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# Influence of House Form on Dweller-Initiated Transformations in Urban Housing

**Peter A. Makachia**

Department of Architecture
University of Nairobi, Nairobi, Kenya e-mail: peter_makachia@yahoo.com

**Key words:** formal housing, design strategy, dweller-initiated transformations, typology

**Abstract**
Dweller-initiated transformations in housing are grudgingly being recognized as an alternative mode of producing dwellings in cities, particularly in the developing world. However, the environments generated are often wanting, inviting designers in housing to redress their position. The paper investigates the inhibition of house-form on the quality of dweller-initiated transformations. Paired estate case study evaluations using observations, functional and spatial analyses in Nairobi, Kenya are used. It isolates typological strategies that encompass 1) grouping, 2) storeys, 3) courtyards and 4) detachment in unit(s) design and analyze the ensuing transformation type. The analysis is based on the resulting transformation type including; 1) function (residential or otherwise), 2) form and magnitude (plinth area, ground coverage and storeys) and 3) technology (permanence or temporal). The study confirms the inhibitions of form to dweller-initiated transformation in housing design strategy and proposes a strategic approach that envisages the phenomenon. It places the phenomenon in policy directions for housing production.

## 1 Introduction

The deficit in housing in Kenya [1] has driven many inhabitants in the few state provided formal housing estates to dweller-initiated transformations [2]. Transformations are understood as modifications, firstly, of the existing design product by the expansion of plinth area, addition of spaces laterally and vertically, or by adding spatial units like rooms, alcoves, corridors, etc... Secondly, transformation is viewed as qualitatively re-organizing the disposition of the provided spaces, through relocating, resizing of openings between spaces and /or to the exterior environment.
Dweller-initiated transformations presume that the architect made no provision for the phenomenon at conception and design stage. Further, in transforming space, dwellers may do so contrary to the set consolidation *type plan* where such expansion was envisaged in the design strategy as in Sites & Services', Core and Starter [4] Unit programmes. Parallel to the spatial, are the functional transformations where estates designated for residence assume different and multi-use aspects

incorporating cottage production and light industry, petty trade etc. as well social functions like recreation, bars and nursery schools.

The emerging space and land use conflicts is disconcerting to the observer; lay and professional alike, as it perversely impacts on the emerging environment; a central objective of architectural design. In Nairobi, the Kenyan capital and typical of other urban settlements in Kenya and the third world, transformations have resulted in not only estates sated with un-envisaged aesthetics, but crowding and congestion. Emerging also are building units devoid of any desired comfort and privacy. Reduced interior lighting, ventilation and other physical environmental functions are observed. Diminished social spaces like children's play areas, privacy within the household, recreation areas are but some of the myriads of observed dysfunctions.

From a real estate perspective, a consequence is the diminished value of the houses. Indeed, Gitau [4] while discussing the phenomenon in middle income estates in Nairobi observes that the effect is 'to remove them from the middle income conventional housing sub-market to lower income housing sub-markets.'

The architects' perspective would dwell on the design strategy employed and how the same contributes to the emerging environment. Hardly any researcher on transformations succinctly isolates design strategy as contributory to these results. Consequently, it is posited that the lack of a strategic design approach in housing that anticipates and / or caters for dweller-initiated transformations as an inevitable phenomenon of formal housing has contributed adversely to the poor environments emerging. Thus, the study will illustrate how conventional architectural design discourse and practice have failed to meet the demand for housing for the low and middle-income leading to the phenomenon. It will be contributory in understanding how architectural design strategies could provide for appropriate dweller-initiated transformations to deter poor environments prevalent in housing estates. Further, professionals and policy-makers will better understand the contribution of appropriate transformations in addressing housing.

A design strategy in housing would involve a conceptual understanding of at least three components of a house i.e. (1) habitation or ownership mode, (2) production process and its (3) form. This paper restricts itself to form components of a design strategy only for reasons of space and time. To this end it is asked: to what extent does the house form and thus indeed the typologies contribute to production of houses through dweller-initiated transformation? Further, to what extent does the choice of a type influence the quality in the transformed environment?

