, mobile houses, semi-detached houses, etc. These types of houses are significant according to the needs of the residents. Although the type of house is large but occupied by few people, single-unit houses can utilize more energy than the rest (D'Alessandro and Appolloni, 2020).

Spatial characteristics of housing refer to the qualities of the area occupied for construction and residence. The spatial characteristics, such as the security level of the area, its liveliness, straightforward approach to resources, peaceful environment, and opportunities to socialize are a few of the most notable examples that motivate clients to seek housing in the preferred area. A study done in Switzerland reflects the power of spatial characteristics by discussing the construction of an urban area. Bern was developed at the corner of a forest that was separated from the forest by constructing a highway between them. The city was covered with a natural landscape offering opportunities for public transport (Lufkin et al., 2018). Housing arrangement is a crucial feature that describes the spatial characteristics of housing as shown in Figure 7.

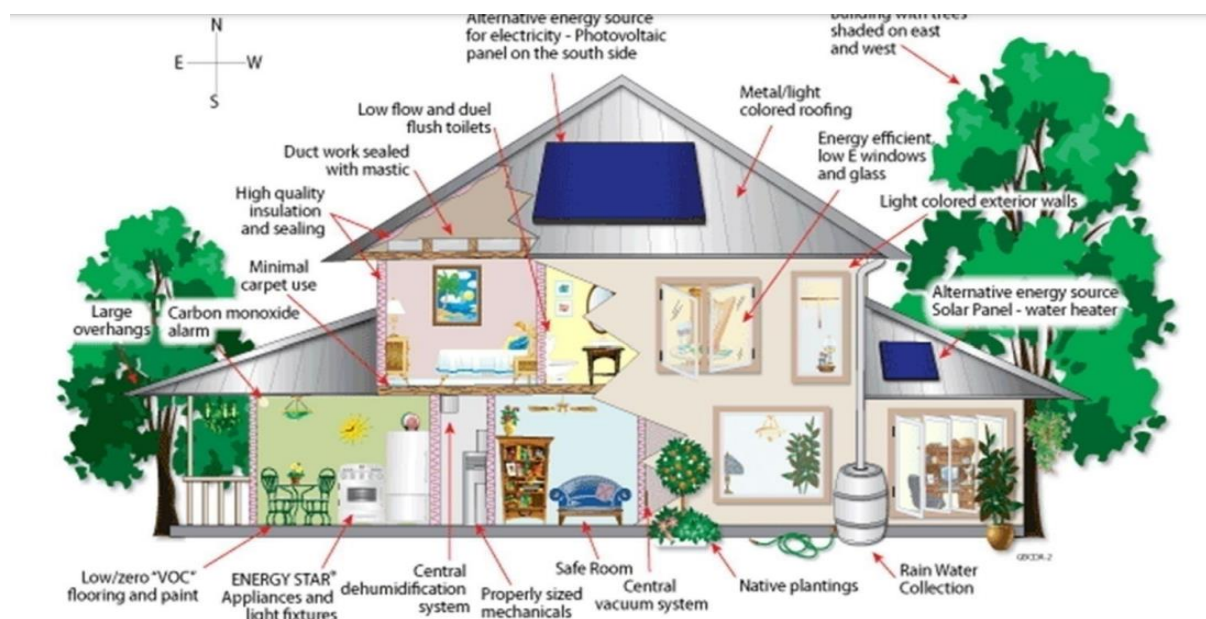


Figure 7.
Spatial features of a house (Chaijan et al., 2018)

Literature found that in some areas, people are concerned and dissatisfied with the distant buildings, providing them with less opportunity to mingle. On the other hand, some citizens were dissatisfied with close buildings that interrupt their daily routine due to noise and overpopulation. It was found that people usually like safe and secure areas with parks, children's play areas, and open areas for sports activities. While in some areas, people do not like open areas and perceive them as a barrier to privacy. Some areas are characterized by houses with spacious balconies and terraces that help them socialize with neighbours and consume quality time socializing. Children's

play areas are of great importance in spatial features of accommodation as this is the physical need of children to be involved in physical activity outside. Private vehicle parking and the availability of public transport are major concerns of dwellers in seeking spatial characteristics as shown in Figure 8(Cazacova et al. 2010).

