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Factors Which Influence the Size of the Contemporary Dwelling: Riyadh, Saudi Arabia

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ABSTRACT

This study investigates the phenomenon of building big dwellings in contemporary Saudi society. It relates the size of the contemporary villa-type dwelling with the traditional dwelling, and it compares it to a number of average (standard) international dwellings. It questions the rationale of its large size; hence, it argues against leaving this trend to continue unchecked. It further defines and discusses factors which influence the dwelling size, i.e. economic, socio-cultural, and new building practice and trade. The aim of this research is to draw attention to this phenomenon, to inform those involved in housing policy and design of the extent of size-related problems in terms of initial construction and furnishing cost and in terms of operating and maintenance life-cycle cost, and to call for further research to investigate its social, environmental, and economic impact on the country and its population. © 1998 Elsevier Science Ltd. All rights reserved

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INTRODUCTION

The housing industry in Saudi Arabia has experienced major changes during the last four decades. The mid 1950s saw the introduction of the gridiron street pattern and the detached villa-type dwelling. With it came new design and organization concepts, new styles of furniture, and major changes in the construction techniques and the building materials used. Whereas the traditional dwelling was built incrementally according to the immediate needs of the family, the contemporary villa-type dwelling is built as a final product of a new design concept that was adopted through municipal rules and regulations (S. Al-Hathloul, 1981).

These changes were first inspired by the housing introduced by the Arabian–American Oil Company (ARAMCO) in the Eastern province at the beginning of oil exploration and later by the Al-Malaz project initiated by the Ministry of Finance in 1953 (Y. Fadan, 1983). After the Saudi government decided to move its agencies from Mecca to Riyadh, it decided to build the Al-Malaz project, located 4.5 km northeast of Riyadh's center, to accommodate government employees transferred to Riyadh. The project consisted of 754 detached (villa-type) dwellings

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and three apartment buildings. By 1957, when the move took place, some sections of it had been completed, and the project was in operation (S. Al-Hathloul, 1981).

Since then, the villa has become the prevalent model with hundreds of thousands built all across the country in the last three decades (Ministry of Planning, 1990). Two principal factors influenced the continuous use of this model: the municipal building regulations and the conditions which the real estate development funds (REDF) requires in order to provide long-term interest-free loans to Saudi citizens who build their own homes.

A main feature of the contemporary villa is its large size, which has greatly exceeded the size of the traditional dwelling. This paper questions the rationale of the large size on functional, economic, and social grounds; hence, it argues against leaving this trend to continue unchecked. This study is not about the "palaces" which appeared in the Saudi cities, it is rather about the typical dwelling for the average family which became known as the "villa". Recognizing the problem associated with the large size of the villa and defining the reasons behind it is the first step towards raising the awareness of housing professionals to produce more efficient dwellings that are less expensive to construct, furnish, operate, and maintain.

OBJECTIVE AND SCOPE

Previous research has led the author to recognize the large size of the Saudi contemporary villa-type dwelling as an unusual phenomenon. In order to explore this the paper will briefly compare the contemporary villa-type dwelling and the traditional dwelling. Moreover, the paper intends to achieve the following: It will statistically compare the size of the average contemporary villa-type dwelling to the traditional dwelling as well as to the average dwelling in several selected developed and developing countries. It will investigate the various economic and socio-cultural factors as well as building practices and trade changes which have contributed to such an increase. Finally, the paper will provide some suggestions and recommendations.

HISTORICAL EVOLUTION OF RIYADH'S LOW-RISE DWELLING

Although the traditional adobe courtyard house was built for hundreds of years all over the region, with a design concept and construction skill passed from one generation to the next, Al-Malaz mass housing project marked a turning point in Riyadh's urban pattern. Its new planning principles and new design concepts determined dwelling architecture, and new, more durable, building materials New building techniques that accelerated the construction process were introduced.

Riyadh currently covers an area of more than 800 square kilometers, with an estimated population of about 3 million people (ADA, 1996). Eighty percent is composed of housing. Almost all of this expansive area utilizes the villa as the standard dwelling. The following presents a brief description of both the traditional dwelling and the contemporary villa.

Traditional dwelling

Riyadh's traditional dwelling is a lumpy thick walled adobe structure built around one or more rectangular courtyards. Its exterior walls have small openings, and its interior walls, which surround the courtyard, have large openings. It is inward-oriented, intended to provide the maximum privacy desired by the society. The dwelling consists of two main sections: the family and the guest sections. Only

family members, female guests, and the maharm[1] use the family living section. To provide maximum privacy, this section is always located away from the entrance.