Qualitative case study method was used to delve to some depth in the phenomenon (rather than statistical methods, which could offer a quantitative view of the aspects of the phenomenon but was not possible due to time and fiscal constraints). The cases used therefore reflect typical scenario. Three generic types commonly used in Nairobi are compared in the study, i.e. *single* dwelling (detached and semi-detached units), the un-storeyed *grouped* dwellings (low-rise courtyard organization) and apartment block (*grouped*, multi-storeyed type). Common to the three categories is that they are owned through a Tenant Purchase Agreement [5] between the tenants and an implementing agency of government (the local government, the Nairobi City Council, NCC) or quasi-government nature (a parastatal organization, the National Housing Corporation, NHC). Comparisons of the findings were based on the type of transformation emanating from these types. The prevalent function accommodated in the transformed unit was identified and discussed in so far as it impacted negatively to the original unit and the vicinity. The magnitude reflected the amount of added plinth area and dwellings added to the existing. The technology used reflected the materials used predominantly in the added space and was deemed permanent or temporary purely based on acceptability in the building by-laws [6] used in urban settlements in Kenya.

It should be stated from the beginning that dweller-initiated transformations are laudable for their positive contribution to the housing stock and are considered an alternative housing production model for countries that lack resources for massive housing programmes for their urban poor. Even the event that such resources are at hand, there is a need to avoid impositionist design approaches and design

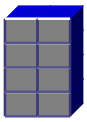
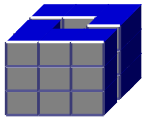
strategies that reduce the dweller to a mere consumer rather that a pro-active contributor to the emerging environments in which they eventually dwell. It is posited that appropriate design strategies that envisage the phenomenon only aid in directing the environmental quality beneficial to the dwellers.

# 2 The Case Studies

## 2.1 Selection of case study projects

Four estates adopting representative unit form layouts are used to illustrate the contribution of form towards dweller-initiated transformations. Form categories identified include: single-storey (detached or semi-detached) linear, single-storey grouped (courtyard), multi-storey linear and multi-storey courtyard typologies. Figure 1 illustrates the cases.

Table 1: Case study estates and form categories

| | LINEAR FORM | | COURTYARD FORM | |
|---|---|---|---|---|
| SINGLE STOREY | Umoja I |  |  | Umoja II |
| MULTI-STOREY | California |  |  | Kibera High-rise |

## 2.2 Findings and Discussion

Dweller-initiated transformations appear in many ways and to different magnitudes in the cases and mirror the form strategy initiated by the architects and developers. Thus the materials used vary from temporal ones which could be subject to removal and upgrading to more durable ones. The materials' types reflect the affordability of the developers (as durable ones are more costly) but also it is a reflection of intention and security assumed by the developer. The form of the transformation is governed by affordability and its anticipated use. It also matters the security of tenure assumed by the informal developer as the transformation often occurs in an authorized manner. It is often without approval by the development control authority: without professional advice, on land beyond the authorized building line, areas above approvable plinth and plot coverage.

The first evidence of the transformation is in plot definition (Fig. 1) which is initially from temporal materials like timber, corrugated or plain sheets and indeed plain barbed wire fencing on wood posts to be later converted to the more durable masonry walling. Accompanied with the plot definition is the gate which also assumes more permanency with time. This first stage is largely for appropriation of the space and towards a more secure unit. In the latter, detailed changes occur as introduction of burglar-proofing for openings; where ill-provided for or entirely absent. As part of this stage of transformation, minimal changes for accommodation needs like changed location of openings can be discerned. This security and initial spatial appropriation aspects are commonly observed in all form strategies in the study, albeit with minor variations.

Quantitative and form transformations occur in the single-storey type and where additional spaces, rooms and even independent, functionally autonomous units are added (Fig. 1). This transformation is

also phased, reflecting affordability and returns emanating from accrued savings, use and rent. The savings are assumed as originating from alternative household rent elsewhere where the extension is converted for owner household use. The use of the extension can therefore be for owner as added accommodation but also as a rental unit for residential and other function. The function is largely dependent on location of the unit on the plot; where frontal placement invites commercial use as a corner shop, for instance. Frontal location also suits residential subletting. Inner locations invite and suit residential use for own use. The reasons discerned include ease of access, independence, security and privacy.