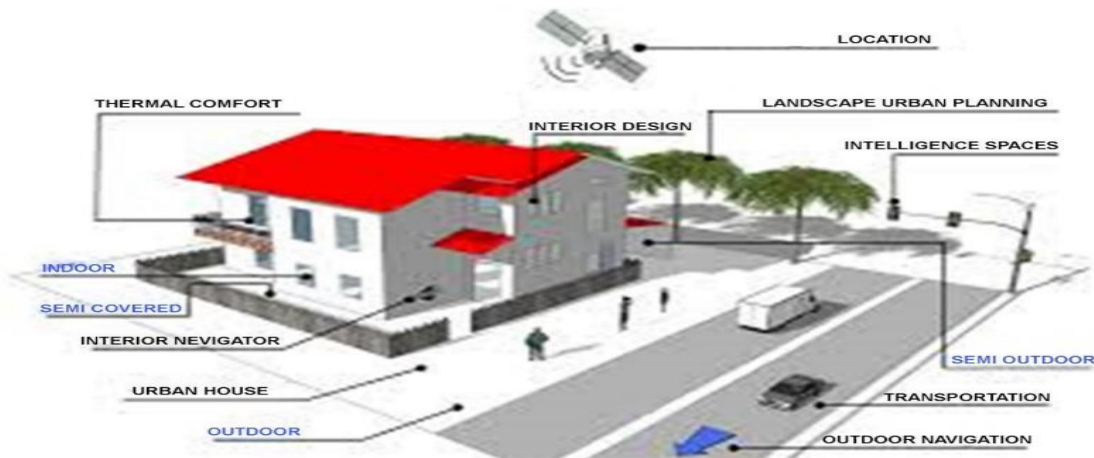


Figure 8.
Spatial Features of a sustainable house

Cultural aspects have been given sheer importance in housing characteristics as culture reflects in a human's lifestyle and every action. The best example of cultural influence can be seen in Malay housing, representing the best space usage by constructing houses efficiently. The extrovert style of its construction, lack of internal issues, and sharing of external spaces help the residents interact with each other frequently, offer hospitality, and do healthy social practices. The space was used by keeping gender differences in mind, which is part of their culture, and defined the sleeping space for everyone. Males and females have different areas allocated for sleeping, even in the presence of guests who share the same space. This tradition and cultural aspect of construction reflect their family priorities and community integration skills (Nawawi et al., 2014).

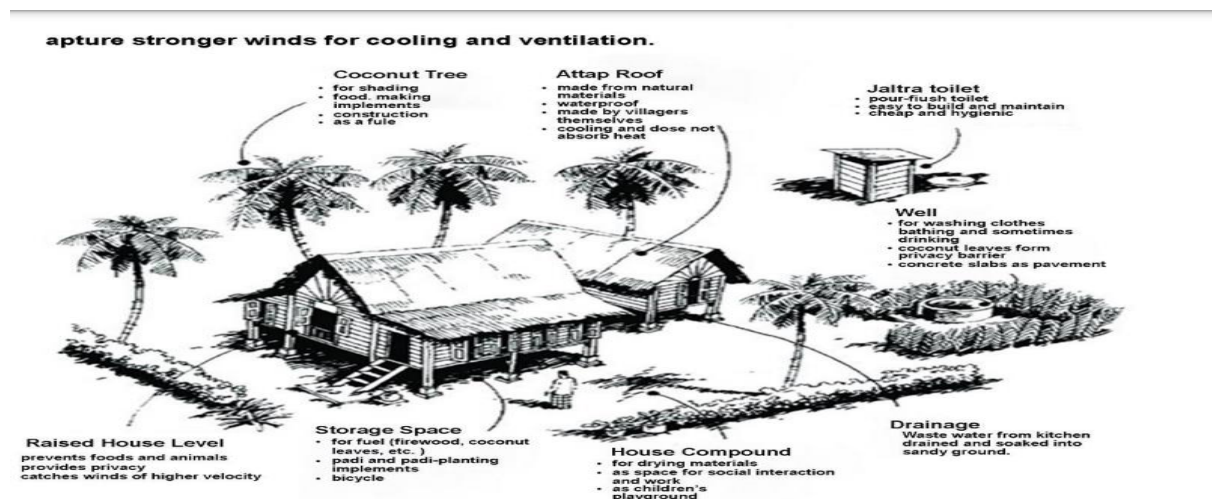


Figure 9.
Malay Housing System (Muhammad et al., 2018)

Another study with the same variables concluded that in Gaza, housing is preferred on a cultural basis that predominantly focuses on religion, gender, kinship, politics, and

social relationships. In Palestine, people are comfortable nearby their extended families rather than living in the same housing to intact their privacy and cultural aspects. The cultural aspect also describes the importance of religion and a sacred place to do religious practices as a major contributor to successful housing. Cultural features of the housing can be seen from the house's entrance, which is of great importance in different cultures. Some people decorate their entrances with flowers, pictures, religious quotes, etc., reflecting culture's importance. Moreover, the housing structure is also a sign of cultural background; the extrovert features of the house show the people's openness and social nature, while an introverted structure with fewer windows and doors is a sign of conservativeness which is represented in Figure 9. In the housing product, the economic feature means a lot to people for decision making as per their affordability to invest in it. Many economic features are counted when the product gets ready to reach the market. The productivity and cost of housing is a significant feature that enhances its value in the market. Most of the cost is utilized on material, labour, capital, and management of a project. The management keeps a budget to invest, so they have to work efficiently to utilize less cost in production.

The cost of housing is significantly essential in demand and supply. At the time of production, clients' affordability is kept in mind to make it price-competitive. A similar product with the same quantity can compete with an expensive product, which motivates construction firms to keep their cost market-friendly and efficient (Larionova and Pavlova, 2014). Moreover, the value of land is another economic feature that plays a critical role in the value of housing. The land is a natural resource with an inherent value that can never be diminished. The environment around the chosen land and the presence of natural resources make it more precious. The value of land increases as the demand increases, and currently, the increasing population has increased the demand for land to make accommodation possible for the present and future generations. The land's illiquid nature makes it more valuable as this is a significant investment that cannot be readily done by cash payment. The necessary payment procedures enhance its value and demand that is irrelevant to the location. This is also said that the impact of the country's overall economic condition affects housing like other areas of development. The economic health of a country can be measured by its Gross Domestic Product, manufacturing activities and industrial performance, ratio of employment, and the prices of goods along with the tendencies of import and export.