Except for the parents' bedroom, all living spaces within the family section are used interchangeably for sleeping, eating, family gathering, and household work. Room floors in this section are covered with oriental rugs or mats and tend to have little and simple furniture which is easy to move, rearrange, or store. This provides a high level of flexibility in using the rooms for various functions, depending on the circumstances and needs.

The guest section, which normally consists of a reception room and bathroom, is for receiving non-maharm guests. The reception room is the main element in the guest section and is the largest room in the traditional dwelling. It is used by males for sitting, dining, and sleeping. It is normally located adjacent to and directly accessible from the entrance lobby.

The inner courtyard is the focal point in the traditional house and is an important element of the family section. It has served various functions as a private open space with direct visual contact with the sky, a place where adults may sit or gather, a place for social and religious celebrations, and as a safe playground for children (A. Bahammam, 1987).

The traditional dwelling grows over time to meet the ever growing needs of the family, and thus, it can be said that the traditional dwelling was never complete when built (Y. Fadan, 1983). The flexibility for change and expansion of the foremost house can be clearly seen in the evolution of land configuration over a period of time as family size increased by marriage or birth; hence, requiring the addition of more rooms either horizontally or vertically (Fig. 1).

Contemporary dwelling

Today Saudi families only consider the villa when building new dwellings. The following local magazine article illustrates the dimension of this phenomenon:

> Now, if we asked any individual in Saudi society, "Why did you choose the "villa" as a type for your house?" He/she will be astonished and will deny the question, and his eyes might widen from the astonishment. He says, "What do you want me to choose? Is there another choice?" He might say your question is "silly". At the moment, this is the only type in his mind. It became the only familiar and known type. It became a custom (Al-Yamamah weekly magazine, 1993).

The contemporary villa-type dwelling differs from the traditional dwelling in several respects, such as the organization of internal spaces, the external appearance, the whole size, and the construction details. Moreover, while the villa has remained basically a two-storey detached dwelling with yards on the four sides, its size has kept increasing over time.

Western style furniture is now used, which is hard to move and store and has limited the degree of flexibility to use the same rooms for various functions. As a result, the villa suffers from duplication of rooms. A typical contemporary dwelling consists of two or three men's and women's reception rooms, one or two guest dining rooms, one or two living rooms (saala[2]), three or more bedrooms, one or two kitchens, four or more bathrooms, and several storage spaces. Some villas also have first floor balconies and dressing rooms as new features which never existed in the traditional dwelling (Fig. 2).

Contemporary dwellings are built out of a large variety of new building materials; however, the most remarkable feature about the new materials and technology is the ability to build longer roof spans, producing bigger rooms and consequently larger dwellings. This factor is just one of those that have influenced the size of the

