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INCREMENTAL HOUSING DEVELOPMENT 2010; LOWERING THE COST, LOWERING-NOT THE STANDARDS - A CONCEPTUAL FRAMEWORK

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ABSTRACT

The serious-most challenges of low cost housing were and still are: lowering the development cost without compromising provision standards and the quality of living in housing projects. They continue to top the list of research interests of scholars and institutions (academic and civic), both in the developed and developing countries and settings.
Two general conceptions/approaches are still prominent in addressing the said challenges in low cost developments, namely:

- Provision of "affordable" completed low cost dwellings and settings with lower (as low as it can get) standards hence cheaper elements, components, details and finishes.
- Provision of "incrementally" developed housing projects, i.e. phasing the development cost over an extended period (spanning the life and operation of the dwelling), thus meeting the "initial" cost limitations at the initial phase without denying the users their rights to expand and upgrade the standards of their dwellings in later phases (according to needs and affordability).

The present paper critically reviews the two approaches to low cost housing, together with underlying conceptions; highlighting valid and current regional and international research contributions. A design and decision making tool/frame-work is then put-forward to enable the involved actors (designers, developers and authorities included)

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to recognize and compare the merits and drawbacks of possible “scenarios” of action, in low cost housing developments.
The discourse comprises five closely related segments, in the following sequence:

- On the challenge of low cost housing; an introduction.
- Related thoughts, conceptions and approaches - a critical review.
- A design and decision making tool in low cost housing development.
- Application and evaluation of the proposed tool.

In praise of incremental low cost housing development - Epilogue.

Key words: Development stages, Development phases, Cost phasing, Professionals roles, Users’ roles.

Introduction

Housing for low income groups has been and will always be among the major concerns and challenges of Developed and Developing Countries, including Egypt. Since the mid Nineteen Seventies, the Egyptian government adopted and implemented with varying success – a variety of low-cost housing development strategies; manifested in housing projects directed to low income groups; including: site and services schemes, core housing projects, and partially completed dwellings in apartment blocks. The said housing development and provision strategies recognized the capacity of the dweller to participate in the development process.

The government sponsored and financed many research projects undertaken by different governmental research institutions, to define means and approaches to lower the cost of the dwelling, mostly developed within a predominant strategy of completely finished housing projects. The said strategy has the obvious merits of the impressive image and impact of completed and finished projects, reflecting the efforts of the central and local governments. Its main drawback is arguably inherent in the approach to lower the cost. Lowering the cost is generally measured in terms of the cost per unit area (square meter) of the proposed dwelling units. Low cost is in turn reached through lowering the standards of all the components, elements and finishes of the dwellings. Compromising the standards approach proved to have negative impact on the quality of the initial product and possible future upgrading.

Monitoring housing schemes development in the Egyptian context during the past four decades, clearly points-out that the development process is a dynamic and open-ended process. A process characterized by continuous action and change that is manifested in the users and dwellers interference and alterations of their dwellings. The alterations vary according to the development scheme, but it is always there, whether in the case of informal housing, site and services schemes, core housing,

partially finished and totally finished dwellings. This dynamic process ought to be recognized and integrated in housing policies addressing low income groups.

In order to benefit from the "Dynamics" of the development process and to formulate scenarios for phasing the cost (instead of merely lowering the cost) and improving standards and quality of the product, it is essential to have a better understanding of the process in terms of: its stages, phases, actions undertaken and involved actors.

Related Thoughts, Conceptions and Approaches - A Critical Review.

The recognition of the dynamic development process usually encounters some resistance from both the Central & Local government and related bodies and the professionals who are traditionally biased and geared to neat completed solutions and products. Habraken (1) suggested that, "the idea of change in itself is alien to the professional culture". He stressed that the idea of user decision-making clearly implies that designers may not decide certain things they are deciding now, but leave them to the future. He believes that it is possible to learn about the built environment by introducing the concept of change. It is through its patterns of transformation that the built environment reveals its most permanent structure. According to him "housing projects and neighborhoods grow and develop over time. There is not such thing as instant environment", (2).

Understanding the dynamics of the development process and adopting the concept of change; simply implies that any dwelling should be phase - developed. Hence; in dealing with the cost issue, it would be more appropriate to consider the concept of "Phasing the Cost" instead of "Lowering the Cost". The "Dynamics" of development and cost "Phasing" are two key factors in the strategies of incremental housing development and construction. Goethert (3) pointed-out that "Incremental construction and expansion of housing is the key process of increasing housing stock and housing quality in most cities". Furthermore he stated that; "Through the incremental process, the low income sectors could be transformed to good quality middle income housing, given sufficient time and limited constraints", (3). The inhabitants/users could invariably improve the standards of their dwellings within time. Incremental development of housing projects conception, strategies and approaches were advocated and applied by the authors, (4).