Different types of housing are affected differently by the fluctuations in the economy. The residential buildings and the construction process tend to suffer highly due to the diminishing purchasing power of consumers. Similarly, unemployment is a threatening factor that causes the demand for housing to lower due to the low purchasing power of employees. Unemployment does not allow consumers to reach the housing market due to the lack of capacity to buy or afford rent. Another economic factor that becomes a barrier to affordable housing is the increase in interest rates. An increased interest rate on mortgages makes affordability difficult and is reviewed by the government occasionally. The availability of mortgages is itself a big challenge. A rapid shift in the global economy limits organizations from offering loans and mortgages to fulfil housing needs. Limited resources and scarcity of financial offers decline the purchasing power of consumers (Hoxha and Salaj, 2014). Hence, the product outcome of the housing process still has to face many challenges in the form of cultural, economic, political, and physical characteristics that significantly affect the industry when the consumer makes the mind to invest in housing. Some of these

characteristics are individual, and some are collective. The characteristics that can be modified by a slight change in the housing process can not bother the consumer compared to those that are out of hand.

Housing Services in Sustainable Houses

These include all social, environmental, and essential services required for a healthy household. Many amenities have become helpful in modern lifestyles that cannot be ignored to lead a healthy life in this century. The availability of efficient electric supply and power backups is highly in demand. The availability of these amenities enhances the value of living and provides ease in life. Sustainable housing is achieved when the electric supply and all connections are well established carefully to fulfill residents' needs. In the same way, car parking is another required facility to keep the personal vehicle safe. Sustainable housing and development emphasize the need for car parking. However, public transport is always appreciated in sustainable development to promote environmental safety, but the housing needs to capture the viewpoint of residents who seek the safety of their belongings. A separate area designated for car parking enhances the value of housing due to the additional facility given to the resident to keep their private vehicle in a safe place. The latest literature argues that limited car parking areas must be considered to promote public transport as shown in Figure 10.

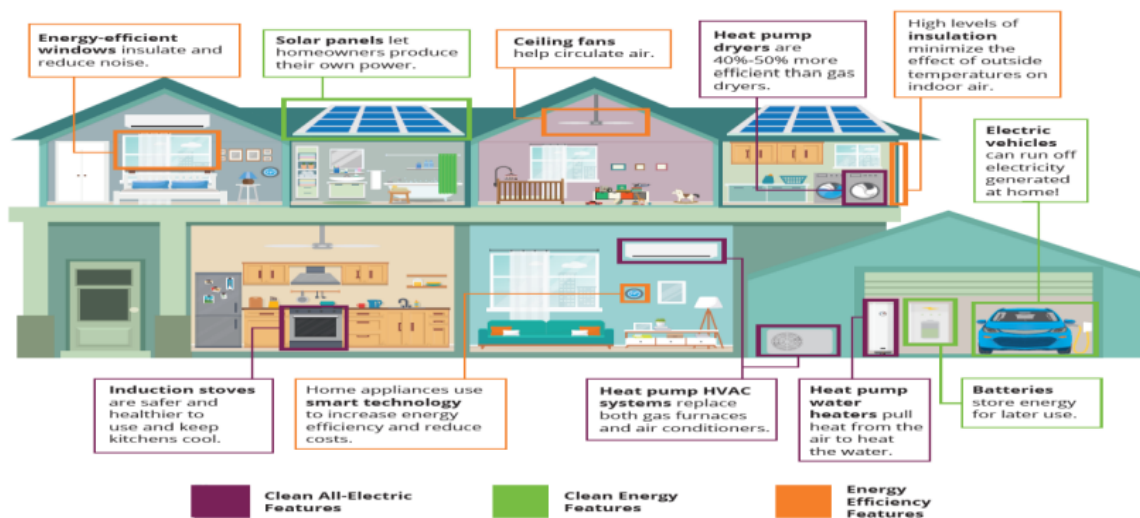


Figure 10.
Electricity Services in Sustainable Housing

Apart from other amenities, security, and safety have been a significant concern of dwellers. Priority has always been given to a secure environment where a family can stay longer without concern or fear. Sustainable housing development keeps the factor on front and posing all efforts to provide a security system with modern housing. Moreover, the establishment of smart homes is in line with that suggests that all house systems can be controlled remotely by connecting them with wireless technology. Security cameras and house locks can be connected to the controlling system that can be monitored and controlled anywhere. The automatic and remote control of electric-consuming gadgets and devices can play a critical role in decreasing the greenhouse effect (Komninou, Philippou, and Pitsilides, 2014). These include all social, environmental, and essential services required for a healthy household. Many amenities have become helpful in modern lifestyles that cannot be ignored to and

lifestyle and are being implemented worldwide. An example of such an exclusive model was developed in Austria and combined into three parts. They included the replacement of windows, rebuilding of the interiors, and modifications to the structure of the units, as well as the installation of solar panels for heating systems. The thermal insulation of the building and the addition of new structural elements to the exterior were two energy-efficient measures. They were constructed of timber and had copper plating on them. Interior lighting that is well-lit reduces the need for ambient light. Large open portions on the wall and the cemented ceiling and walls' heat capacity encourage solar energy recovery through passive means. A separate area outside has been designated for social gatherings and small meetings, which is necessary for older citizens to keep them engaged in healthy living.