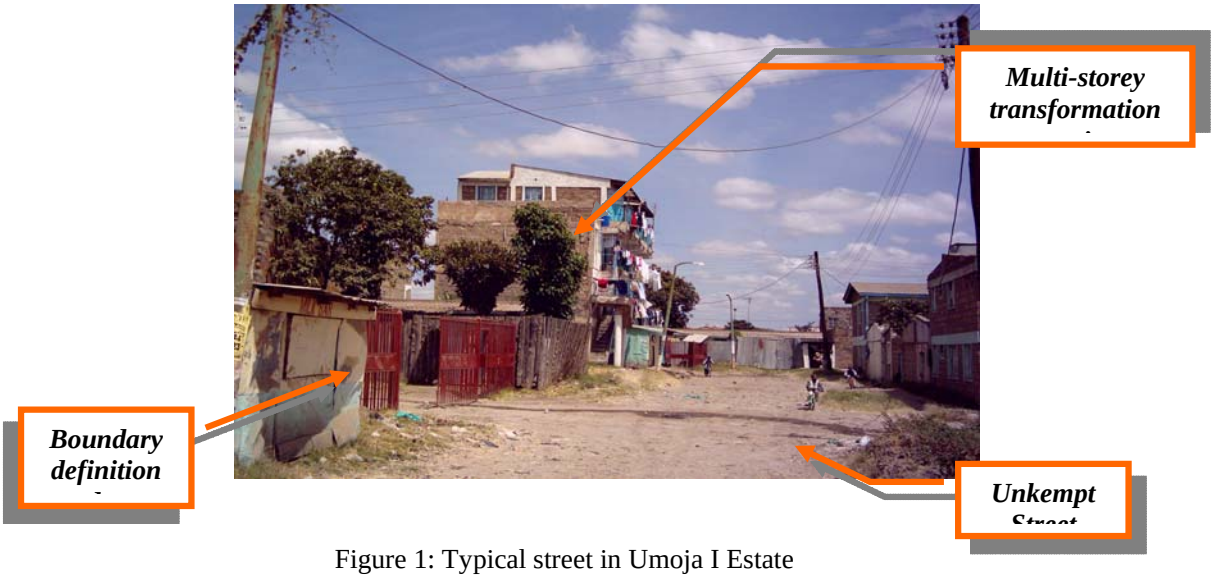



Figure 1: Typical street in Umoja I Estate

Multi-storey transformations constitute the next level transformations for this 'grounded' type and this also defines a different spatial hierarchy from what was provided, with the street facing ground floor unit mostly used for public function like a shop. The upper levels mostly reflect residential accommodation, thus generating un-envisaged functional mix. The motivations for these extensions are largely income generation and subsequently impinge on the privacy levels of the original dweller household. The dwelling densities invariably increase by the additional space, stressing the physical, social and recreational infrastructure. A consequence of these unplanned transformations is that the environmental quality of the space including lighting and ventilation in service spaces like kitchens is compromised. By their very nature multi-storey extensions are largely from stable more permanent materials like steel reinforced concrete and masonry. However in the process of erection, inadequate safety measures and procedures are considered leading to reported structural collapse and human fatalities . In Umoja Phase I, the described transformations have changed the streetscape significantly (Fig. 1) which would have been welcome if the phenomenon had been anticipated beforehand and commensurate road infrastructure provided for.

The opportunity to define the household territory is understandably less prevalent in multi-household grouped dwellings as in single storey 'grounded' (condominiums), multi-storey linear and courtyard blocks. Instead the group identity may be defined only with a gate when the access point is shared. However, differences in the subsequent transformation stages define these typologies distinctly especially the later two types from the 'grounded' ones. Thus in area and spatial unit terms, the single storey typologies are prone substantive transformations; a reflection of the cost and technological limitations of transformations at upper levels. It reflects also on the complexity of needed covenants between adjacent dwellers required to effect such transformations.

