Changing Boundaries and Meanings of Middle Class Houses in Sri Lanka

Primali Paranagamage

Lincoln School of Architecture,
Lincoln, UK

Abstract

Houses are distinctively organised spatial networks that embody social norms and meaning of a given culture. Normally it is accepted that visually identifiable house 'types' which also closely fit the culture of a group are adopted by society. In Sri Lanka, there was popular house 'types' among the middle class until about 1980. Today, house forms of the middle class are diverse with apparent new trends in recent years. If contemporary middle class house forms are not visually characterized by type/s, how does 'culture' influence house form? This paper explores whether there are 'types' with distinctive spatial networks among the diverse house forms and the nature of embodied social norms. In the context of apparent change, such exploration advances the understanding of the association of house form and culture for the contemporary society of Sri Lanka.

By using space syntax analysis, this paper argues that although eclectic in visual appearance, middle class houses share a cultural 'gene' in their spatial configuration as a 'genotype' that operate beneath the visual. Analysis of forty houses revealed that an older genotype named as the O model is diminishing and that a new genotype named as the M model had stabilised after 1980. The contemporary 'genotype' classifies space to accommodate meanings of a new everyday home life. The older genotype which classified space to accommodate meaning of a by-gone lifestyle is no longer popular. The negotiation between the new genotype and heterogeneous phenotypes allow for the affirming of class solidarities in new ways in contemporary Sri Lanka.

Keywords: Sri Lanka, middle class, house and home, genotype, space syntax.

1. Introduction: Changing house forms and society

1.1. Changing house forms

House forms are distinctively organised spatial networks that embody socially constructed meaning of particular lifestyles which is argued to be the association of house form and culture (Rapoport 1969, Hillier and Hanson 1984, Lawrence 1987). Normally, it is accepted that society agrees on visually identifiable 'types' of houses that closely fit the culture of a group. As such, a variety of information is packed into one icon that conforms to 'rules' of construction and organisation of space (Rapoport 1969). Such common house forms were also among the Sri Lankan middle class, first known as 'Bungalows' and later as the 'American style'(Peiris 2011). House forms of the contemporary middle class are diverse with apparent new trends in recent years. Recognising this heterogeneous residential fabric laymen have

developed a spontaneous vocabulary to describe house forms such as a 'Dutch house' 'Colonial house' 'Bandusena house' 'Geoffrey Bawa house' 'Muslim house', etc, These are sometimes tagged on a time notion and at other times associate an image with the designers or ethnicity.

Architectural readings of this phenomenon too associate imagery to the many explanations. In symbolic readings, house forms are regarded as an expression of social or political structures that are manipulated to communicate meanings, values and identities in relation to social and political change (Duncan1981, Duncan1989, Malkawi et.al 2003). Duncan (1989) argues there was obvious economic and political change since the 'open economy' which created cultural repercussions such as the existence of a powerful imagery of an 'ideal house' among the city dwellers. Sri Nammuni (1992) divides middle class house forms as 'extroverted' and 'introverted' which communicate opposite meanings with the latter notably recognisable as built in recent years. Pieris (2011) attributes changing house forms to post colonial identity struggles of the middle class. For Pieris suburban residential architecture of the 1950s-1970s was characterised by the simple new vernacular of the 'American style' that provided a mode of entry into the middle class for those migrating to the city for work. This trend was replaced by a modern reinterpretation of traditional rural architecture that emerged in the 1980s. This was due to the generation of architects who followed the legacy of Bawa, whose distinctive style gained popularity in the booming tourist market of the open economy (Pieris 2011). For O'Coill & Watt (2009) this superficially picturesque style represents a point where architecture and power intertwined as an expanding and predominantly Sinhalese elite sought to ground a new post-colonial identity in the context of ethnic and class relations that were becoming increasingly polarised.

If contemporary middle class house forms are not visually characterised by type/s how does 'culture' influence house form? Do heterogeneous house forms share common spatial networks to embody socially constructed norms of the group? What is the nature of their interaction? What does the interaction of space and culture imply for times of change in Sri Lanka?

1.1. Social Change in Sri Lanka

Several authors have recognised changing social institutions evident during urbanisation following the 'open economy'. Hasbullah et.al (2004) argues that the trebling of population since independence in 1948, rapid urban growth, the availability of high quality education to the general masses and a shift from an agriculture-based economy to manufacturing and the service sector has forced individuals and institutions to deal with new problems, which others have examined in detail. Perera PDA (1999) discusses the nature of changing family structures and the position of elders. He found out that younger generations do not perceive their family roles and responsibilities in the same way that older generations did and argues that elders cannot depend on traditional family structures for support and care at present. Caldwell (2003) argues that marriage patterns in Sri Lanka are changing along with a new family structure, which gives more autonomy to the individual. Traditional marriage structures seen as a bonding of two families have lost meaning in the present context and therefore have been replaced by new marriage patterns. Kemper (2001) investigated in detail, consumption patterns, choices in the open market, and the influence of advertising in the Sri Lankan context and the effect of new consumption regimes on families. Changes to women's positions, role, and employment patterns have been discussed by many authors (Kiribamune et.al 1990 (a), Peiris 1990, Perera T

(1996) as has the influence of new work patterns on family life in urban Sri Lanka (Ismail 1990, Abeysekera 1996, Dias 1990).

This paper aims to explore the association of house form and social institutions in the context of their parallel changes in contemporary Sri Lanka. The key objectives of this paper are to explore 1.How far does the seeming variety of house forms in contemporary Sri Lanka, accommodate similar space organisation? 2. How does common knowledge/ social norms of everyday home life interact with space organisation? 3. What does this imply for the association of house form and cultural meaning, especially in times of social change? The answers to these questions advance the understanding of the association of house form and culture in Sri Lanka in times of social change.

1.2. Spatial patterns and social knowledge

Form and space in houses are known to transform with the practices and beliefs of the people who occupy them to express social orders of the time. However, the translation processes of the social intent / culture and house form are difficult to understand as the variables are unequal in scale; the latter being a subset of the former (Rapoport 1991). The idiosyncratic and societal manifestations have been distinguished by the consistent relations that reveal underlying meaning in classic studies such as identification of homologous structures of classification and meaning among the Thai (Tambiah 1973) and the Berber house organised of spatial categories structured on gender principles (Bourdieu 1966). Glassie's (1975) seminal study of house forms in Virginia argued for the reappearing of rules derived from the syntax of combining geometric properties of space that changed over time with changing lifestyles.

Hillier and Hanson claim the difficulty lies in the separation of social dimension from architecture where 'the former being reduced to mere inert material and the latter to mere abstraction' (Hillier and Hanson 1984 p9). For them, space is constantly renegotiated to embody meanings appropriate to the context and time by the intervention of human actors. Through everyday life 'cultural practices' are unconsciously communicated and become embodied in the domestic settings that facilitate them. As such space by itself has to be considered as cultural data. Hillier argues that through a process of unconscious reproduction patterns or 'rules' are transmitted in society. "Knowledge of principles is acquired unconsciously, and remains unconscious. It has to be so, because social knowledge is what makes society works. The abstract principles are transmitted through the behaviour and thus reproduced." (Hillier 1996 p 40) This common, social knowledge of conventions operating in a particular society is the 'culture' of a given group of people at a given point in time.