When the client plans to move to a new house, water is a primary necessity for highly demanding individuals. Providing an efficient water supply should be the commitment of the construction firm. For years, the central operating system in water supply and sanitation services has helped to improve widespread access to safe drinking water and adequate sanitation services. However, the traditional cycle of water supply and sanitation services can result in significant redundancies and cannot address the problems of today's water concerns. One of the most basic premises for developing nations to promote their socioeconomic growth is access to clean water resources and efficient adequate sanitation. International communities have put forth much effort to build such a vital foundation. Piped water supply systems and large-scale, consolidated wastewater treatment systems are critical for improving essential water and sanitation services as shown in Figure 11a(Çelik, 2021).



Figure 11.
Sustainable Housing in Austria

Critical Success Factors for Sustainable Housing Physical Aspect and Climate Consideration

Designers, architects, and planners have substantial potential to create or rebuild robust outdoor spaces and buildings in the face of future climates due to climate change. In the future, adaptation will improve communities' liveability and quality of life. Climate change allows new services and products to be developed in response to shifting customer preferences. The first to grab these possibilities will obtain a competitive advantage known as an "early mover." Many adaptation strategies contribute to wider policy objectives and the creation of a quality public realm. The imperative to manage high temperatures and reduce flood and drought impacts can justify creating and maintaining green infrastructure. In turn, a linked network of open spaces that a range of people can use contributes to the quality of life and health. It

is also crucial in maintaining and improving air quality, flood and surface water management, and biodiversity (Rice et al., 2020). An adaptable and sustainable urban environment uses well-designed green and blue spaces for cooling, water storage capacity, and rainfall infiltration. Unfortunately, public and private greenspace is frequently squandered during urban expansion. Cities not constructed to cope with hotter, drier summers may need mechanical air conditioning more frequently. This not only adds to climate change but also has social ramifications. In order to preserve the long-term viability of future communities, planners, developers, urban designers, and architects must examine potential conflicts between adaptation and mitigation actions as shown in Figure 12 (Raneses et al., 2021).

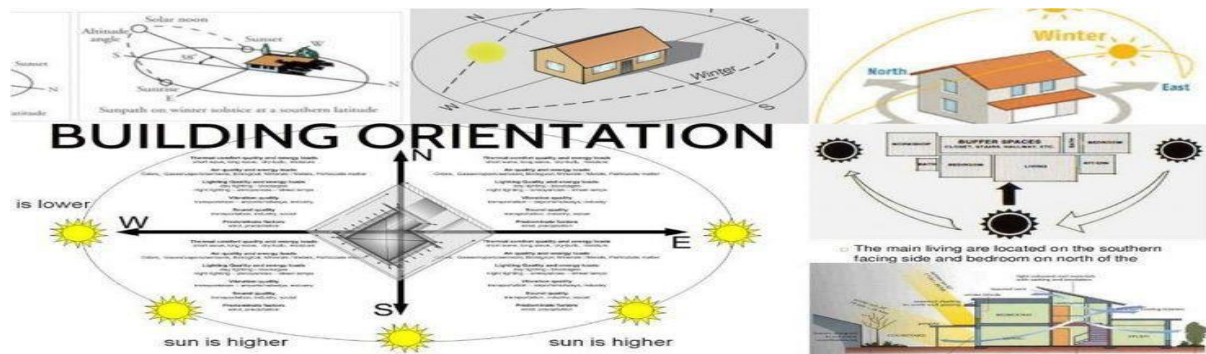


Figure 12.
Climate Consideration in House building

Flexibility

Few studies in the literature deal with user evaluations of requested flexibility in house design. Notably, the assessment of architectural design flexibility is closely related to the user assessment of home design, which considers several qualities for assessing architectural design flexibility. The floor plan's flexibility, the flexibility of the windows and doors, the finishes, the visibility of the service pipes, the sound level, and the renovation cost are all factors to consider. The researcher chose these assessment features based on his assumptions and observations, implying that there are fundamental variations in how a designer and a layperson analyze and interpret the living environment, with the designer relying on their knowledge. Laypeople did the study's evaluation. However, it was based on the predictions of a researcher. Flexibility is measured using the research listed above and others (Estaji, 2017). As a result, flexibility is ultimately linked to a long-term social, environmental, and economic need. Flexible housing, emphasizing technology (building and services) and use, allows for unpredictability regarding demographics, social interactions, and technological advancement. Flexibility is about designing out of obsolescence and future-proofing our buildings by embracing change as an underlying parameter while accepting the quantity and scope of change as unknown (De Paris and Lopes, 2018).

Demographics

Nationality, religion, population, age and sex composition, structure (urban, rural, nomadic, etc.), and population mobility and development are all concepts in demography. Population expansion encourages city development and necessitates increasing the number of houses and improved quality (Perrucci, Vazquez, and Aktas, 2016). Housing consumption will change as the population grows. Because the demand for housing must originate from a population that needs to be

accommodated, the housing market's overall dependence on population increase is well known. In demographic structures, age structure is most closely related to housing consumption. Modigliani researched the relationship between age and consumption in 1954 and presented the Life Cycle Theory. Campbell and Easterlin concentrated on the link between age structure and home consumption in the early period. Carliner argued that the income elasticity of housing demand varied with age, resulting in disparities in housing consumption (Green and Lee, 2016). Family size, education level, and other socio-demographic characteristics are becoming increasingly significant in determining whether or not to buy a home. Scholars usually look at population social structure from two perspectives: education structure based on individual characteristics and family size based on family characteristics (Jin, 2018).