In single storey multi-household dwelling condominiums as in Umoja Phase II (Fig. 2), initial transformations include individual dweller defining the extent of their territory within the polyglot. In the estate an allowance was made for the separate dwellers to extent an extra room to complement the rather meagre space of a single room provided. This accorded an avenue for defining individual territoriality. The invitation was gladly accepted but was qualified by the dwellers to allow for independent rental unit and occasionally a front kiosk. But this was only the first stage as multi-storey transformations also emerged. On the access street the streetscape hardly differs from the Umoja I single linear type described above. Thus the ground floor is used for commercial ends and subsequent levels are mainly for residential usage. The storeys hardly overcome the four storey levels as in Umoja I (Fig. 1 & 2).

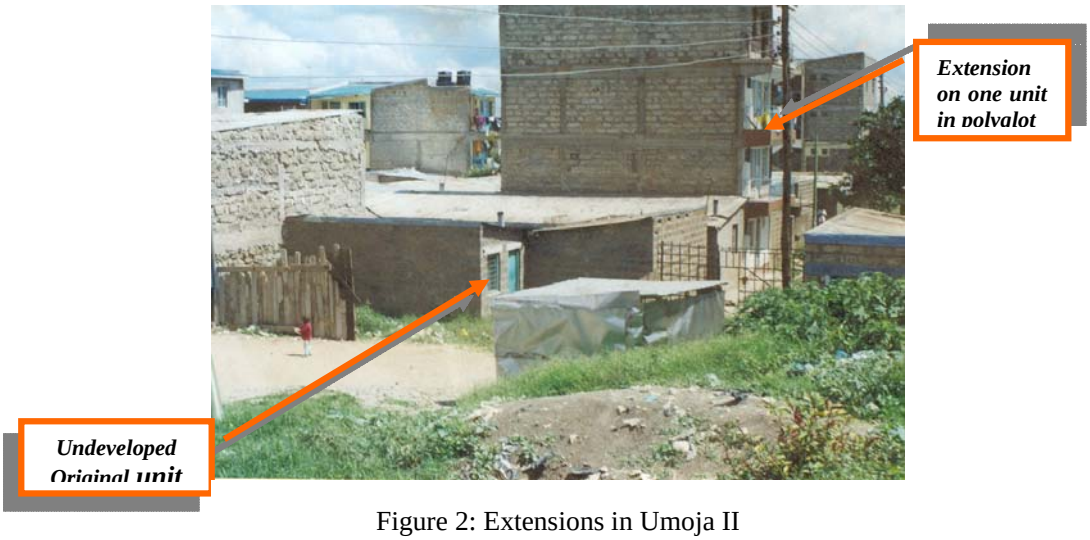



Figure 2: Extensions in Umoja II

The extensions are in clearly defined individual parts of the polyglot condominium, thus respecting commonly used spaces like the accesses and the courtyard. Technologically limitations are evident as at some stage construction activities impinge on individual domains like during erection of foundation and storage of building materials during construction. In some instances, adjacent neighbours arrange covenants of sale to allow sectors of the polyglot to be consolidated independently allowing multi-level transformations. The shared space like the courtyard remains for use communally where activities like for laundry cleaning and drying are done and are kept clean by mutual arrangements. Transformations are understandably kept away from these courts. The design also allowed for communally located cooking space, storage and wet services spaces. The 'wet' services including water closets (WC) and shower rooms still remain for that use but the kitchens are hardly used, ostensibly because the dwellers prefer to cook in the single rooms due to cultural attitudes.

In multi storey condominium blocks as in Kibera Highrise (Fig. 4), the common spaces including staircases and courtyards, are respected to the extent of not allowing transformations but have required the intervention of the developers, the National Housing Corporation (NHC) to maintain and keep clean. This is more a reflection of the difficulty of organising a (more than) forty-household community than lack of will. Indeed in the units were to be administered using a condominium ownership mode reflected in the Kenya government Sectional Properties Act [7], where a 'corporation' entity was to be formed to handle common resident interests. This 'corporation' composed of individual owners of apartments has yet to be formed since most units, purchased through a Tenant Purchase Agreement, still have outstanding repayments and cannot revert to the owners ceding control and maintenance to NHC. A common anomaly in all housing is lack of provision for laundry spaces leading to appropriation of any available outdoor space for the same.