In order to tackle the issue of standards, it is necessary to understand the nature of those standards. Some standards are dealing with vital key issues, others with secondary and relative issues. Vital key issues are mostly physical, quantitative and related to safety and health, including structural stability and provision of infrastructure networks. Relative and secondary issues on the other hand are qualitative and flexible, including activity and physical density, acceptable crowding, minimum areas per inhabitant, types of finishes, components and installations. In

most development scenarios, the final/completed housing project is the outcome of the collective efforts of the authorities, public as well as the private sectors and individuals. It should be pointed-out that the issue of standards and quality control is critical for works and actions undertaken by the government and related organizations. The issue of standards is rather relative, flexible and open-ended in the works undertaken by the users or dwellers; who could accept modest standards at the beginning of occupancy, with a view to possible future upgrading and betterments.

When considering the issue of standards, it is equally important to address two main subjects:

- First: to breakdown the levels of development of housing projects into components and physical systems in order to understand which components are basic, i.e. cannot change within time (having an impact on the safety and health measures of the project), and which components are secondary; i.e. could be gradually dealt with and upgraded.
- Second: the recognition of the institutions, individuals controlling the components/elements of housing projects; this control is related to their capacity to take decisions, to finance, to physically undertake action towards projects components/elements within time.

In order to address the concept of phasing the cost, it is necessary to discuss the different approaches to phasing the development process. It is equally important to identify the actors participating in the various phases of the process.

Stages and Phases of the Development Process

In project management, the development process (physical and non-physical) is a sequence of stages, comprising: problem identification, feasibility study, program elaboration, conceptual design, tender documents, bidding, implementation, running and maintenance. This may be summarized and regrouped into fewer stages, namely: conceptual design, implementation, running and maintenance. The said stages apply to any project (in full, part, scale or level); e.g. the planning and design of a neighborhood, the design of a dwelling or even the design of the internal layout and finishes of a flat. The stages of development encompassed in project management are essential because of the presence and awareness of the inherent notion of time. In considering development phasing and stages, it is important to understand the relation between housing projects levels and related actions.

The concept of levels as presented by Habraken (5), stipulates that; it is possible to distinguish five “Levels” in any housing project, each level deals with different physical systems. The levels are presented in a hierarchal order; descending from the higher level (Urban Structure) downwards to the lower levels (Tissue, Building, Infill, and Furniture). In the physical world, there is a distinction between those elements

belonging to a higher level (e.g. “circulation network and streets” at the “Urban Structure” level) and other elements belonging to lower levels (e.g. “partitions” at the “Infill” level). Through the levels, it is possible to identify the physical systems that should not be modified and those that could be altered within time. On the level of the “Building”, permanent elements related to the construction system are referred to as “Supports”. On the “Infill” level, there are many physical systems that could be altered within time, including: internal partitions, kitchen and bathroom fixed fixtures, all conduits and installations for electricity, heating, water supply and drainage and gas, (5).

The concept of levels and the recognition of the related physical systems, help to tackle the issue of phasing the action and in turn phasing the cost. The Egyptian development experience supports the proposition pointed-out earlier, that the development process is a dynamic and hence an open-ended process. Projects are predominantly gradually implemented, whatever is the income group, whatever is the development policy. There is always the concept of phases for the project, certain phases get a priority, and others follow within time. In the development process, certain basic elements could be completed within a relatively short period of time, while other activities would continue to occur during the lifetime of the project; e.g. the upgrading of the internal finishing. The authors participated in the design, assessment and monitoring of housing projects for the Egyptian Government providing partially completed dwelling to be gradually finished according to flexible phases, (6), (7), (8).

The concept of phases in the dynamic development process is closely related to the financing scenarios of housing project. In the case of completing all the development elements in a short period of time, most of the allocated investment for the project is used immediately. On the other hand if the implementation of the basic elements is undertaken in a short period of time, leaving the completion of other elements to be spread over time; only part of the total investment is needed in the near future with the rest of the investment is gradually needed for the subsequent phases of development. The gradual allocation of investment over time is likely to be affected by:

- Housing “phases” that allow the immediate use of the completed/provided facilities and assets (otherwise the physical product will remain unused and would be considered as a waste of invested capital).
- The “actors” playing a role in providing the investment for the initial and subsequent phases.