An Analysis of Existing Housing Policies Worldwide

Different sorts of housing policies have been used and applied all over the world since World War II, and all of them can be grouped into four fundamental types: policies relating to demand and supply, policies supporting house ownership, and policies promoting rental housing (Malik and Tariq, 2020). According to Tariq and colleagues (2020), Demand-oriented policies primarily address the housing sector's demand side and include tactics for increasing housing demand in the first phase to secure higher house ownership and later attempt to regulate that demand. Because of the immense destruction caused by World War II in many nations, affected countries implemented supply-oriented strategies to address the housing shortages produced by the war and rapid urbanization. Many developing countries have also implemented supply-oriented policies by building more housing units to meet rising demand. Many countries have experienced a substantial shift in policymaking, shifting their focus from supply to demand. The Republic of Korea and Singapore are two countries that initially implemented supply-oriented policies and increased housing supply before shifting to demand-oriented policies.

The government focused on interest rate deregulation, reverse mortgage loans, and cash subsidies. Many developing Asian countries now consider supply-side strategies as vital as demand-side measures. In India, for example, policies aimed at the supply side are still regarded as crucial as those aimed at the demand side in ensuring the delivery of affordable housing units (Clapham, 2018). A summary of housing policies in developed and developing countries is provided here; This list is based on the fact that these countries solved most of their housing problems by systematically implementing their national housing policy. England, Chile, the United States, and Malaysia's housing policies are examined to learn how these countries dealt with housing-related challenges. It also aided in developing a deeper grasp of the processes and practices involved in formulating an efficient national housing strategy. The countries mentioned above are constantly changing their housing policies to meet their demands and releasing a new national housing policy after a set time.

England's Housing Policy

To begin with, England has a highly centralized political system and fiscal sector. Thus the housing sector is also managed by central institutions. The housing sector addresses housing issues, the financial industry, and the Department of Works. The government also invites housing developers, building contractors, housing associations, mortgage lenders, and landlords to step forward and engage with government institutions to make the policies a reality. In addition, the government makes interventions based on

demand, such as planning laws, grant money, and lending programs (Murie, 2012). The primary goal of the English government has always been to increase the proportion of people who own a home. The government and relevant departments have implemented many regulations and guidelines (Holmans, 2005). However, while the government concentrated all these programs on promoting home ownership by improving the community's purchasing power, supply did not keep pace. As a result of the increased demand, there was a lack of units, resulting in an affordability crisis. However, the housing stock has improved throughout the years, and in the last decade, the proportion of non-decent houses has dropped below 20% from a high of 35% in 2006 (Mckee et al., 2017).

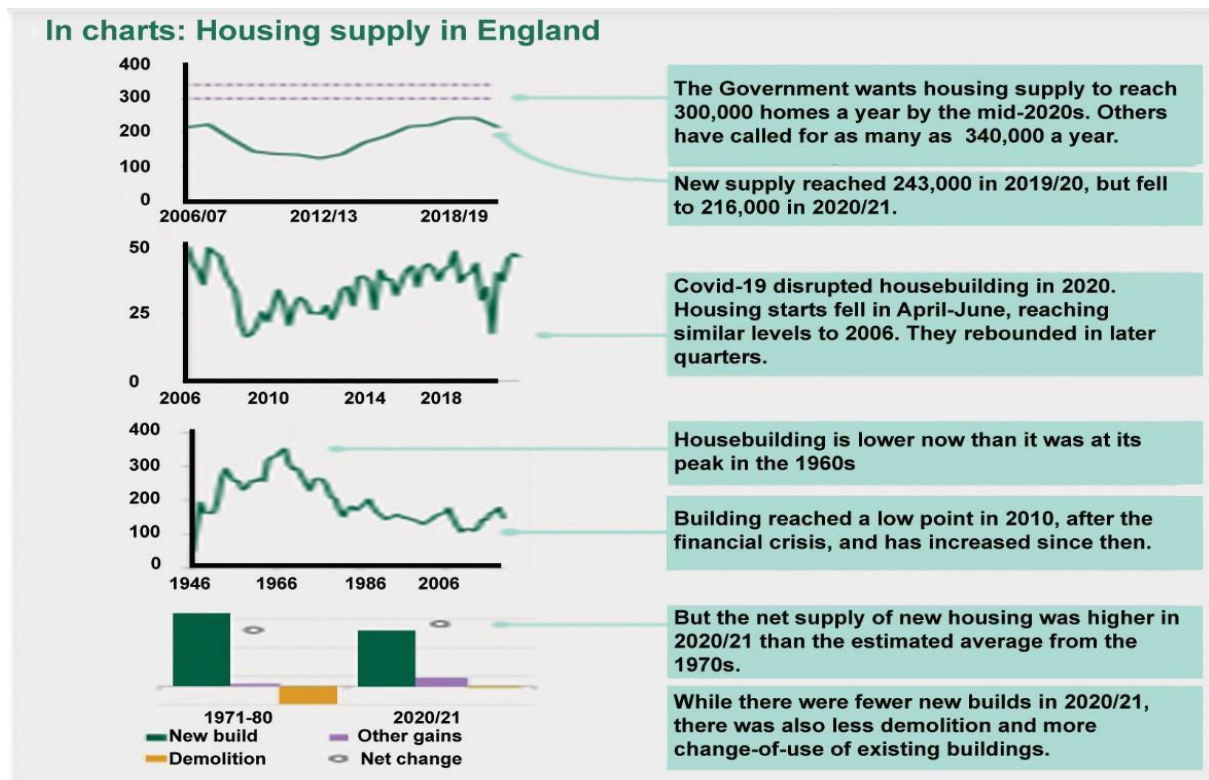


Figure 13.
Housing Supply issues-England (Sayce et al., 2012)