Thus the courtyard space is strewn with clothlines precariously tied to handrails. Another shortcoming is lack of common cabling for television antennae which now forest rooftops on all the blocks.

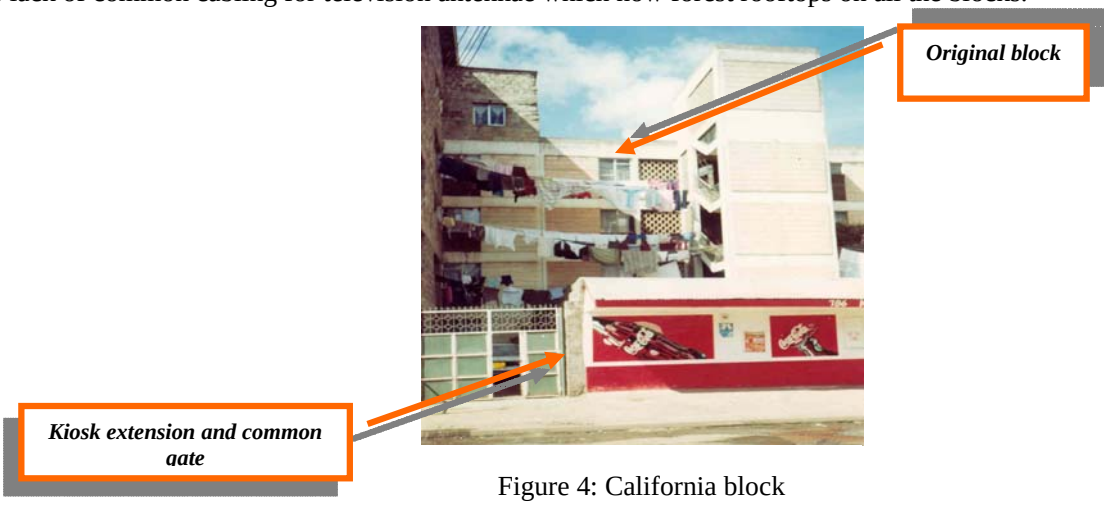



Figure 4: California block

In all the apartment typologies, no significant spatial transformations are observable on the individual units. In only the ('grounded') ground floor units, temporal extensions, ostensibly to accommodate petty trade like grocery kiosks, hair saloons, barbers (etc...) not otherwise provided for in the estate design are common. These take the form of canvas and corrugated iron or asbestos sheets on the roofs as well as timber framed walling (Fig. 3). Clearly demarcated common spaces restrict avenues for substantive transformations. Security oriented transformations in opening burglar-proofing are evident on the lower level units and at each entrance door and appropriated space at corner units.

The scenario of ground floor extensions is replicated in linear multi-storey blocks as in California (Fig. 4). The reason for non-extensive extension is not entirely attributable to 'non-groundedness' as the dwellers own a wing from ground to topmost unit (because at the time of its development in the 1960s 'sectional' ownership was not legislated). Indeed some few units have developed units up to the height on the owned wing. This invariably demanded heavy investment hence it is commonly observed in the entire scheme. In the few developed, the extended blocks assume similar spatial quality prevalent in the provided. Such a strategy would encourage controlled dweller-initiated transformations but be restricted to the more affluent. This would have a limited spread and distribution; often a desirable though controversial policy objective.


Figure 3: Kibera Highrise

# 3 Conclusions

## 3.1 Specific Conclusions

On the overall environment, one notes the better maintained common spaces multi-storey blocks in both California and Kibera as opposed to the ones in the single storeyed ones in Umoja I and II estates. This may point to the continued and almost endless transformation process that the less developed (if single storey can be understood so!) types seem to invite. In the same breathe it implies that the dweller-initiated transformation process in itself deteriorates the environment, a fact aggravated by the sporadic timing that in turn relies on individual dweller nuances.