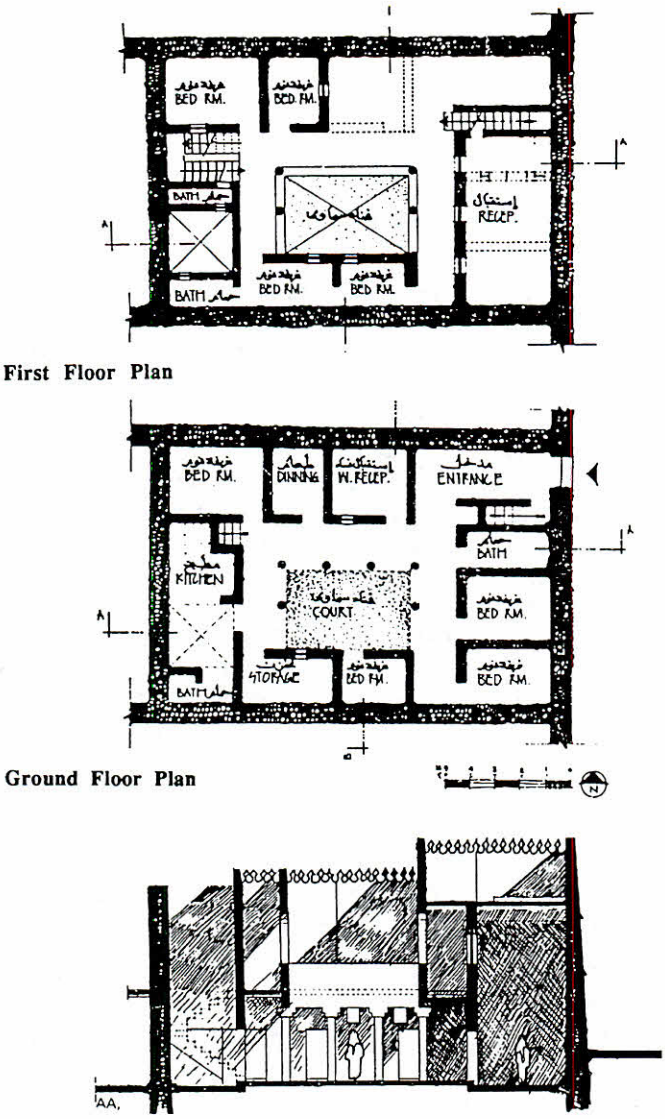


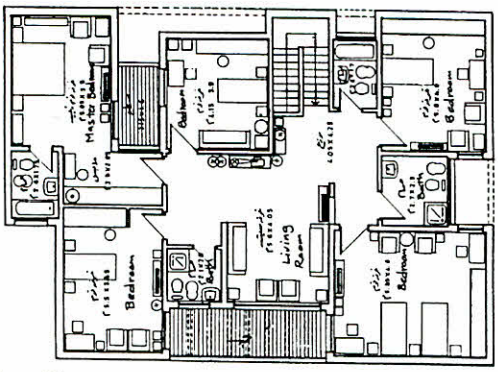
Fig. 1. Floor Plans and Section of Traditional Dwelling in Riyadh. Source: Mousalli–Shaker–Mandily. An Introduction to Urban Patterns in Saudi Arabia — The Central Region. (AARP, London, 1977), p. 30.

villa as a result of the change in building practice and trade. Table 1 summarizes the influence of those factors.

STATISTICAL COMPARISON ANALYSIS

This section compares the average traditional and contemporary dwellings in Riyadh in terms of total size of the plot, the built-up area of the plot (plot coverage), the total built area, the number of rooms per household and per occupant, the total number of spaces and their average size.

The paper used data for nine traditional dwellings; four of the dwellings are from the central traditional part of the city (M. S. Mousalli *et al.* 1977) and five are from Al-Diraiyah, located northwest of Riyadh (A. Kilical, 1984). For contemporary dwellings the paper selected 20 prototypes from the 64 prototype housing designs



First Floor Plan

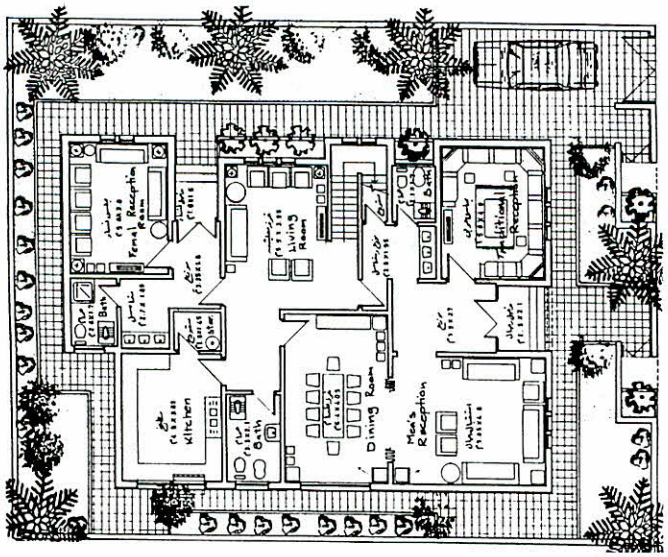


Fig. 2. Floor Plans of Contemporary Villa-Type Dwelling. Source: The Municipality of Riyadh. Prototypes of Detached Dwelling Units: Group Number 2. (Riyadh, ND.), prototype #9.

Table 1. The influence of the building practice and trade change on the size of the contemporary dwellings

Factors	Traditional dwelling	Contemporary dwelling
Plot size	Land is almost free and people can build as much as the need.	The land is subdivided into plots of 400 square meters or more, bought and sold as a commodity.
Rules and regulations	People can build as much as they need and as they wish without harming the community or the individual interests.	Built area should not exceed a certain percentage within a certain setback from all four sides and building should not be more than two stories.
Construction budget	As much as the household can afford from their income at different stages of their life cycle.	In many cases, a long-term interest-free loan can be acquired if the family built a dwelling with size not less than (300 m^2).
Technology	The short span of the available local roofing materials and building technology produced small spaces (rooms).	New imported roofing materials and technology allow for longer spans and bigger spaces (rooms).
Building process	Accumulative process, building expands with the family size and needs throughout the years.	Building is viewed as an end product to be delivered complete to the family.