Following discovering the fundamental issue, the government plans to produce 1 million units in the next five years (2015-2020). The government hopes implementing this scheme will improve home ownership and housing supply. If delivered on time, these 1 million apartments will be an excellent addition to the country's housing stock and affordable to people experiencing homelessness which is represented in Figure 13 (Murie, 2012).

Chile's Housing Policy

Chile has the highest per capita income in South America, at \$14,000. Chile's housing policy has emphasized assisting low- and middle-income families in purchasing homes. Household savings programs, state housing subsidies, and government aid for long-term mortgages are among the policies. These initiatives hastened the development of the formal sector and mortgage-backed home ownership (Del Pero, 2016). In the second half of the twentieth century, the government focused on building affordable units and built 75 % of the estimated units to increase ownership and reduce housing shortages. This resulted in fewer crowded housing units; in 2002, 242,000 secondary

households were living in central housing units; in just four years, that number had reduced to 126,000 (Farias, 2014). Later, the government implemented a new program that focused on providing funds to people rather than loans to promote the purchase of newly constructed or existing housing units. Recipients have to pay a small amount of money. It eventually resulted in a significant drop in government loans and assistance to middle-income people (Del Pero, 2016). Authorities also wanted to expand access to high-quality, affordable housing by providing more high-quality units and improving the condition of older units. As a result, the number of households living in poor housing units decreased from 780,000 in 1992 to fewer than 500,000 in 2011, and the poverty rate decreased (Cummings & DiPasquale, 2002). At the market end, the management attempted to enhance access to housing financing by providing additional subsidies to low-income groups, allowing them to purchase a home reasonably. The administration also focused on rental housing schemes, allowing low and middle-income young families to meet their extended housing needs by allocating 25% of their income to housing rent. Emergent families with household heads aged 18 to 30 and monthly earnings ranging from \$360 to \$1,125 were targeted; rent varies but is expected to be around \$400 (Farias, 2014). Chile developed market-oriented social housing policies in the late 1970s, with demand-side subsidies to improve financing and formal housing access. The state provides supplemental funds to low-income groups as part of this approach, allowing them to obtain a dwelling unit at a reasonable cost (Urzua, 2008).

Malaysia's Housing Policy

The Malaysian government considers the housing industry critical because it ensures socioeconomic stability and fosters growth throughout the country. According to the government, housing is an essential requirement and an important component of the country's economy. According to the Ministry of Finance Malaysia's economic forecast for 2010/2011, the construction sector is predicted to contribute 4.9 % of the country's Gross Domestic Product (GDP) in 2010 (Idrus & Ho, 2008). According to Tan (2011), Malaysia's government has prioritized the supply of low-cost housing in its five-year national plans since independence. For this aim, government agencies had direct control over the situation and could produce housing units in metropolitan areas with the help of private urban agencies. Furthermore, the private sector was required to establish a 30% quota for low-cost housing in residential areas in order to ensure that low-cost housing was available (Bakhtyar et al., 2013). Like all other countries, Malaysia has encountered troubles and challenges over the years, and its housing policy has been centred on these issues. For example, abandoned housing projects, a widening gap between supply and demand for housing, poor quality built houses and outdated construction techniques, low affordability of housing for people with low incomes to own or rent, noncompliance with building and planning regulations, and ineffective government monitoring. According to Sulaiman and colleagues (2005), the concerned authorities attempted to address the difficulties mentioned above, and as a result, the most recent housing policies have the following primary goals:

1. Ensure appropriate and high-quality housing is available, with all necessary amenities and a conducive environment.
2. To increase people's ability and accessibility to own or rent a home.
3. To propose future recommendations to ensure the housing sector's long-term viability.
4. The policy is formed based on thrusts and policy declarations to achieve the goals mentioned above.

First and foremost, the policy framework prioritized the provision of suitable housing tailored to the requirements of target groups. It was suggested that government organizations work with private agencies to ensure that people of all income levels can access rental and saleable housing (Foo & Wong, 2014). It was suggested that the number of low-cost residences built in any new mixed-use development should be proportional to the demand in the area. It also offered recommendations for improving people's ability to purchase or rent homes, such as setting realistic prices for low-cost homes and limiting ownership and procurements to prevent speculation in the housing market. It was also suggested that Housing Micro Finance Institutes be established to provide financial assistance to the low-income population for access to shelter (Abdullahi & Abd Aziz, 2011). Second, it underlined the importance of increasing the housing sector's quality and productivity. To improve the quality of the building, it was suggested that professional and qualified personnel be used. Some standards and specifications were established, and everyone was required to follow them; a few limits were also recommended to encourage the use of locally available building materials. The policy framework strongly emphasizes ensuring the successful implementation of government policies and ensuring that people follow the rules. They improve, develop, and enforce housing rules, regulations, and recommendations. Policymakers insisted on laws and practices ensuring the housing sector's long-term viability. This might be accomplished by employing new technologies and ideas and providing environmentally friendly homes. The need for urban renewal and renovation of historic buildings was recognized and emphasized in improving housing research and development initiatives.