In attempting to understand space as cultural data, the notion of a 'genotype', becomes important (Hillier 1984). The Oxford dictionary defines genotype as the genetic makeup of an organism, and therefore in spatial terms a genotype refers to the invariant properties of spatial boundaries across a sample. By using the idea of the genotype, Hillier and Hanson (1984) suggested generic spatial patterns that underlie surface features of spatial configuration and also the degree of flexibility such spatial structures offer, through the idea of the 'phenotype'. The Oxford dictionary refers to a phenotype as the visible characteristics of an organism resulting from the interaction between its genetic makeup and environment. Hillier and Hanson (1984) argue that invariant properties of space contain the shared meanings and behaviours of a culture which can explain the variety of houses across the world despite the similarity in daily chores that take place in them day after day. Therefore the spatial configuration of the home is considered as a key variable that embodies socially constructed meanings. Hence in a given culture, genotypical patterns are thought to be able to evoke similar experiences for different

people, which facilitate socially constructed behaviours as appropriate to the time and context that makes one a part of the culture. This affirms solidarity.

2. Method of Study

This paper explores genotypes firstly in the spatial configurations using space syntax measurements. The results of spatial analysis were further analysed with thirteen interviews with the occupants of the two genotypes across a range of profiles such as young and old, living as extended and nuclear families. The embodied meanings in the genotypes in everyday home life are explained through visitor, family and outsider interfaces. Their synthesis reveals unwritten 'rules' or classifications that operate in society which characterises the home in a particular context and time. Therefore, this paper argues that a change of a genotype may indicate new socio- cultural ideas that influence domestic space organisation in a particular society.

2.1. The sample

The sample represents variables of the house- road relationship to characterise visual diversity. The 40 houses consist of 20 houses constructed before 1980 and 20 houses constructed after 1980 due to the visible change that accelerated from this time. However to represent middle class house forms its origin, the 20 houses before 1980 are further divided with 10 houses from 1970-1980, ('closed economy' period with more socialist oriented economic policies) which was the closest time to the open economy era and 5 houses each from 1950-1970 and the pre 1950 periods. The sample is mainly from Moratuwa, a suburb to the south of Colombo with a recorded history of inhabitation by middle classes since emergence (Wright 1907, Jayawardena 2002) with the exception of three seminal houses taken from outside this area.

The variables of 'house–road relationship' are as follows. The presence G) or the non-presence (NG) of a garden between the road and the entrance, the presence (B) or the non-presence (NB) of a visual barrier between the garden and the access road, and the transparency of the facade towards the access road. The facade is classified as 'solid' (S), if the inside of the house cannot be seen from either the road or the garden and as 'void' (V) if the inside can be seen (figure1 and 2). The combination of these variables could result in six possible house types that constitute the sample.

The skewed number of house types over the time in the 40 cases represents the difficulty in finding some of the types for each time period in the middle class housing stock (figure 3). Overall, the sample is balanced in terms of house road relationship types with 9 houses of V/NB/G type, 10 houses of V/B/G type, 6 houses of S/B/G type, 6 houses of S/NB/G type and 9 of S/NG type. Of the possible six types one type (V/NG) did not occur.

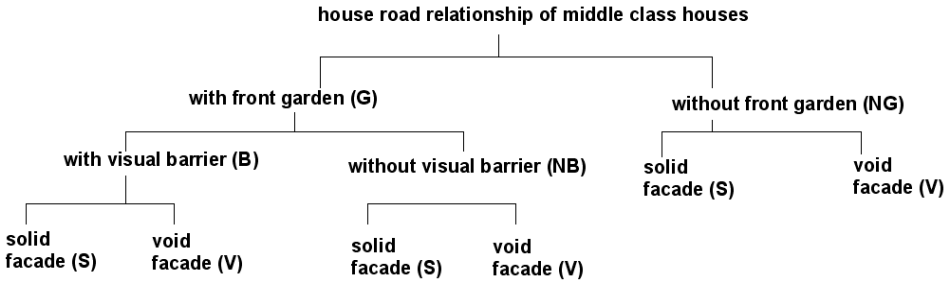


Figure 1: Variables of House –road relationship (Source: author)

Houses with gardens

Houses with visual barrier

Houses with solid facades

Houses without gardens

Houses without visual barrier

Houses with void facades

Figure 2: Variables of house road relationship (Source: Author)

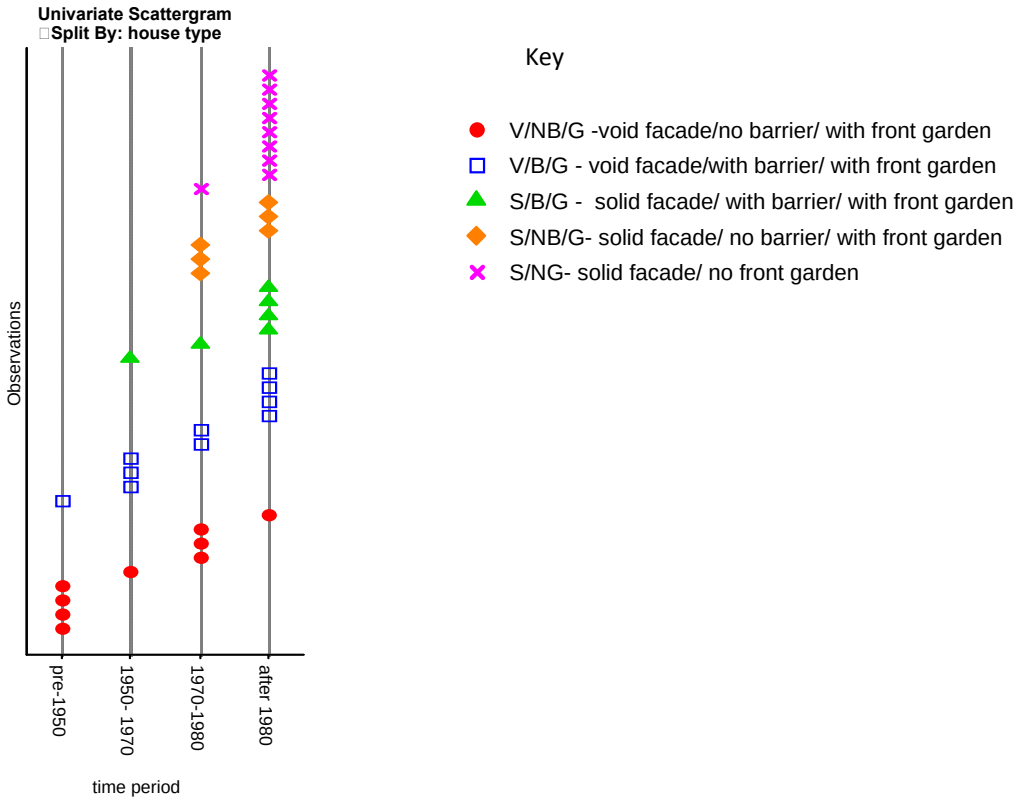


Figure 3: The Sample (Source: Author)

1.1. Definitions

The notions and measurements used in this analysis from the space syntax toolbox and statistics are described below.