Table 2. Comparison between the size of Riyadh's traditional and contemporary dwellings

	Traditional dwelling	Contemporary dwelling	Percent difference
Plot and built area			
Plot size	184 m^2 100%	503 m^2 100%	273%
Plot coverage	142 m^2 77%	226 m^2 45%	159%
Total built area & F.A.R.	191 m^2 1.04	442 m^2 0.88	231%
In relation to inhabitants			
Number of rooms per household*	6.3	12.2	194%
Number of rooms per occupant†	0.98	1.9	194%
Number of Elements			
Guests' section	1.7	3.5	206%
Family section	3.6	8.1	225%
Kitchens	1.0	1.4	140%
Bathrooms	1.7	5.0	294%
Storage spaces	1.1	0.8	79%
Average size of rooms			
General	14.7 m^2	24.4 m^2	166%
Reception rooms	17.0 m^2	25.1 m^2	148%
Multipurpose, living, and/or bedrooms	13.7 m^2	24.0 m^2	175%
Kitchens	11.3 m^2	18.6 m^2	165%
Bathrooms	5.0 m^2	6.8 m^2	136%

* In estimating the number of rooms per households the following Habitat definition is applied: a room is a space at least 4 m^2, enclosed by walls at least 2 m high, which is intended for residential use only. Examples would include bedrooms, kitchens, living, and dining rooms, servants' rooms and studies. Hallways, verandahs, lobbies, bathrooms, and rooms used for work or business purposes are not included.

† The number of occupants per household in Riyadh is 6.4 person/household.

F.A.R. = Floor area ratio.

which the municipality introduced in 1986. These prototypes selected are considered by the municipality as the most popular.[3]

The difference in size between traditional and contemporary dwellings

Table 2 summarizes the data on the traditional and the contemporary dwellings. Several points can be noted. First, the total built-up area in the traditional dwelling is more than the size of the plot, while that in the contemporary dwelling is less than nine-tenths (88%) of the plot size. Thus land is less utilized in the case of the contemporary dwelling. Second, using Koleva's (1980) terminology, one may say that while the traditional dwelling is "normally occupied", meaning that the number of occupants is equal to the number of rooms, the contemporary dwelling is "under occupied", meaning that the number of occupants is fewer than that of the rooms in the dwelling (M. Koleva, 1988).

Table 2 shows an increase in the number of spaces of the contemporary dwelling compared with the traditional dwelling. The number of guest rooms in the former is more than double (206%). The number of rooms in the family, as well as bathrooms, is also notably higher. Finally, the table shows the remarkable increase in the average area of the rooms for the contemporary dwelling.

The dwelling size in international context

Table 3 compares the traditional and contemporary dwellings in Riyadh with the average dwelling in several other selected developed and less developed countries with respect to the number of rooms per household and number of rooms per

Table 3. International comparison

	Number of rooms per household	Rank	Number of occupants per household	Number of rooms per occupants	Rank
Saudi Arabia–Riyadh					
Traditional dwelling	6.3	3	6.4†	0.98	6
Contemporary villa-type dwelling	**12.2**	**1**	6.4*	**1.9**	**1**
Australia	5.0	5	3.0	1.7	3
Brazil	4.5	7	4.4	1.0	5
Cameroon	4.1	9	5.2	0.8	7
France	3.6	10	2.7	1.3	4
Germany	4.4	8	2.4	1.8	2
India	2.0	15	5.5	0.4	10
Indonesia	3.1	11	4.9	0.6	8
Japan	5.3	4	3.1	1.7	3
Mexico	2.3	13	5.5	0.4	10
Morocco	2.1	14	5.9	0.4	10
Spain	4.4	8	3.5	1.3	4
Syria	6.4	2	6.2	1.0	5
Turkey	2.5	12	5.2	0.5	9
United States	4.7	6	2.7	1.7	3

* The number of occupants per household in Riyadh is 6.4 person/household.

† The same number of occupants per household in the contemporary dwelling is used to determine the number of rooms per occupants in the traditional dwellings.

Note: In estimating the number of rooms per households, Habitat defines a room as a space at least 4 m^2, enclosed by walls at least 2 m high, which is intended for residential use only. Examples would include bedrooms, kitchens, living, and dining rooms, servants' rooms and studies. Hallways, verandahs, lobbies, bathrooms, and rooms used for work or business purposes are not included.

Sources for International Statistics: United Nations Center for Human Settlements (Habitat), Human Settlements Statistical Database (HSDB. stat) 1993.

occupant. The data shown are from the United Nations Center for Human Settlements (Habitat) (HSDB.Stat, 1993).