The acceptance of Development as a dynamic open-ended process phased and spread over time, and deciding the portion of capital/money to be invested in the various phases of the development project are the keys to the concept of lowering the cost of housing - keeping in mind that the low cost product in the initial phase of development is a resource that could be upgraded in the subsequent phases.

The recognition of "Levels" in housing projects and the physical systems related to each "level" allows the definition of actions needed/related to development phases; thus lowering the cost of the initial phases without lowering the prospective standards of the future project. Effective phasing of the cost is strongly related to the actors involved in the development process.

Actors in the Development Process.

The concept of "levels" allows defining the controllers and the decision makers for the various elements of each development "Level". The professionals are likely to operate at the higher "levels", while the inhabitants/users could be the responsible operators at the lower "levels"; depending on the scenario of development and the nature of the project. In the case of "site and services" schemes for example, the professionals would mainly operate on the levels of the "Urban Structure" and the "Tissue", while the users would be better responsible for the levels of the "Building" and below. Similarly in "core housing" schemes, the professionals would produce the core of the house leaving the later expansion of dwelling to the users/inhabitants.

The recognition of the levels inherent in any housing project helps to breakdown the complex projects into more specific sub-projects that could be dealt with through professionals and users. Each sub-project is thus treated as an entity that should be developed according to the previously discussed stages of project management; i.e. the sequence of conceptual design, implementation, to operation and maintenance.

The involved actors in the development process were identified in earlier studies. Habraken (9), classified the actors involved in the process into two main groups, namely; the professionals and the users/dwellers. He also pointed out that other entities/actors could have a role, e.g. the collective users, local government bodies, municipalities etc. The Egyptian experience shows that the roles are usually played by local government and related authorities, intermediate bodies related to public or private institutions (including; housing cooperatives, owners associations, investors and developers), and the users (individuals, inhabitants, dwellers). The authors delineated and discussed the possible roles and potentials of the various actors in the Egyptian housing development context, (10).

A Design and Decision Making Tool in Low Cost Housing Development

In order to formulate a design and decision making tool/matrix combining the roles of the various actors in the different stages of development, it is possible to start with a table consisting of three main rows and three main columns, see table (1). The rows represent the three principal stages of development, namely: the conceptual design, the implementation and the running and maintenance stage. The columns show the possible key actors involved in the process, namely: the professionals and the users.

The professionals in this respect include the government and the intermediate institutions. The users are the individuals and the inhabitants.

Table 1 : Actors and Stages in the Development Process

Actors / Stages of Development	Professionals		Users Individuals/ inhabitants
	Government	Intermediate institutions	
Conceptual Design			
Implementation			
Running and Maintenance			

Since the key stages of development comprise all "levels" of the housing project, from the "urban structure" to the "internal layout" of the household, the tool/matrix should show the previously presented "levels" and related physical systems with each development stage. Table (2) shows an example of the introduction of the "Levels" and related "Physical Systems" to the chart/matrix - in front of the implementation stage, three levels of action are indicated; i.e.: the "Tissue", the "Building" and the "Infill" (for simplification, only three of the five possible "Levels" are presented in the proposed tool). The physical systems related to each level are also presented (e.g. the sub-systems related to the "infill", including: the outer skin, the internal partitions, the finishing).

Table 2 : Actors, Levels of Actions and Related Physical Systems.

Stages	Actors / Levels of Action and Related Physical Systems			Professionals		Users Individuals/ inhabitants
				Government	Intermediate institutions	
Implementation	Tissue	Road Network				
		Water Supply and Drainage				
		Electric Network				
		Landscaping				
	Building	Supports	Vertical Elements			
			Slabs			
	Infill	Outer Skin	Walls			
			Openings			
		Internal Partitions	Walls			
			Openings			
		Finishing	Walls			
			Floors			
			Ceilings			
		Plumbing	Piping			
			Equipment			
		Electric Work	Conduits			
			Equipments			

For each stage of development, for the various levels of action to be accomplished by the actors, the actions could be incrementally taken according to phases and, needs and budgets. The duration of the phases is rather flexible and is likely to change according to the variables in the development context. It could be a month, a year or more. However, it is possible to consider the possible spreading of an action over various phases. Accordingly it is possible to show the different phases for any action (1^{st}, 2^{nd}, 3^{rd}, 4^{th} phase and so on) on the tool/matrix table. Postponing the action means that there is not an urgent need for its early accomplishment. It could however be carried-out to the required standard when it is needed and is affordable. Table (3) shows the possibility of integrating the development phases (without defining the duration of each) against the levels of action undertaken by each actor.

Table 3 : Actors, Levels of Actions, Related Physical Systems and Phases.