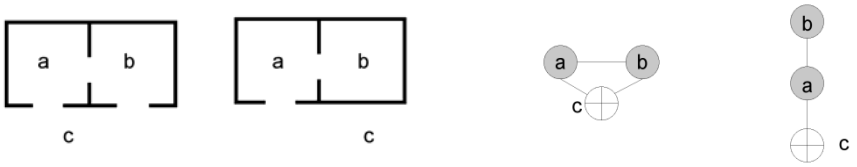


Figure 4: J graphs (Source: Hanson, 1998)

J graphs - J graphs visually represent the accessibility (drawn as a line) from one space to another (A space is drawn as a circle), in relation to a particular space. Hanson describes J graphs, in a simplified manner;

> "…. on the left, both A and B are directly permeable to C whereas, on the right, only A is directly connected to C. This means that in the latter case we must pass through A to get from B to C, whereas in the former we can go either way. In the second example, A and B are different with respect to C. The relation has become asymmetrical. There is a configurational difference between the two examples, and also between the two constituent cells, which make up the second illustration (Hanson 1998 p.23).

Real relative asymmetry (RRA) – These characteristics of visual configuration can be measured and expressed in numerical terms by the measure of 'integration'. The RRA value of a space measures how connected a space is in terms of accessibility from other spaces or in other words how integrated or segregated the space is within the configuration. Therefore the mean RRA or mean integration value (reciprocal of RRA) of a configuration as Hanson (1998) describes it "seems to capture the extent to which each spatial element contributes to drawing the whole configuration together into a more or less direct relationship". The higher the integration value (reciprocal of RRA) the less integrated the space is, e.g. a space with an integration value of .93 is a more integrated space than a space with a value of 1.54. These values are absolutes, as the calculations are related to a datum and not relative to the particular configuration. Hence if the basis for differentiation of space is consistent, the integration values from any sample become comparable.

Mean Depth - This gives an indication of how deep or shallow a space is from the root space, from which the J graph is drawn and which is usually the exterior. Therefore, the Mean Depth of a configuration is an indication of the layering of spaces. The higher the value, the more deep the space is, and lower values indicate fewer layers in relation to the exterior and are therefore shallow.

Base difference factor (BDF) - This measures the strength of the differences in 'integration' between three or more spaces. Therefore, if the minimum, mean and maximum integration values of a configuration are known, the BDF value of the configuration will indicate whether the differences are weakly realised, i.e. by the homogeneity of RRA values or strongly realised, i.e. if the difference between the maximum and minimum is large. The values are always between 0 and 1. The closer the BDF value is to 0, the more differentiation there is among the spaces; the closer the values to 1, the more homogeneous the spaces are.

Function: transition ratio - This measure gives a feel of whether there are more function spaces or transition spaces in a configuration. For example, a house with 5 function spaces and 4 transition spaces with ratio of 1.25 indicates that there are slightly more function spaces than transition spaces.

Categories of space - The spaces were broadly categorised as four function groups; common activities named as day spaces, individual activities named as non-day spaces, circulation functions named as transitions and the exterior as a category of space for the analysis. The day spaces are the dining, sitting, outer sitting, family sitting, family dining, occasional cooking (show kitchen used occasionally, kitchen, office and utility areas. The non-day spaces are the bedrooms, toilets, dressing rooms, servant's quarters and garages. The transitions include corridors, lobbies and entrance porches that are solely used to move between functions.

3. Two Genotypes

3.1. Overall Sample

The J graphs show that the houses have broadly one spatial structure with variations in the position of space labels. The figure 5 presents an abbreviated J graph model for the sample. There is either a shallow or deep ring integrated with the exterior, which contains day spaces and/ or transitions. One arm of the ring contains the kitchen and/ or occasional cooking area, if there is one. The other arm contains the sitting and outer sitting areas or a series of transitions and usually the arms meet at the dining area to complete the ring. Around this point, the graph is connected to the deeper parts of the house; to the family sitting area if there is one and the bedrooms, which normally take a tree form or ring form. If one arm of the ring consisted of transitions then there are likely to be more than one deeper branch, amounting to sub complexes; one for visitor day spaces and another for the family sitting area/ bedrooms.

Within the broad spatial structure, the tendencies over time reflect two sub themes or genotypes. As explained, the genotypic characteristics classify a house as belonging to a group but could result in different physical forms or phenotypes. The day spaces and transition areas are positioned in distinctive ways in relation to each other and to the exterior that demonstrate two structures of space named as the Occupation model (O model) genotype and Movement model (M model) genotype.

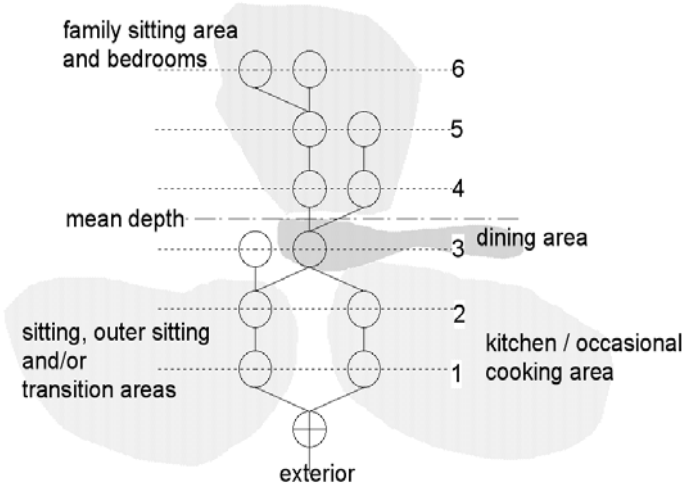


Figure 5 – Basic structure of the J graph (Source: Author)

3.2. The 'O' Model genotype

Genotype 1 is named as the ''O'' model because spaces are organised around patterns of 'Occupation''. The ''central nerve'' or the integration core (15% of the most integrated spaces has been considered as the integration core[i]) consists mostly of day spaces including the dining and sitting areas (table 2). Figure 6 is a typical J graph of an O model house. The configurations are hinged together by the integration core that is located deep in a ring relative to the mean depth of the house having a 'global' effect on the configurations. The rest of the spaces, which are the deeper spaces (bedrooms) and shallow day spaces (outer sitting and kitchens) are pulled towards the integration core, in one cohesive network by this arrangement. Being part of the global ring, the exterior is a crucial space in maintaining the model. Therefore, if one entry route is closed, the spatial structure breaks down (figure6).

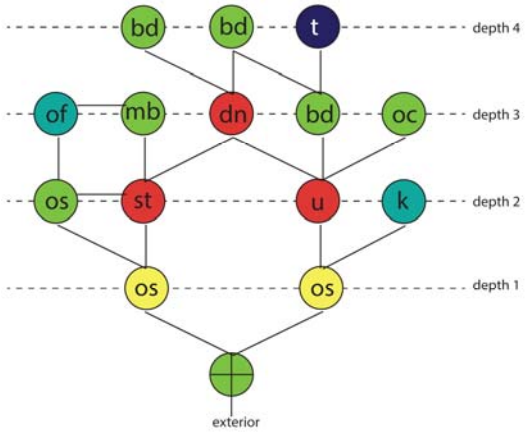
To move from the exterior or shallower day spaces to the deeper non-day spaces, or to move from the front day spaces to the back day spaces, the 'central nerve' of the integration core cannot be avoided. Therefore, the front, back and central spaces are dependent on each other to maintain the spatial structure. Hence the integration core is positioned as a ''real'' centre, where activities could take place while other household members pass through to go to other areas of the houses.