United States Housing Policy

Housing is the third largest consumer expenditure in the United States of America, after food and medical bills. According to the Housing Act of 1949, the purpose of Congress was to provide quality and affordable housing to every American family. To reach this goal, the government has contributed to constructing and repairing almost 5 million housing units for low-income families and providing rental vouchers to about 2 million additional households, yet the country's housing problems remain the same (Schwartz, 2021). The following goals are frequently specified in housing policies in the United States (Mueller & Steiner, 2011):

1. Assuring a minimum level of housing quality.
2. Increased housing supply.
3. Encouragement of new buildings and preservation of existing housing
4. Stabilization of rents and asset prices
5. Reduction of overcrowding
6. Encouragement of house ownership.
7. Community development.

As a result of its ability to address the state's need for low-cost housing, the public housing program, which began in 1937, has resulted in improved job possibilities and slum clearance. The public works housing division announced 58 projects totalling more than 25000 residential units. The Housing Act of 1949 reauthorized the public housing program to deliver 81,000 homes in the next six years. Since the program began, housing production has increased, reaching a peak of 1.4 million units in 1994. However, by 2012, housing output had decreased by 18 %, with over 25000 housing units lost. Only 9% of all public housing in 2012 was constructed after 1989. In contrast, 44 % of all public housing was constructed before 1970. In 2012, 3,095 housing

authorities in the United States owned and operated public housing (Conway & Alcock, 2003).

Housing Policy of Turkey

The housing policy of Turkey has been described in studies in five stages that represent how modifications take place as per the needs of residents and the country. The need for housing must be fulfilled at every stage by applying modern and effective policies (Sarioglu-Erdogdu, 2014). So, the first housing policy stage was initiated in 1923 and ended in 1945. Due to the low rate of urbanization during this time, the need could be satisfied by homes built utilizing individual housing supply types. However, Ankara, expanding at a rate of 6%, became the capital city by the republic's proclamation in 1923. Thus, housing was starting to be an issue. Moreover, some immigrants were Ottoman Empire nationals moving to Anatolia from West Thrace, which led to a housing crisis. The state had set a limitation on rent costs at this point, and it remained in place until 1963 to encourage the utilization of the existing housing stock (Baradan, 2008).



Figure 14.
Ankara, The Capital of Turkey (1923)

The second phase of Turkey's Housing development remained from 1945 to 1960. The country's urbanization rate increased to 6% during the second era, and the supply of existing homes was insufficient, resulting in two new types of housing development, shanty and build- and-sell housing system. However, the number of slum houses expanded daily since housing issues and progress had been handled separately, and the relationship between the housing sector and the economy had not been considered at this time as shown in Figure 14 (Sarioglu-Erdogdu, 2014). The next stage (1960-1980) has been described as the planned era. Studies were carried out within the framework of four five-year development plans, which were created. These programs consider housing-related issues as a health benefit, so "corresponding the necessity" is used in place of "doing everything possible to help every homeowner." Then the interim period lasted 3 years (1980-1983). The first law on mass housing was passed during the interim period. The law was in effect for 2.5 years.

However, it was never put into action. The ability to provide loans to individuals was one of the most significant features of the new mass housing law implemented during the liberal period. House manufacturers were also given personal loans in addition to homebuyers (Sarioglu-Erdogdu, 2014). The liberal period followed the interim period, which is still implementable after 1984 with timely modifications—the initial five years of this stage belonged to the political party to achieve a few goals. The central tenets of the plan include providing infrastructure for slum regions, rehabilitating them, normalizing the ownership situation, creating a mass housing fund, and privatizing the housing industry. Moreover, the financialization policy era started in the 2000s, becoming Turkey's new housing policy. Housing has shifted away from being acknowledged as the focus of the right to housing during the preceding period of marketization. On the other hand, the housing policy has stopped being a measure carried out concurrently with social policy. In any case, social factors remained a role in deciding housing policy.

However, since the 2000s, economic characteristics have primarily determined housing policy. Turkish economic strategy now includes a section devoted to housing policy. Two Urbanization Councils were convened in Turkey in 2009 and 2017 to accurately decide housing policies in addition to macro planning at the national level. The Ministry of Environment and Urbanization, which is in charge of executing housing policies at the national level, convened these sessions where ideas on the state of housing policies today and how they ought to be shaped in the future were prepared. The development of a financial system to support mass housing construction and mortgage mechanisms, a focus on social housing production, the construction of "rental social houses" under the right to housing for groups who cannot afford to buy a home, and increasing the declining share of housing production by providing public loans to housing cooperatives are just a few of the proposals made in 2009, according to the report. As a result, it is asserted that the housing crisis will vanish once urban transformation initiatives are successful. Therefore, it is suggested to make changes to the financial infrastructure to achieve urban transformation (Celik, 2021).