Stages	Actors and Phases / Levels of Action and Related Physical Systems			Professionals								Users Individuals/ inhabitants			
				Government				Intermediate institutions							
				Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Implementation	Tissue	Road Network													
		Water Supply and Drainage													
		Electric Network													
		Landscaping													
	Building	Supports	Vertical Elements												
			Slabs												
	Infill	Outer Skin	Walls												
			Openings												
		Internal Partitions	Walls												
			Openings												
		Finishing	Walls												
			Floors												
			Ceilings												
		Plumbing	Piping												
			Equipment												
		Electric Work	Conduits												
			Equipments												

The extensive table/matrix could provide a useful design and decision making tool to be used to:

- Show the different actors participating in the development process according to different scenarios: completely finished dwellings, partially completed dwellings, core housing projects, site and services schemes, etc.
- Highlight the initial phase and latter phases of housing projects, together with the related the actions, systems and subsystems and related identified standards since

they represent a potential and a base to which further future development will be added to.
- Assess the cost of the initial phases that needs to be allocated and spent in a relatively short period of time.

Application and Evaluation of the Proposed Tool.

Tables (4) and (5) demonstrate the possible distribution of roles on the different actors in two different development scenarios. The phases appearing in the tables are assumed in the light of the accumulated experience from the recent history of housing projects development in the Egyptian context. The actions related to the initial phase are highlighted by dark tones in tables (4) & (5). The initial phase represents the backbone of the project, as it provides the basic permanent components to which other elements could be added later. The standards for the components of the initial phase ought to be defined and endorsed by the central or local government and the involved agencies.

The two applications of the proposed tool on tables (4) and (5) show that the cost of the initial phase could either include the cost of all the components and elements of the housing project, or some of those components. In the case of totally finished dwellings, the total budget is allocated from the initiation of the project: in this situation, lowering the cost depends on lowering the standards of most components of the physical systems as stated earlier. In the case of partially completed dwellings, core housing projects and site and services schemes; the cost of the initial phase is relatively less. Accordingly the project's budget is spent on fewer components and elements of better standards. The subsequent phases of the projects are incrementally developed, allowing the users to phase the cost and provide acceptable standards that could be modified and upgraded within time.

In Praise of Incremental Low Cost Housing Development - Epilogue

The present paper addressed the issue of lowering the cost of housing projects targeting low income families and demand groups. It pointed out that lowering the cost should not compromise achieving appropriate acceptable standards through the project's life cycle.

The incremental nature of the development process, calls for housing projects to be "incrementally" planned and implemented; i.e. in "Stages" and "Phases". Each "Stage" comprises and is developed in coordinated "Phases". The "Phases" in turn are to be carried out by the involved actors in the process. This in essence means a radical

and effective transformation of low cost housing developments, through phasing the cost and maintaining better standards and quality of living.

The discourse pointed out the potentials and merits of phasing housing development; hence combing initial essential phases that should be accomplished according to appropriate (relatively higher) standards and the subsequent flexible and open-ended phases that could be achieved according to acceptable and affordable standards that could be upgraded in time. In other words, phasing the cost allows reaching affordable housing units without lowering the standards and downgrading the environments of low cost housing; hence turning low-cost to a potential rather than a constraint.