The table shows that Riyadh's contemporary dwelling ranked first in both the number of rooms per household and the number of rooms per occupant, having almost twice the number of rooms compared to the next largest dwelling.

FACTORS WHICH CONTRIBUTED TO INCREASING THE SIZE OF THE CONTEMPORARY DWELLING

Several factors have influenced the design and affected the size of the contemporary Saudi villa. These include the economic boom, new building practices, and socio-cultural changes. This section will examine these factors in detail.

Economic boom

The increase in the crude oil revenue beginning in the 1970s created a boom in the national economy bringing a sharp rise in national and household income (T. Al-Soliman, 1991). This increase, coupled with the government's program for providing free plots and the REDF loans, have made it possible for many Saudi households to build new, "better quality", bigger dwellings (A. Al-Saati, 1987).

Financial assistance to the private sector was one of the housing policies of the Saudi government under its first five year development plan (1970–1975), but the

mechanism for implementing this policy was not ready until the second five year development plan (1975–1980) (Y. Fadan, 1983). In 1975/1976 the REDF was granting earmarked interest-free loans of SR 300,000 ($ 80,000) to individuals and private organizations for real estate development. The loan was to be repaid in 25 annual installments, with a 20% reduction of the principal if repaid regularly and on time (REDF, 1983).

The interest-free home loan program has given thousands of families the opportunity to own their own houses for the first time and has allowed them to build larger dwellings. By the end of the fiscal year 1995/1996, REDF had provided loans for the construction of more than 550,000 homes (Al Riyadh newspaper, 1997).

New building practice and trade

The introduction of the villa brought an unfamiliar and more formal building practice which involves more professionals. The architects, engineers, contractors, and municipal officials have replaced the traditional master builder al-astad. In the traditional process, the size of the dwelling was determined mainly by the owner and the master builder, however, in the case of the villa the issue involves many professionals, each with a different point of view.

The architect's role is misunderstood in various societies (M. Danby, 1963); however, the problem is more serious in Saudi Arabia because the contemporary design profession is relatively new. Saudi clients are not familiar with the process of consulting an architectural office and becoming involved with an architect and a contractor. It reaches the point that some people go to see the architect without the slightest idea of what should be done or what they should expect from the architectural office (A. Bahammam, 1992). The fast pace of the contemporary construction process has also changed the people's traditional practice of participation.

In building the traditional dwelling, the floor plan and its interior organization were drawn on the construction site itself. Seeing a 1 : 1 scale floor plan and being able to walk over the interior organization of the house before it is even built exposes the owner in advance to the real size of his dwelling.

Although, it is very difficult for many people to foresee the design, and especially the size, of the dwelling from the architect's blue prints, the reason many people end up living in large dwellings is due to the failure to determine the household's exact needs at the design stage and to choose a design that fits their particular lifestyle. When the designer's policy for developing the schematic program or for molding the design is influenced by factors other than those of household size and housing needs, such as covering the total permitted area of the plot, duplicating previous design, producing good looking drawings of a collection of unneeded elements, etc., it is most likely that the household will end up with a big dwelling. There are several other factors which guide the home-owner to end up with a dwelling which is larger than the household:

Wrong design approach

Previous residential experiences: The short-span and the low-quality roofing materials of the traditional dwelling kept the size of the whole house small, leaving some of the residents who lived in such houses in the recent past with negative experiences. In their quest to avoid having a small dwelling, some end up with an extra large dwelling which greatly exceeds their needs.

To avoid criticism:

> Very few lay people understand architecture and many who would hesitate to criticize a poem or a picture or a piece of music will often give final judgment on a building (M. Danby, 1963).

In order to avoid people's criticism and negative comments, many clients seek to obtain a design with a size which only satisfies the taste of the people whom they know. The following local magazine article presents an example of such peer pressure:

> [With the beginning of the contemporary stage of housing] The people, when they enter a new "villa" and find the area of the "men's reception room" or "the dinning room" about (5×3) (m), shake their heads, feeling sorry, and saying "Wish it were (6×4) (m)." Then they find the reception (6×4) (m), shake their heads, feeling sorry, and they say "Wish it were (7×5) (m)." After that, they start to say, "Wish it were (8×6) (m)." Then this size could not satisfy their aspiration, they say, "Wish it is (10×7) (m)." Of course, the dining room will be the same size as the reception, which means that the area of the two rooms will be about (150 m^2), and if we added to it the bathrooms, and the corridors, the guest area in the house will exceed 200 square meters (Al-Yamamah weekly magazine, 1993).