Table 2 presents the syntactical differences of the two genotypes case by case. The integration cores of the O model homes are deep in the global ring (If the difference between the mean depth of a house and the depth of the integration core was less than 1 step the core position was named as 'deep') pulling other spaces towards it, making one interdependent network. Reflecting this structure of strong cohesion in the spatial network, overall the O model homes are more integrated in the sample with a mean value of 1.08. It is because overall O model homes are ringy and shallow, which allows for this cohesive network; they have an overall mean depth of 2.89 less than the sample mean of 3.9 with the exception of two houses. With a mean Base Difference factor value of 0.78, below the sample mean, the O model homes are more structured within the sample indicating larger differences between the integrated spaces and the segregated spaces. Also, the function: transition ratios at 4.92 are higher than the sample mean of 3.20, reflecting the lower number of transitions in these homes, with a few exceptions. Being the older houses in the sample, they have been modified over the years and therefore each house represents different degrees of strength in the realisation of the 'model characteristics'.

3.3. The M model genotype

Model 2 is named as the M model because spaces are organised around patterns of 'Movement'. The configuration is held together by transition spaces such as corridors, lobbies and stairs around which the integration core has developed although there may be some occupation spaces in it. Of the 25 M model homes, the dining area becomes a part of the core spaces in three houses, the master bedroom in one house and the sitting area in 6 houses but not as the most integrated space. The other 16 homes only have transition spaces in the integration core (table 2).

Compared to the ''O'' model in which the integration core was occupation space, no activities take place in the 'nerve spaces' of this model as these are for through movement to other spaces. Figure 7 represents a typical J graph of the M Model. The configurations are hinged together by this core of transitions located as shallow spaces compared to the mean depths of the houses.



Note: The colours ranging in respective order from red, orange, yellow, green, light blue and dark blue represents the configurational importance of the particular space in the spatial arrangement which has been measured by space syntax methods.

Key

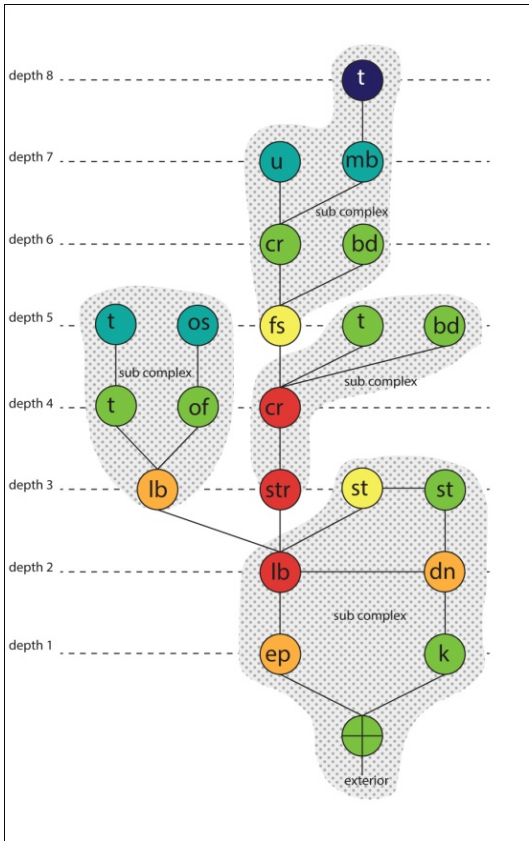
dn	Dining area	**oc**	Occasional cooking	**fd**	Family dining area	**u**	Utility
cy	Courtyard	**sr&t**	Servants area	**st**	Sitting area	**k**	Kitchen
mb	Master bedroom	**t**	Toilet	**os**	Outer sitting	**fs**	Family sitting
bd	Bedroom	**vb**	Visitor bedroom	**of**	Office	**ep**	Entrance porch
bky	Backyard	**tr**	Terrace	**str**	Stairs	**cr**	Corridor
lb	Lobby	**ex**	Exterior	**g**	Garage	**sh**	Shrine room

Figure 6: Typical J graph of O genotype (Source: Author)

Although the ring with the exterior is apparent, being an overall characteristic of the sample, it only has a local effect on the configuration, as it is shallow. One arm of the ring goes to the kitchen or occasional cooking area. The other arm consists of a series of transition areas that make up some of the core spaces which enables movement into several sub-complexes. Most of the spaces of the integration core are located outside the ring. (table 2)

This reflects an arrangement, which has opposite characteristics to the O model. Activity spaces are organised as many sub-complexes differentiated as service spaces, visitor spaces, office spaces and family/ bedroom spaces. In fact, the dispersed sub complexes are hinged together by the patterns of movement between them, created by the integration core. The integration core consists of shallow spaces close to the entrance, as movement is facilitated into the desired sub-complex soon after entry. Unlike in the ''O'' model, cutting across the occupation spaces can be avoided when moving between the sub-complexes as this is provided for by the integration core. Additionally, functions of the activity spaces are independent from one another and the exterior. Therefore, as a network, spaces in this M model are less cohesive compared to the O model, more dispersed and independent. As the ring with the exterior only has a local effect on a few spaces, even if one route from the exterior is closed, the spatial structure does not break down (figure 7).

Overall, reflecting on this composition, the houses are more segregated, deep and tree like compared to the O model houses. As seen in Table 2, the M model homes have an average mean integration value of 1.35, which is greater than the sample mean of 1.25. There are four exceptional cases of the M model houses which have integrated configurations below the confidence interval[ii]. The M model houses are deeper, with a mean depth of 3.86, above the sample mean. The Base difference factor is 0.82, which is greater than the sample mean, indicating that the spaces are less differentiated and are composed of segregated sectors. The high number of transition areas that make up the structural characteristics are evident in the function: transition ratio of 2.23. Table 3 summarises the characteristics of the two genotypes.



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bky	Backyard	**tr**	Terrace	**str**	Stairs	**cr**	Corridor
lb	Lobby	**ex**	Exterior	**g**	Garage	**sh**	Shrine room

Figure 7 Typical J graph of M genotype (Source: Author)

3.4. Space Categories of the two genotypes

The configurational differences of space categories between the models are distinctive. The visitor day spaces are the most integrated space category in the O model but in the M model this category is less integrated (1.2) than transitions (1.13) (table 4, figure 8). Along with more segregation, transition areas have become the most integrated space category for the M model. The transitions, which comprise of lobbies, corridors and staircases, are located deeper than the visitor spaces in the M model and are almost one step deeper than in the O model, the difference being 0.9. The transitions remain as the shallowest group of spaces in the O model, being composed mainly of entrance porches and lobbies, the first spaces encountered. The exterior has segregated comparably in the M model, as the difference between the two models is 0.23. These space categories are integrated below the mean integration in both models. The family day spaces, which had a mean integration of 1.27 for the whole sample, have an integration value of 1.4 in the M model and 1.07 in the O model. Thus in the O model the family day spaces are more integrated than the mean, and in the M model they are more segregated than the mean.