Single detached dwelling typology proliferates into dweller-initiated transformations but often resulting in environments not earlier envisaged. If a singular objective is production of housing, it is laudable. But often the dwelling environment amounts to 'informalisation' echoing qualities in in informal environments.

Multi-household ownership of blocks or polyglots as in Umoja II condominium units limits the transformation possibility but invites alternative ownership covenants before transformation occurs. The positive lesson here lies in the status of the common spaces as manifest in the courtyard which remained respected, avoiding transformations.

Multi-storeyed multifamily dwellings hardly attract transformations presumably because of the cost and technological ramifications. The courtyard multi-level types seem to posses less transformation possibilities than both the single-storey courtyard as well as linear multi-storey type. Other limitations to transformation involve the complex covenants needed between vertical and lateral neighbours.

These agreements are minimised in California estate where 'wing' ownership reduces these legal constraints, but leaves matters of cost still unattended. The multi-storey transformation also demands a more skilled builder, often a contractor and therefore reducing the informal aspect of dweller-initiated transformation [8]. Indeed, the 'wing' transformations demand more affluent developers reminiscent of the formal sector.

In conclusion, the four typologies studied confirm that the form as a design strategy can promote or deter dweller-initiated transformations and in the process generate varying environmental qualities.

## 3.2 Policy Directions

It is apparent that the less developed unit types attract more transformation activity and a multiplicity of functions. Further, the technological choices vary from temporal materials to more durable types for reasons of cost and investment priority by dwellers. The position here assumes that a dweller-initiated transformation reflects market demands and therefore puts less emphasis on original owner and the income of the developer. Its felt that housing products generated through the transformation phenomena simply beefs up the housing stock supply, a desirable policy objective. However, as an architect one is concerned about the environmental quality which these forms aid in generating. This puts one in an ambivalent position whereby less design as in detached forms with abundant open space promotes more (less controlled) dweller-initiated developments on one hand. On the hand more controlled forms as in apartment blocks invite less dweller-initiated generation of housing stock in a more controlled physical and aesthetic environment.

The case for minimal design revolves around the 'process' paradigm [9] where one argues for state enablement by providing a framework and encouraging the dwellers to proceed with their own housing through their resources and ingenuity. This frees state resources ostensibly to provide an enabling environment through planning, legislation, trunk services and finance. The cases confirm the potential for such a policy in aspects of housing stock reproduction (which is what dweller-initiated

transformation amount to) but hardly answers the 'slumification' of formal estates though deteriorated environments. The case for more design as in apartment blocks mirrors the 'product' paradigm [9] and argues that controlled environments are desirable design and policy objectives. This would have to at price of costlier units, out of reach to most low-income earners; the majority.

Policies should ordinarily concern themselves with production of adequate housing (1) stock, (2) distribution to the majority and a desirable (3) quality of the environment in the estates. Minimal design as in the 'grounded' typologies produce limited housing stock in the short run but promote long term reproduction of more units through dweller-initiated transformation. They presumably promote a fairer spread to the poorer reaches of the population. The physical (and arguably also the social environmental quality) quality that results is however questionable.

The position on a fairer spread is however increasingly questioned given that most houses allocated to the poor often get transferred to those with means and they are indeed the ones who engage in the dweller-initiated transformation. It is felt that this is not a bad happening as it housing owned by the richer urban residents but actually occupied by the target, poorer group as tenants. It points to policy objective of renting as opposed to ownership, as a more realistic position. In discussing housing reproduction one should comprehend the dynamics of ownership and renting. The minimal design strategy creates the new level of a micro-developer and landlord outside of the government in government provided estates. The focus should shift to enabling covenants that can curb excesses by this new layer of housing provision whilst promoting their continued investment in more housing reproduction through transformation.

## Acknowledgements

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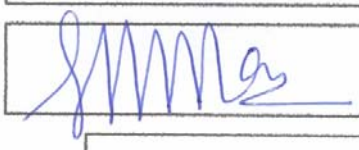
**Signature**  **Date** 13.7.05

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