The influence of others on the design of the dwelling: What aggravates the problem is that many people turn to their non-professional relatives, friends, and neighbors for advice during the design and/or construction stage, just because they have previous experience building a new dwelling.

> The housing of friends, families, and colleagues is usually a part of the individual's experience with housing (R. Al-Dakheel, 1995).

> Indeed, this is a big problem. There are many people who are aware of their very limited architectural knowledge, but they do not hesitate to give their advice as if they know everything (A. Bokary, 1988).

Such advice plays a major role in shaping a dwelling that might be more suited to the needs of other bigger families.

Imitation of good architectural examples: Visual media and travel have made it possible for Saudis to experience new architectural concepts, which may inspire the desire to have larger dwellings.

Construction technology. The construction of the traditional dwelling was an incremental process involving only the household and the master builder. The walls of the dwelling were built of solid sun-dried bricks. The second story floor and the roof were generally made by laying tamarix aphylla (athel) or palm trunks parallel to each other, spaced about 50 cm apart on properly raised walls. However, because of the short length and the low quality of the available wood trunks, the width of the room in most traditional houses rarely exceeded 2.5 m (eight feet). If the span was more than three meters, it was divided into two by a thick wooden beam, usually consisting of two athel-tree trunks (A. Kilical, 1984).

In building the contemporary dwelling, the use of reinforced concrete has sped up the building process and has allowed the building of wider spans and consequently larger spaces. It is normally built as a two story reinforced concrete building, using the post and beam conventional technique.[4]

Official rules, regulations and conditions. The rules which governed the architecture of the traditional dwelling stem from the Islamic teachings of the Quran, the Holy Book of Muslims, and the Hadith, the sayings of the Prophet (J. Akbar, 1992). Saudi families traditionally have built their dwellings with considerable care following special designs to respect the rights of the individual neighbors as well as the whole community. In general, anyone was free to build as he or she pleased as long as one was not causing any damage or harm to others.[5]

However, in the late 1960s, the municipality of Riyadh, as well as other municipalities in the Kingdom, introduced and enforced the following regulations:

- land coverage, including all attachments, should not exceed 60% of the land;
- front setback should be equal to one-fifth of the width of the road and should not exceed 6 m;
- side and rear setbacks should not be less than two meters, and projections are not permitted within this area (The Municipality of Riyadh).

As of today, the municipality of Riyadh continues to apply setback requirements in all low-rise residential areas.[6] The impact of limiting the built-up area to a certain percentage of the plot, which is usually worth a lot of money, is a major reason for the homeowner to seek a design that covers the maximum permitted part of the "expensive" plot, even if the design exceeds the household's size and needs. Furthermore, the REDF requirement that the dwelling should not be built less than (300 m^2) in order that the owner can receive the maximum loan amount of SR 300,000 is another factor, it has established a minimum standard for the size of the contemporary dwelling which equals more than one and a half the size of the average traditional dwelling.

Socio-cultural changes

The economic boom in Saudi Arabia has increased the wealth and prosperity of the population, resulting in a new lifestyle. The contemporary dwelling has to accommodate the new lifestyle while also retaining the previous traditional experiences and customs. As a result, many spaces are duplicated and new ones have been added, thus increasing the size of the dwelling. The following are some examples of these elements:

Reception rooms. In Saudi tradition, hospitality has a special place; therefore, attention is usually given to the reception rooms which are spacious, friendly and warm (H. Kilical, 1985). Many contemporary dwellings, as shown in Table 2, have more than three reception rooms. Some dwellings have three men's reception rooms as well as the guest dining room(s) and the women's reception room(s). Many have two men's reception rooms, one furnished with "modern" or "Western" couch style furniture and the other furnished with a traditional style furniture. The "modern" or "main" reception room is for "official" or "special" occasions and major parties.

The youth reception room is another new element added as an annex in the yard of many contemporary dwellings. It is used mainly by the adolescent boys as an informal private gathering place. This new concept has never been a part of the traditional way of life; in the past, older boys would immediately be considered and treated by the society as men as soon as they reached puberty, and they were expected to behave as full grown men (A. Bahammam, 1992).

All these reception elements result in having a very large area, with distinct furnishings, that is used only for limited functions and on few occasions.

Maid's and chauffeur's rooms. Having a maid(s) is a new luxury and often a necessity to maintain the large well-furnished villa. An extra room for the maid has thus become part of the contemporary dwelling.