O Model									
House No	mean RRA	mean depth	BDF	F:T ratio	Core spaces	core RRA value	core depth	core position	time period
17	0.75	2.06	0.73	8.00	dn,oc,st	0.45	1.66	in ring, deep	pre-1950
8	1.03	3.00	0.83	14.00	fd,dn	0.59	3.00	in ring deep	pre-1950
37	0.89	2.27	0.8	2.33	ext,tr,dn,os,tr	0.60	1.00	in ring, shallow	pre-1950
7	1.05	2.64	0.82	no transitions	dn,u	0.62	2.50	in ring, deep	pre-1950
11	1.33	3.50	0.83	7.00	dn,fs	0.80	3.50	in ring, deep	pre-1950
6	0.88	2.50	0.84	3.67	cr,oc/fd	0.51	2.50	in ring, deep	1950- 1970
16	0.94	3.00	0.75	4.67	cr,oc/fd,os	0.55	2.67	in ring, deep	1950- 1970
18	1.21	3.26	0.75	2.80	st,bd,dn	0.75	2.66	in ring, deep	1950- 1970
1	0.93	1.89	0.84	8.00	st	0.55	2.00	in ring, deep	1970-1980
13	1.03	2.63	0.78	3.00	fs,cr	0.56	2.50	in ring, deep	1970-1980
14	1.06	2.77	0.7	3.25	cr,k	0.62	2.00	in ring, deep	1970-1980
20	1.32	4.42	0.73	1.71	dn,st,cr	0.77	3.00	outside ring, shallow	1970-1980
19	1.24	3.47	0.79	3.75	dn,cr,st	0.73	2.67	in ring deep	1970-1980
5	1.27	3.23	0.77	2.25	dn,lb	0.70	2.50	in ring, deep	after 1980
2	1.28	2.73	0.8	4.50	oc, cr	0.77	2.50	partly outside ring, deep	after 1980
O model mear	1.08	2.89	0.78	4.92		0.64	2.44		
sample mean	1.25	3.50	0.81	3.20		0.77	2.65		

M model									
House No	mean RRA	mean depth	BDF	F:T ratio	core spaces	core RRA value	core depth	core position	time period
28	1.46	3.52	0.77	2.29	lb,st,str	0.93	2.66	partly outside ring,deep	1950- 1970
40	1.40	4.49	0.85	2.00	dn,cr,cr,cr,cr	0.94	3.33	partly outside ring,shallow	1950- 1970
4	0.85	2.25	0.76	5.00	cr,mb	0.52	2.30	in ring, deep	1970-1980
12	1.09	2.25	0.78	2.20	str,ext	0.65	0.50	in ring, shallow	1970-1980
21	1.20	3.00	0.87	2.33	lb,ep,ext	0.85	3.00	partly outside ring,deep	1970-1980
27	1.38	3.86	0.84	1.75	cr,str,cr	0.86	3.00	partly outside ring,deep	1970-1980
22	1.37	3.60	0.8	1.86	cr,cr,cr,	0.91	3.00	in ring, deep	1970-1980
9	0.94	2.73	0.88	4.00	cr,str	0.49	1.50	partly outside ring, shallow	after 1980
3	1.03	2.83	0.76	3.00	lb,cr	0.52	2.50	in ring, deep	after 1980
38	1.22	3.93	0.82	1.73	lb,str,cr,ep,cr	0.75	2.20	in ring, shallow	after 1980
23	1.33	3.30	0.85	4.00	cr,str,fs	0.81	2.00	partly outside ring,shallow	after 1980
32	1.31	4.08	0.9	1.60	cr,str,cr,cr	0.83	3.00	partly outside ring,shallow	after 1980
33	1.19	3.42	0.87	1.60	lb,cr,cr,cr	0.84	3.00	in ring, deep	after 1980
25	1.41	4.48	0.78	2.50	lb,str,cr	0.84	3.00	partly outside ring,shallow	after 1980
29	1.40	4.26	0.82	2.29	st,lb,str	0.84	3.00	partly outside ring,shallow	after 1980
10	1.35	3.31	0.83	1.67	str,cr	0.87	3.50	in ring, deep	after 1980
39	1.37	4.87	0.81	2.44	os,str,cr,cr,st	0.88	3.50	partly outside ring,shallow	after 1980
31	1.41	3.96	0.79	1.78	cr,str,cr	0.88	2.50	partly outside ring,shallow	after 1980
36	1.45	4.97	0.77	1.64	cr,str,cr,g	0.92	3.20	partly outside ring,shallow	after 1980
26	1.54	4.52	0.83	2.50	st,str,cr	0.98	3.00	partly outside ring,shallow	after 1980
15	1.58	4.24	0.82	1.43	cr,st,str,	0.98	3.00	partly outside ring,shallow	after 1980
30	1.54	3.83	0.82	1.56	cr,dn,str	0.99	2.33	partly outside ring,shallow	after 1980
24	1.56	3.48	0.8	1.62	lb,st,str	0.99	2.00	partly outside ring,shallow	after 1980
35	1.64	5.66	0.81	1.70	cr,str,fs,st	1.03	4.50	partly outside ring,shallow	after 1980
34	1.68	5.65	0.82	1.36	dn,str,cr,cr	1.04	4.00	partly outside ring,shallow	after 1980
M model mean	1.35	3.86	0.82	2.23		0.84	2.78		
Sample mean	1.25	3.50	0.81	3.20		0.77	2.65		

Table 2: Syntactic properties of O and M genotypes case by case (Source: Author)

Key

dn	Dining area	**oc**	Occasional cooking	**fd**	Family dining area	**u**	Utility
cy	Courtyard	**sr&t**	Servants area	**st**	Sitting area	**k**	Kitchen
mb	Master bedroom	**t**	Toilet	**os**	Outer sitting	**fs**	Family sitting
bd	Bedroom	**vb**	Visitor bedroom	**of**	Office	**ep**	Entrance porch
bky	Backyard	**tr**	Terrace	**str**	Stairs	**cr**	Corridor
lb	Lobby	**ex**	Exterior	**g**	Garage	**sh**	Shrine room

O model spatial attributes	M model spatial attributes
Overall integrated system	Overall segregated system
Shallow and ringy	Deep and tree like
Ring with exterior has a global effect	Ring with exterior has local effect
High function: transition ratio	Low function: transition ratio
Integration core is made up of occupation spaces such as dining, sitting and family dining areas	Integration core is made up of transition spaces
Integration core is deep and is in global ring most of the time in relation to overall depth	Integration core is shallow and lies partly in local ring and outside it
Dining area is the most integrated	Transitions are the most integrated
Sitting area integrated and deep	Visitor spaces shallow and integrated
Verandah is integrated and shallow	Family spaces segregated and deep
Bedrooms integrated, ringy and relatively deep	Servants spaces shallow and segregated
Kitchen segregated and deep	
Office segregated and shallow	

Table 3 Summary of the spatial attributes of genotypes (Source: Author)

The family day spaces remain as shallow spaces in the O model at mean depth of 2.6, compared to the model mean of 2.9. However in the M model, this has moved to a deep position with a mean depth of 4.2, compared to the model mean depth of 3.9. The non-day spaces follow the overall sample trends for the two models being the most segregated category and the deepest. Therefore the pattern of integration and position in the configurations of categories that relate to visitors, family and non-day (individual) activities have changed. These findings are visually represented in figure 8.

	sample		O model		M model		difference
	mean	count	mean	count	mean	count	
Integration							
visitor day spaces	1.03	40	0.8	15	1.2	25	0.4
transitions	1.06	39	0.94	14	1.13	25	0.19
exterior	1.17	40	1.03	15	1.26	25	0.23
family day spaces	1.27	40	1.07	15	1.4	25	0.33
mean RRA	1.25	40	1.08	15	1.35	25	0.27
non - day spaces	1.56	40	1.4	15	1.65	25	0.25
Depth							
transitions	3	39	2.4	14	3.3	25	0.9
family day spaces	3.6	40	2.6	15	4.2	25	1.6
visitor day spaces	2.9	40	2.6	15	3.1	25	0.5
mean depth	3.5	40	2.9	15	3.9	25	1
non day spaces	4.2	40	3.8	15	4.5	25	0.7

Table 4 Syntactic values of the space categories (Source: Author)