The concept of Batikent

Following the Second World War, more prominent cities in Turkey experienced rapid urbanization, much like other nations worldwide. This was mainly due to the effects of the technological boom, agricultural mechanization, and significant global industrialization, which led to massive migration from rural to urban areas worldwide. Following the Second World War, more prominent cities in Turkey experienced rapid urbanization, much like other nations worldwide. This was mainly due to the effects of the technological boom, agricultural mechanization, and significant global industrialization, which led to massive migration from rural to urban areas worldwide. Squatter areas started to appear due to the extreme lack of housing that this growth in city population brought about (Eryildiz and Batikent, 2002). The Ankara municipal government established Kent-Koop, an institution of the national government, the municipality, and an association of housing cooperatives, to respond to this new dilemma. Later, the project was given the moniker Batikent. Batikent was created as the ultimate answer to the housing crisis and to position itself as a role model for implementing future urban initiatives. For cities in emerging nations like Turkey, the concept of an urban population explosion is relatively new compared to European cities, which underwent a similar process in the 19th century due to the industrial revolution (Eryildiz and Batikent, 2002). The 300-unit "cooperative block" with a social centre for business activities was chosen as the smallest unit for Batkent. The nursery

facility was designated at the "neighbourhood level" above the cooperative block. The "quarter unit" comprised two neighbourhood units: a primary school, parks, playgrounds, and piazzas. The "district unit," created from five quarter units, included a high school and a subcenter serving 50,000 people. As the settlement's largest entity, the "primary centre" provided Batkent with economic activity, religious institutions, and social and cultural centres. A total of 40 nurseries, 20 primary schools, 4 high schools, 4 health centres, and various social and commercial establishments were built in Batkent to accommodate 250,000 people. Batkent is a project that has served and should continue to serve as a significant illustration of how an urban settlement can be designed to provide a haven for its residents and the surrounding environments, in addition to meeting demand for facilities and accommodations (Eryildiz and Batkent, 2002).

Operational Definitions of Main Terminologies

Sustainable Housing: It refers to the housing process that uses efficient construction technology with less use of harmful material, recycling, and reuse of old material by keeping in mind the environmental safety and protection of natural resources with promising reliability and satisfaction (Ibem and Aduwo, 2015).

Residents' Comfort: The level of satisfaction and positive impact of house structure on residents' physical and mental health

Environmental Safety: Protect the environment from the latest technology's harmful material and hazardous outcomes (Glinskiy, Serga, and Khvan, 2015).

Government Policy: The policies regarding new laws and regulations for the betterment of the country that are designed and implemented by the government.

Economy: The consumption of available resources, goods, and services and the transfer of money for shifting resources from one place to another in a country.

Cost Efficiency: The affectivity and value of cost in an activity are known as cost efficiency (Shad et al., 2020).

DISCUSSION

The discussion covers the development and implementation of housing policies around the world since World War II, and it divides them into four categories: demand-supply policies, homeownership support, rental housing promotion, and others. Demand-oriented policies target increasing demand for housing in the first instance and then controlling it. Supply-oriented policies, especially after WWII, were directed at meeting the housing shortage caused by war and rapid urbanization, although some countries like South Korea and Singapore have now switched to demand-oriented approaches. Policies of various countries are discussed: England - The central government led with policies for increasing homeownership, but it suffered from an affordability crisis caused by supply lag. It has set a target for the production of 1 million units by 2020. Chile - Focused on low and middle-income housing, savings programs available along with state subsidies, reduced overcrowding, and improved housing conditions;

1. Malaysia: Emphasized low-cost housing, supply and demand in balance, quality and affordable housing through public-private partnership.

2. United States: Gave emphasis on affordable housing through public housing with mixed success. Despite significant efforts, housing problems persist.
3. Turkey: Presented in five stages, starting from the early 20th century up to the 2000s, first emphasizing urbanization and mass housing to market-oriented policies, with recent emphasis on financial support and social housing.
4. It allows this global comparison to demonstrate the shift in housing policy focus and varying success in dealing with housing challenges.

CONCLUSION

Housing policies worldwide have their share of evolution with time and according to the specific problems that different countries face. The aftermath of World War II, rapid urbanization, and an acute shortage of housing prompted various governments to take diverse approaches toward ensuring available affordable housing for citizens. They can be categorized as demand-oriented, supply-oriented, homeownership-promoting, and rental housing strategies. Countries like England, Chile, the United States, and Malaysia have all devised national housing policies to address housing problems with limited success. The highly centralized system in England relied on home ownership, but supply simply could not meet demand, which resulted in unaffordability. Chile's policy has been directed at low- and middle-income families through savings programs coupled with state subsidies, and the results are increased homeownership. The Malaysian approach is based on government initiative and private-sector cooperation, focusing on the provision of low-cost houses to meet demand. The United States has focused more on an increase in housing quality and ownership, coupled with relief from overcrowding through welfare housing. As these countries continue their efforts to adapt their housing policies and strategies to meet the emergent needs of their populace, lessons can be realized from their experiences in informing housing policy formulation in the years ahead. The ongoing challenge is to find sustainable means to ensure adequate, decent, and affordable housing, particularly in the face of economic shifts, urbanization, and changing demographic needs.

DECLARATIONS

Acknowledgement: We appreciate the generous support from all the supervisors and their different affiliations.

Funding: No funding body in the public, private, or nonprofit sectors provided a particular grant for this research.

Availability of data and material: In the approach, the data sources for the variables are stated.

Authors' contributions: Each author participated equally to the creation of this work.

Conflicts of Interests: The authors declare no conflict of interest.

Consent to Participate: Yes

Consent for publication and Ethical approval: Because this study does not include human or animal data, ethical approval is not required for publication. All authors have given their consent.

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