The increase in the size of the contemporary residential plots has rapidly affected the expansion of the residential areas and the growth of the urban settlements. Therefore, since women do not drive in Saudi Arabia and with lack of a sufficient public transportation system, many families have also hired a chauffeur. Providing him with a place of his own, apart from the household, requires the addition of an extra room and bathroom in the front yard.

Traditional elements. The experience of living in the "villa" represents a quantum leap from living in the traditional dwelling; therefore, many residents add elements such as the Bedouin's black tent and/or the fire hearth room in the yard in order to satisfy their need for a traditional way of living.

New elements. The contemporary dwelling is often built with a dressing room and balcony which were never part of the traditional dwelling. The balcony was borrowed from the Mediterranean architecture. Since it neither maintains the required level of privacy for the society (A. Bahammam, 1987) nor provides a climatic enjoyable space in the harsh weather of the region, it has become another extra unused space in the contemporary dwelling.

Arrangement of furniture and use of spaces. Rooms that are full of potential for a variety of uses is one of the major characteristics of the traditional Saudi dwelling, however, one of the most significant characteristics of the contemporary dwelling is that spaces are designed for special purposes incorporating the particular furniture under certain names (H. Kilical, 1985). Fitting each room with a set of cumbersome furniture for a certain function, is another reason for building a larger villa with more space and rooms that have limited use.

Privacy. The attitude toward privacy is a major factor that has influenced the shape of the house. The notion of privacy has been discussed and appears in the literature of several disciplines (I. Altman, 1975). To the designer, questions of privacy are involved in decisions about visual and auditory separation between the different sections and elements within the home, between the home and the street, and between dwelling units (N. Marshall, 1970). In Saudi society, as in some other Muslim societies, dwelling privacy is defined by explicit Islamic teachings.[7] These rules have existed for many centuries and their influence is clearly visible in traditional dwellings. They define the following three different spheres: (1) Privacy of the whole dwelling, (2) Privacy between the sexes, and (3) Privacy among individual family members (A. Bahammam, 1987).

To maintain the needed level of privacy between the sexes in the contemporary dwelling, with the absence of the multiple use of rooms, a number of new elements such as the female guests' reception and dining rooms have become a permanent part of the villa. This has in turn led to a bigger dwelling with more spaces and elements that are only occasionally used.

Household structure. The basic needs for a dwelling are a function of the stage in the household life cycle and their lifestyle (D. Soen, 1970; P. Rossi, 1955). All types of Saudi traditional dwellings, from the Bedouins black tent to the courtyard adobe house, used to be enlarged through an incremental building process as family size increased by marriage or by birth. It has been said that traditional dwellings were never complete when first built.

On the other hand, the contemporary dwelling does not have this flexibility. All parties involved in the design and construction of the contemporary dwelling view it as a one-time product which has to be delivered complete to the client for a pre-determined family size. Furthermore, the municipality rules and regulations add to the problem of inflexibility, as residents cannot easily expand their dwellings later. They are forced either to build a dwelling which exceeds their current needs or to end up with a small dwelling which may not be suitable in the future, therefore, some households build as large a house as they can afford, taking into account their family's possible needs for a number of years ahead.

Home and investment. "The house is the first to be bought and the last to be sold" (Al Riyadh newspaper, 1993). The residents of the traditional housing had fully applied the above Arab saying; however, the contemporary dwelling has been

viewed as a capital for future security, as a commodity that can be sold for a profit, and as an easy, low risk investment. During the design stage, some clients became obsessed with the idea of building a dwelling that can be sold for a big profit. They concentrate on a design and size that will attract more buyers, and they pay less attention to their household needs.

There are two main variables that influence the selling price of a dwelling: location and size. Although a dwelling must be appraised in relation to adequate design, the size and total floor area has become the major price indicator in today's Saudi real-estate market. As a result, there is a great temptation to produce large contemporary dwellings to suit market demand. Moreover, some clients see the house as a source of extra income and build a dwelling that can be easily divided into two-units in case they decide or need to rent a part of it one day.

Symbol of status. It was difficult, in the fabric of Riyadh's traditional neighborhood, to tell where one dwelling ended and the next began. The size of most traditional dwellings was not apparent from the street; however, the detached villa has more emphasis on the external appearance and size of the building. Its outward concept has encouraged a sense of public display of status and individual identity.

> The outward concept seems to encourage and control the way in which the residents' perceive themselves and are viewed by others (J. Montgomery, 1975).