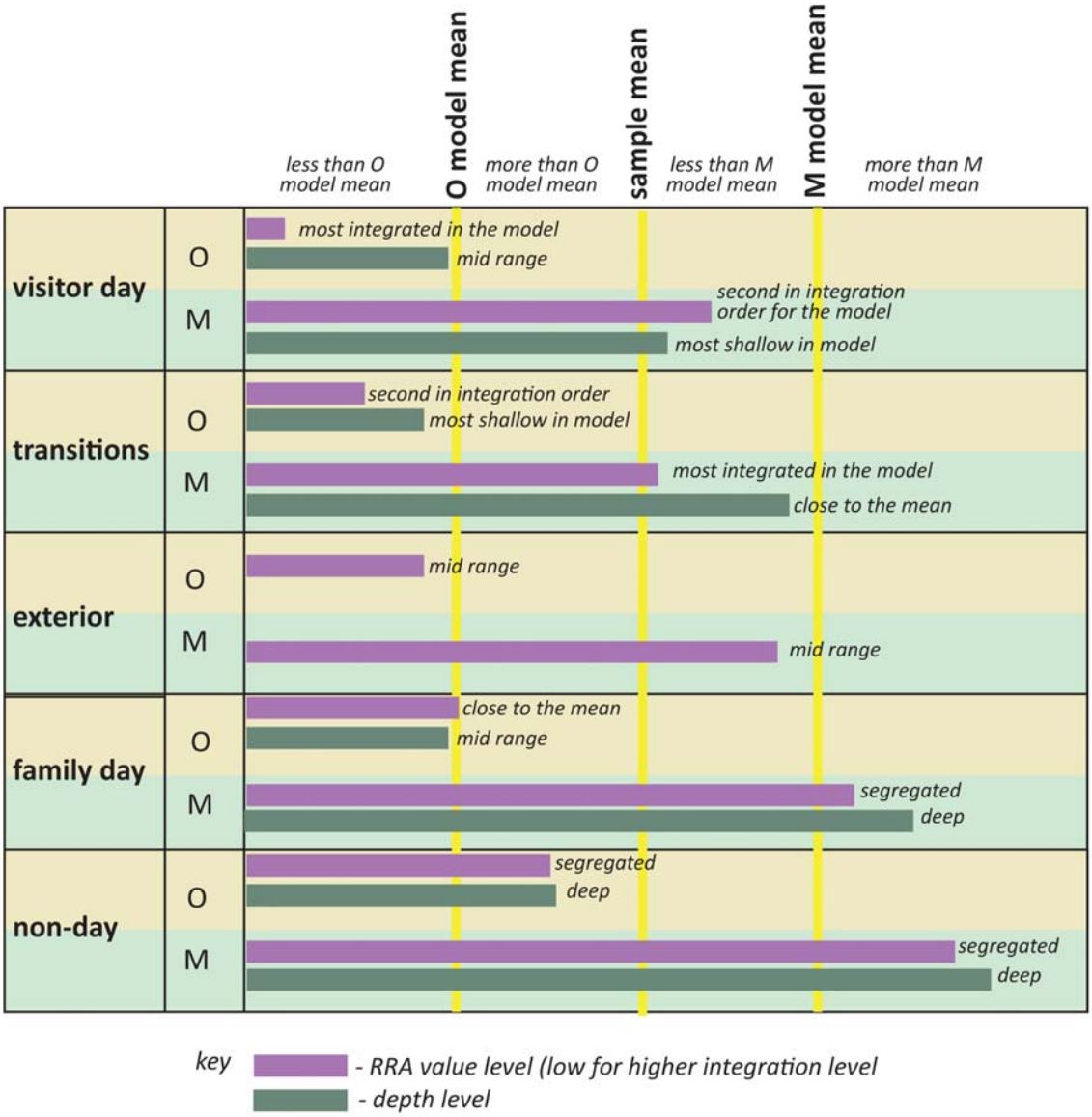


Figure 8: Visual representation of integration and depth level of space categories (Source: Author)

4. Transformation of embodied social meanings

4.1. Change of genotype over time

Analysis of the spatial configurations of 40 houses revealed that there had been one conceptual spatial model (O model) among the middle class, which had changed and stabilised to an alternative one (M model) after 1980. All five pre-1950 houses were O model and 18 of the 20 post 1980 houses were M model. There is a mix of types in the periods in between, but the 1950-1970 period includes two exceptional M model cases for the times, one of which is a recently modified house and the other a seminal house designed by architect Geoffrey Bawa. For 1970–1980, the houses are divided equally between the two models suggesting a period of possible transformation (table5). This section will discuss how the spatial classifications of the two genotypes become meaningful in the society in which they are situated which explains the transformation over time.

Frequency Distribution for model
Split By: time period

	Total Count	pre-1950 Count	1950- 1970 Count	1970-1980 Count	after 1980 Count
O model	15	5	3	5	2
M model	25	0	2	5	18
Total	40	5	5	10	20

Table 5: Distribution of genotypes over time (Source: Author)

4.2. Embodied social meanings of O model

The results suggest that the spatial arrangement of the O model remained largely intact until the opening of the economy when it stabilised into a new M model genotype. Referred to as bungalows at the time they emerged, the O model genotype was 'dressed' differently in outward form in successive years, known as the 'American style' and its variations with 'gable roofs', 'french windows' etc.

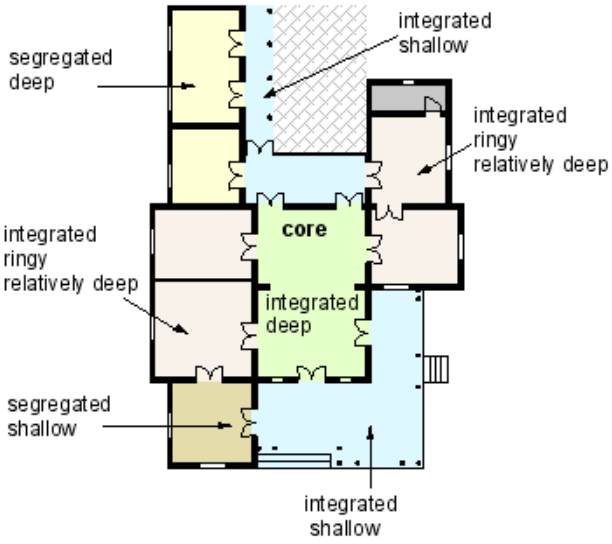
How does the O model embody socially constructed meanings of the pre- open economy lifestyle? The configurational properties of the O model facilitated the function of the 'home' as one interdependent unit, supportive of the type of family system in which everyday life revolves around patterns of events (Caldwell 2003). Ceremonial and daily rituals were performed in the central reception area in the 'inside', which is the 'central nerve'; located as a deep integration core that pulls the rest of the network of spaces towards it (figure 9). When rituals of home life were performed in hierarchical spaces, the ascribed positions and roles of the family were synchronised in space-time, which facilitated the socially constructed institution of home (Ludowyke 1989, Robson 2002). More casual activities were performed in the verandas or outer sittings, located 'outside' in the periphery in shallow but integrated positions with less possible scrutiny from other spaces. The front veranda was a space to retire to where parents and children, men and women, servants and masters, kith and kin interacted informally, balancing the activities of the controlling centre (Ludowyke1989). As such, the separation between reception spaces and verandas as a centre/ inside and periphery/outside respectively, trapped roles of the 'group' that correspond to formal and informal roles that constituted home (figure 9).