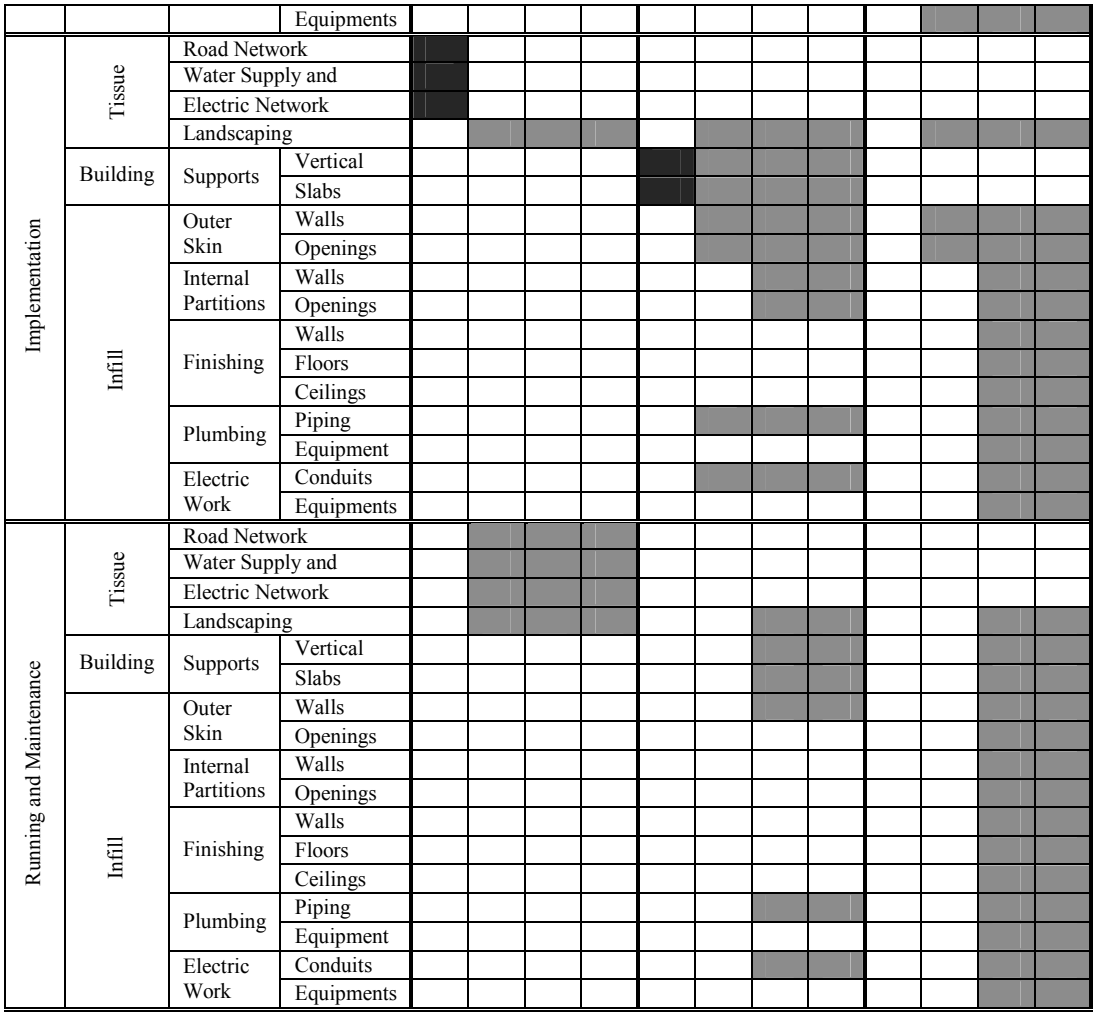
Table 4 : Possible Action and Cost Phasing in Partially Completed Apartment Buildings.

Stages	Levels of Action and Related Physical Systems / Actors and Phases			Professionals: Government				Professionals: Intermediate institutions				Users Individuals/ inhabitants			
				Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Conceptual Design	Tissue	Road Network													
		Water Supply and													
		Electric Network													
		Landscaping													
	Building	Supports	Vertical												
			Slabs												
	Infill	Outer Skin	Walls												
			Openings												
		Internal Partitions	Walls												
			Openings												
		Finishing	Walls												
			Floors												
			Ceilings												
		Plumbing	Piping												
			Equipment												
		Electric Work	Conduits												
			Equipments												
Implementation	Tissue	Road Network													
		Water Supply and													
		Electric Network													
		Landscaping													
	Building	Supports	Vertical												
			Slabs												
	Infill	Outer Skin	Walls												
			Openings												
		Internal Partitions	Walls												
			Openings												

		Finishing	Walls												
			Floors												
			Ceilings												
		Plumbing	Piping												
			Equipment												
		Electric Work	Conduits												
			Equipments												
Running and Maintenance	Tissue	Road Network													
		Water Supply and													
		Electric Network													
		Landscaping													
	Building	Supports	Vertical												
			Slabs												
	Infill	Outer Skin	Walls												
			Openings												
		Internal Partitions	Walls												
			Openings												
		Finishing	Walls												
			Floors												
			Ceilings												
		Plumbing	Piping												
			Equipment												
		Electric Work	Conduits												
			Equipments												

Table 5 : Possible Action and Cost Phasing in Incremental Development (Core Houses).

Stages	Actors and Phases / Levels of Action and Related Physical Systems			Professionals								Users Individuals/ inhabitants			
				Government				Intermediate institutions							
				Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4	Phase 1	Phase 2	Phase 3	Phase 4
Conceptual Design	Tissue	Road Network													
		Water Supply and													
		Electric Network													
		Landscaping													
	Building	Supports	Vertical												
			Slabs												
	Infill	Outer Skin	Walls												
			Openings												
		Internal Partitions	Walls												
			Openings												
		Finishing	Walls												
			Floors												
			Ceilings												
		Plumbing	Piping												
			Equipment												
		Electric	Conduits												



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