The contemporary villa through its size and appearance has become a symbol of status, of achievement, and of social acceptance to many Saudi residents. A local magazine comments on this:

> If we asked about the reasons for the [people's] desire for big spaces and a large house, the answers will differ in form but will unify in content, which is the desire to follow or catch up with others (Al-Yamamah weekly magazine, 1993).

CONCLUSION

This study reveals that the size of the contemporary Saudi dwelling is larger than any other standard dwelling in both the industrial and developing world. Triggered by the economic boom and the fast pace of the modernization process during the last two decades, a number of factors have had a direct effect on the size of the dwelling. The absence of the "responsible" architect and/or architectural office is a major element behind the sustaining effects of some of those factors, because designing a dwelling should not only be a matter of providing nice drawings; it should be the efficient and economic arrangement of space.

The architect should design multi-function elements in order to save space. He also should not include any unnecessary "wasted" space, and he should reduce circulation spaces to a minimum. When this is done, a reasonably sized, efficient, and beautiful dwelling may emerge, one that can be kept and maintained for a long period of time.

Those involved in housing design and policy should take measures to allow the Saudi contemporary dwelling to grow incrementally with the size of its household. This is very important for the reduction of the initial construction and furnishing cost and the longer term maintenance costs.

Although, nowadays many residents can still afford to pay for maintaining their large dwellings. Many people already find it a burden to maintain a large home as illustrated in the following newspaper story:

> Our houses need an additional management effort. They are too big for us; they have many rooms and utilities; they have many instruments, tools, and equipment. All this requires constant maintenance, continuous care, and complete follow up. As soon as you fix one thing another one breaks down. As soon as you are finished with the electrician, you are in need of the plumber. As soon as you redecorate the reception rooms, you will be asked to redecorate the living room, and before you can catch your breath from changing the decoration and the furniture in the bedroom, you will be asked to change the [furniture of the] children's rooms too (Al Riyadh newspaper, 1995).

The size of the contemporary dwelling has also affected the domestic consumption of water and electrical usage. Now, the Saudis consume, on average 4992 kV/h of electricity (Al Riyadh newspaper, 1997). This high rate of consumption and demand will lead to the construction of more power stations and to more air pollution. It has also been found that the average consumption of water per person has multiplied about (25 times) within the last 30 years; in Riyadh, for example, the average consumption per person is more than (400 l/day) (Al Riyadh newspaper, 1996). It is no surprise that this unusual size phenomenon will produce such environmental problems, which need to be identified and further investigated.

Public awareness programs and a training program for those who are involved in housing design, planning, and/or policy should be instituted. Both professionals and residents have to understand that conserving on spending for large dwellings means a better national economy and money that can be spent for better community services, facilities, and utilities. Finally, special economic and environmental studies are needed to determine the impact of this phenomenon on the environment and on the national economy.

NOTES

[1] maharm are male relatives, who, according to Islamic teachings, cannot marry females in the house, e.g. brothers, uncles.

[2] The saala is the most interesting element in the villa. It is a central area on the ground floor, which provides access to all other rooms. The saala replaced the traditional courtyard as the place for family gathering (K. Talib, 1984).

[3] Municipal prototypes built account for more than one third of the total designs built in Riyadh. According to the municipal archives, the average number of housing models sold each year is 2020. This represents 37% of total villa designs and 34 percent of total housing units permitted to be built in the city each year (I. Al-Jowair, 1990).

[4] This technique involves in-situ reinforced concrete of the elements of the frame construction, where the load of the roof and the floors is carried by a frame which concentrates these loads until they are redistributed by the foundations. Cement bricks are used to build in-fill walls.

[5] The Prophet of Islam says: "La-darar-wa-la-dirar," (Ibn Majah, 1984), with this he is prohibiting the cause of damage.

[6] From 1980 until 1989–1990, there was one exception–Al-Urayja, a residential suburb in the southwest corner of the city. Here the municipality of Riyadh had applied the modified regulations from the master plan proposed by SCET, which calls for the abolition of all side and rear setback requirements. Two groups of dwelling units whose design concepts are not in accordance with the concept of the villa-type dwelling, have been approved by the municipality for construction, however, only in the Al-Urayja area. The first group consists of thirteen examples of the attached type of single family dwelling unit, and the other group consists of eight examples of the courtyard type with no side or rear setbacks. The latter are part of the blueprints of the 64 models that were provided by the municipality in 1984–1985.

[7] The Muslim scholars say that Islam embraced not only a system of beliefs and practices but also a complete code of rules to regulate every aspect of an individual's existence. The Sharia (the Holy Law) is a comprehensive code for the total way of life, subsuming all legal and social transactions as well as personal behavior.

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