The bedrooms are integrated, deep and ringy spaces, within the scrutiny of the central core spaces with a strong cohesion to it. Sleeping was an event performed at 'night', categorised by 'group' notions such as parents, grandparents, older /younger children, female/ male children. During the 'day' bedrooms were mainly store spaces for belongings. Individual autonomy was unimportant in the home, family rules and rituals assumed priority (Caldwell 2003). Extended family boundaries and nuclear family boundaries were blurred, and a strong integration network did not allow for a separation.

These family attributes seem to be comparable to Bernstein's (1971) distinction between positional and personal family types with closed and open communication systems respectively. In the positional family type, there would be a clear separation of roles that are ascribed by a formal status such as mother, father and children. Such roles are highly regulated. Bernstein argues that "in positional families, the range of alternatives which inhere in the roles (the role discretion) is relatively limited, consequently the communication system reduces the degree of the individual selection from alternatives (1971, p 155)". The family relations in the O model

homes are comparable to the positional family type, which Bernstein suggests relates to a particular way of socialising and communicating.

The 'group', made up of extended family members, neighbours, kith and kin, and servants had a part to play in the everyday home life to maintain the solidarities of the social system (Jayaweera 2000). Meanings of home in this system constantly bring about a collectiveness in which patterns of events are important to maintain a socially constructed home life (Ludowyke 1989).The home life of this form of solidarity enables the primacy of the institution that overpowers individual freedom by the spatial system it has developed. Therefore, each space is an integral part of the overall network with its boundaries subjected to possible overpowering from the rest. Hence it is event-oriented meanings that are embodied in the occupation based (O model) spatial classification that is seen in the configurational analysis. This type of home life is unpopular among today's middle class and houses that celebrate this are no longer popular.



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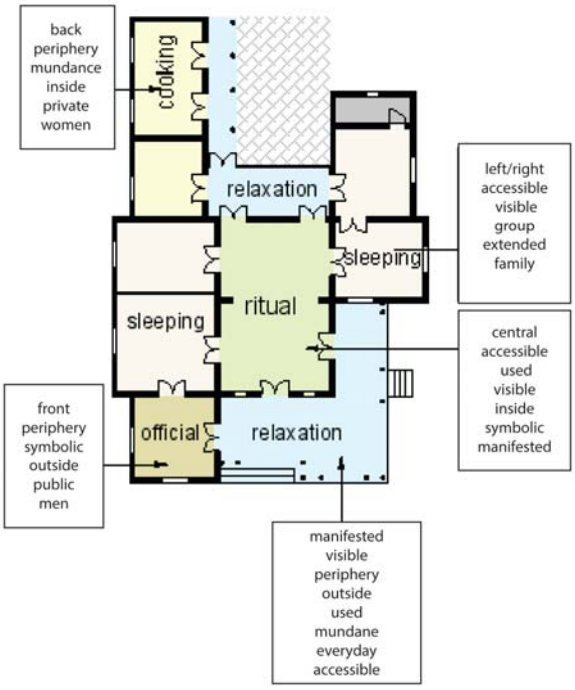

Meaning

Figure 9: Configuration and meanings of a typical O model house (Source: authors)

4.3. Embodied social meanings of M model

Along with urbanisation, plot sizes reduced, courtyards were introduced as internal gardens, more houses were built on site boundaries, and solid facades appeared. Incorporating these, a range of plan arrangements are seen and a 'type' like in the earlier times is not represented. The overall properties of the configuration of the M model embody social meanings identified with a new lifestyle. The social boundaries between categories of users, such as the family, visitor and outsiders, are distinctive in the new lifestyle with 'user oriented' meanings apparent in the classification of spatial boundaries. There is a formal 'visitors zone' and a 'separate 'work zone' that is used on an everyday basis, visually hidden from the formal visitors' spaces, consisting of a space for a kitchen, car parking and facilities for domestic helpers which consist of comparatively small rooms. There is also a 'family zone' for the exclusive use of the family (Dovey1999).

The 'formal visitors' area has a symbolic role and the informal family area has a more mundane role. The formal visitor assumes an important role in the homes with the new spatial mapping of visitors' spaces set aside to display forms of consumption that symbolises achievement (Goffman 1959, Lawrence 1987, Ozaki 2003). The spaces for everyday home life have an alternate form of classification which is hidden and inaccessible to visitors.

Extended family boundaries had been renegotiated in the new genotype as the nuclear family unit and senior family unit call for more independence, although they are not totally cut off from one another (Perera 1996). In the absence of domestic and professional child care services, child care is usually taken over by grand parents, when both parents are working. However, the spatial boundaries of extended families were arranged as conjugal units although under one roof, enabling forms of support that could be pre- arranged. The inevitable meeting of family members has been avoided by the spatial network.

With the distancing of the extended family and local community, together with new forms of leisure and relaxation, spatial configuration has been renegotiated (Wilmott and Young 1959). The home is now a place for individual relaxation. Family relaxation does not happen on a daily basis but at longer intervals outside the home through events such as eating in restaurants, going on holiday etc. that have become available within the new economy. The sequential layering of space seen in the earlier periods, as spaces for shared, social activity being encountered first from the roadside does not have meaning and are therefore redundant. This has been replaced by individual spaces with strengthened boundaries providing more autonomy for the person within it (Caldwell 2003). If the O model family relations and spatial communication system is comparable to the positional family type with a closed communications system, the M model family relations are comparable to the person-oriented family type with an open communication system according to Bernstein's division (1971).

Numerous home-based enterprises have mushroomed in the neighbourhoods allowing strangers to wander about. Compared to the peripheral verandas that accommodated the local community, the veranda is also obsolete for this reason. This is symbolised by solid facades or a high boundary wall which cuts off connections outside your own plot. It is not that neighbours exist as total strangers, but have become 'less intrusive' and interaction with them is left as a matter of choice rather than as a compulsory act built into home life like in the older lifestyle.

To facilitate these new social boundaries, spatial networks are categorised and organised as more independent sectors in which each category of people performs distinctive functions (Hanson 1998). The overall spatial system is comparatively segregated, making each space relatively inaccessible from another and independent with strong boundaries between

them (Ekanayake 1996). Reflecting these segregated sectors, the configurations are deep and tree-like compared to the old genotype, which was shallow and ringy. Spaces are configured to be accessed sequentially, usually through other spaces imparting a strong sense of direction to the respective sectors. Compared to the O model homes the M model home has changed to one of more independence, where each member as part of a system is individually valued. The spaces in this system are characterised by autonomy and the configuration can be described as an 'individual oriented plan'. This type of home life is popular among today's middle class and houses that celebrate this have stabilised as the popular type.

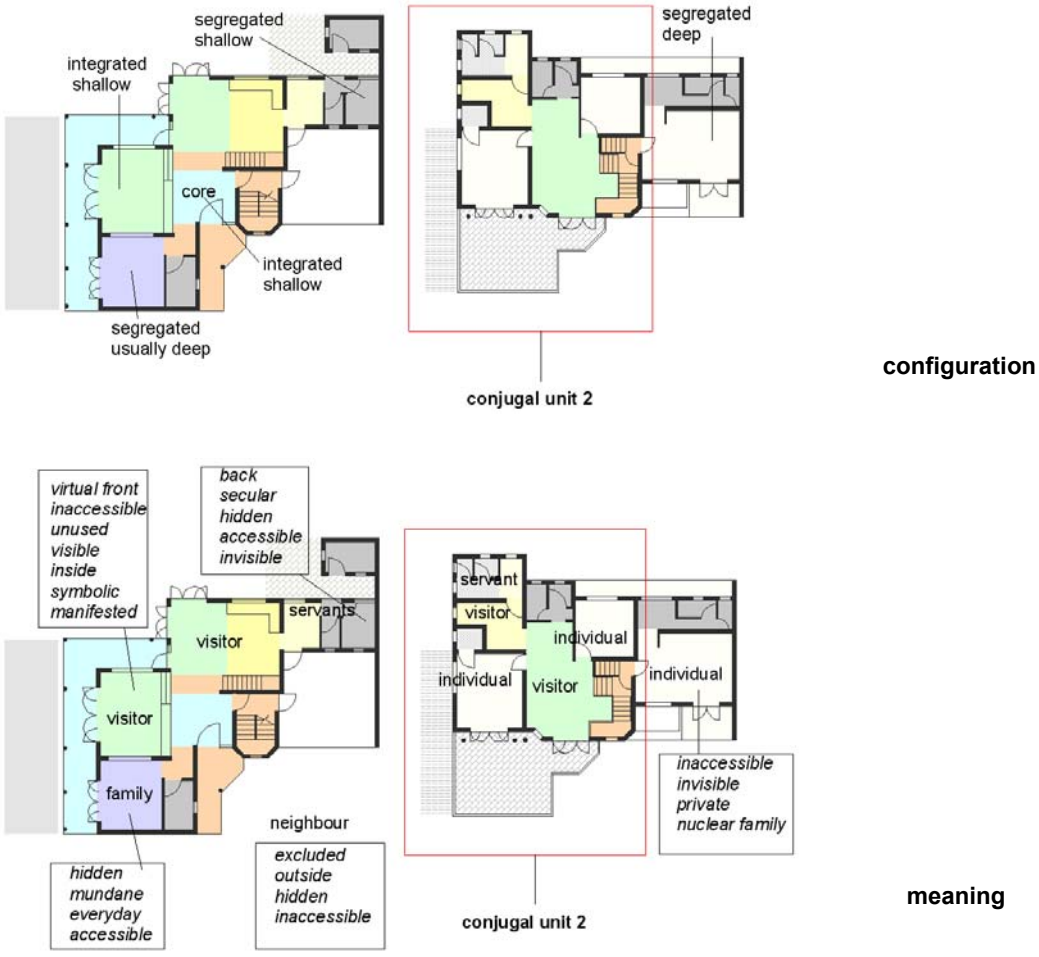

Figure 10: Configuration and meanings of a typical M model house (Source: Authors)

5. Conclusion: House form and culture in social change

Using space syntax theory this article investigated the nature of a spatial gene which lies beneath surface manifestations of space. The underlying patterns were thought to be transmitted and reproduced as abstract 'rules' for combining the spatial network to embody the social and cultural meanings of society.

A typical middle class suburb of today consists of numerous house types. However, as understood from the analysis of 40 houses, within this diversity there is an abstract model, which is a generic 'cultural model' that allows for a new type of home life. The older O model

genotype was generic which enabled a strong patterning of space, also epitomised by visually recognisable 'types' to a larger degree. Such homes were socially constructed during the British Colonial period, symbolising a newly emerged social stratification of the middle class (Wright 1907, Jayawardena 2002) along with rapid changes that took place with the new economic, administrative and educational structures.

In the post independence period that followed, the economy was stagnant and as a result change to the social structures was slow. The only significant change was in education, which was constantly improving (Blackton 1983, Karunatilake 1987). The open economy era, introduced in 1977 can be considered as a time of major policy change after independence (Balakrishnan 1979). This resulted in rapid social change that affected middle class lifestyles and created fresh influences and demands on the institution of the home. In the wake of rapid social change, the earlier genotype seems to have stabilised into an alternative model.

The issues that impinge on society in the transformation to urban industrialised contexts or indicators of change are global. Some indicators such as the decline in domestic services, the transformation of family structures, the separation of conjugal roles and attitudes towards the larger community have been known to change during urbanisation in other contexts, for example during industrialisation and in the post-war periods in UK society. Interestingly, however, the solutions arrived at in transforming such phenomena to the boundaries of home are immensely diverse, which has led to the organisation of home in unique ways in Sri Lanka.

Although transformed to acquire novel characteristics, there is still a cultural model with a distinctive, abstract space pattern that lies beneath the surface manifestations as a new genotype. This 'cultural model' could not only be generic but also generative to accommodate the diversity of house forms. The generative power allows for numerous kinds of individuation that is synonymous with the new lifestyle to allow for 'phenotypes' of personalisation (Caldwell 2003). The houses analysed comprised many architects' work, who had experimented with changing needs and constraints of practice that had resulted in a richness of plan forms. However, the cultural intent is subtle but nevertheless there in an abstract mode of reproduction. The new genotype can accommodate architects' and designers' preferences in the rise of architecture as an international and institutionalised discipline and also the constraints of land and site forces in operation during urbanisation.

The cultural roots embedded in the built forms are nevertheless present as an association of how middle class Sri Lankans may use domestic space and embody their own cultural meanings that are conditional to the socio-historical structures. Such cultural intent may not be recognisable outwardly in physical form or even in the surface manifestations of space but nevertheless present in the taken-for-granted assumptions about how to organise domestic space in contemporary Sri Lanka. Hence in Bourdieu's (1966) terms, a great degree of 'orchestration' has been made possible in the interaction of space and culture, through the intervention of actors that initiate change. This 'cultural model' may not be an invariable one, being a production of everyday life. As society consists of unstable and continuously renegotiated phenomena, the 'cultural model' had been renegotiated in the Sri Lankan culture together with the social change evident.

At the time middle class emerged, the house and home were powerful symbols in a system that defined an exclusive class through it (King 1984, Jayawardena 2002). Today, the house and home still symbolises social solidarity of the middle class, but the modes of belonging to the class have changed along with social change. The renegotiated boundaries of home facilitate and symbolise today's achievements and therefore new modes of entry into the 'class' affirming

solidarity in contemporary Sri Lanka. The heterogeneous middle class house forms of Sri Lanka today can be understood as a negotiation between new invisible conformist ideals and visible individual visual expression that distinguishes this class in an era of social change.

This claim for a transformation from a 'pre-open economy' cultural model to a 'post-open economy' one is conditional to the data gathered from the sample area of Moratuwa to the south of Colombo, where early middle classes settled down and have been living since (Jayawrdena 2002). At present this sample area is also one of the most populated in suburban Colombo, where recent urbanisation trends are known to be effective at the largest scale (Colombo Metropolitan region structure plan 1998).The findings and its interpretation in relation to social change in Sri Lanka are conditional within the framework in which the question was examined. Although the knowledge on social change was drawn from a larger database as applicable to the urban context, the conclusions drawn are limited by the research sample.

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[i] If the core is made up of an even number of function spaces and transition spaces, then the highest in the order was considered as to whether it was a function space or transition space to classify for numerical analysis.

[ii] A confidence interval reports a range of values within which a particular parameter would most likely occur if samples were taken from the same distribution over and over again. As used in the analysis a 95% confidence interval from below and above the mean value therefore indicates, the range of mean values within a variation of 5%.

Primali Paranagamage is a Senior Lecturer at the Department of Architecture, University of Lincoln, Lincoln, LN6 7TS, United Kingdom and can be contacted at pparanagamage@lincoln.ac.uk.