

MODELLING COST AND QUALITIES FOR UNDERSTANDING STAKEHOLDERS EXPECTATIONS. CASE GUAYAQUIL-ECUADOR

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Abstract

Understanding of stakeholder's expectations is a key concept for successful new housing projects. Stakeholders are satisfied when their objectives are achieved and best value for invested money is provided. Over the last 15 years Guayaquil Municipality invested in major urban renewal projects. Nevertheless there is still a great necessity for better quality of housing and urban projects for low and medium income groups of the population. For those major projects collaboration between different stakeholders will be required in order to mobilize enough funds, including: public sector, private developers and housing end-users. A better understanding of stakeholder's roles in this specific context is essential in order to achieve their expectations regarding urban and housing projects. The aim of this study is to develop a simulation tool that will help different stakeholders to achieve those expectations. The methodology used includes cost-quality evaluations, based on people's preferences and willingness to pay for housing characteristics. This study examines how the balance between increased costs and better qualities could evolve to a win-win situation between different stakeholders. The paper concludes with implications of the study findings on increased quality of projects, long term profitability for developers and the provision of better and affordable housing units for the users.

Keywords: stakeholders, costs, qualities, profitability, affordability.

INTRODUCTION

A major challenge for those involved in the proposal of the strategic plan for the urban development of Guayaquil, more than one decade ago, was the recovery of the city from decay through major urban projects that would serve as a catalyst for capital attraction and reinvestments. The regeneration process of the city started with a major project for the redevelopment of a new waterfront for the city "Malecon 2000" (Fernandez, 2007). For that project a more broad definition of stakeholders was used, involving the main representatives of civil society, designers, central and local government, private constructors, planners, project developers, social organizations, but excluding one of the most important group: the inhabitants of the city. The very tight project schedule at that time was one of the most important reasons for this exclusion. In fact just one year after the beginning of the design

phase, the construction phase of a first part had already started. The citizens were informed of the project and its characteristics but there was not real time for participation.

A new form of public-private partnership was used for the city “Malecon 2000” project, involving for the first time in this context private donors to finance public goods. Especially for that project new regulations and laws were created. The idea was to use this project as a “catalyst” for a regeneration process and for new projects in the city. Excluding the participation of citizens has blocked possible social projects. As result of this, years later, the outputs of the project were also criticized by a section of the civil society as a profit making project that did not really worked as a “catalyst” for the economic and social development of the city.

Consequently “Malecon 2000” project, down town was reshaped, historical neighbourhoods and whole sale markets rebuilt, massive transport improved. The whole process was even recognized by the United Nations Development Programme (UNDP) as a best practice in local development. Nevertheless still significant steps have to be set towards improving the quality of life of large sections of the population. In fact there is still a huge unsatisfied housing demand for the poorest groups of the population, besides the improvement and redevelopment of existing deprived urban areas. In accordance with Tiepolo (2007), 70% of the population of Guayaquil still lacks of drinking water, sewerage systems, drainage rainwater system and paved streets. There is at the same time a scarcity of green and recreational areas for the people living in peri-urban residential developments, besides sports facilities, health care centres, social communal centres, police stations, schools and commercial areas (Mera G., 2007).

For the implementation of these major projects collaboration between public and private sectors should be redefined. Public sector and private developers should take care of the public space (green areas, communal services) and the provision of infrastructure. This will add value to private developments and public spaces. At the same time private developers should become aware of the opportunities to provide a whole range of housing types and public spaces within the neighbourhood in accordance to people’s preferences, income ranges and willingness to pay for certain housing characteristics. This will also help private developers to maintain profitability levels and the economic sustainability of the whole urban development process.

The aim of the study is to develop a simulation tool that will help different stakeholders to make appropriate decisions being aware of the consequences of changes in design parameters for the houses, plots and the urban environment. This simulation tool also include people’s preferences and willingness to pay for housing characteristics, phasing investments possibilities for the project and revised loan systems. This approach goes beyond the traditional view in this context of considering the housing users as clients and is being replaced by project stakeholders, whose opinion should be important for making a successful project and obtaining the benefits expected by developers and planners.

Cost implications of housing technologies for low income groups have already been analyzed in previous studies in Ecuador (Pronk, 2007; Garcia Cedeno 2006), however little efforts had been made to investigate people’s preference and the willingness to pay. Willingness to pay is estimated via a multi-criteria analysis, a weighting system (based on an Analytic Hierarchic Process – AHP) (Voogd, H, 1983), and score functions to obtain some quality points (QP) based in people’s preferences. By changing housing characteristics value will be added to

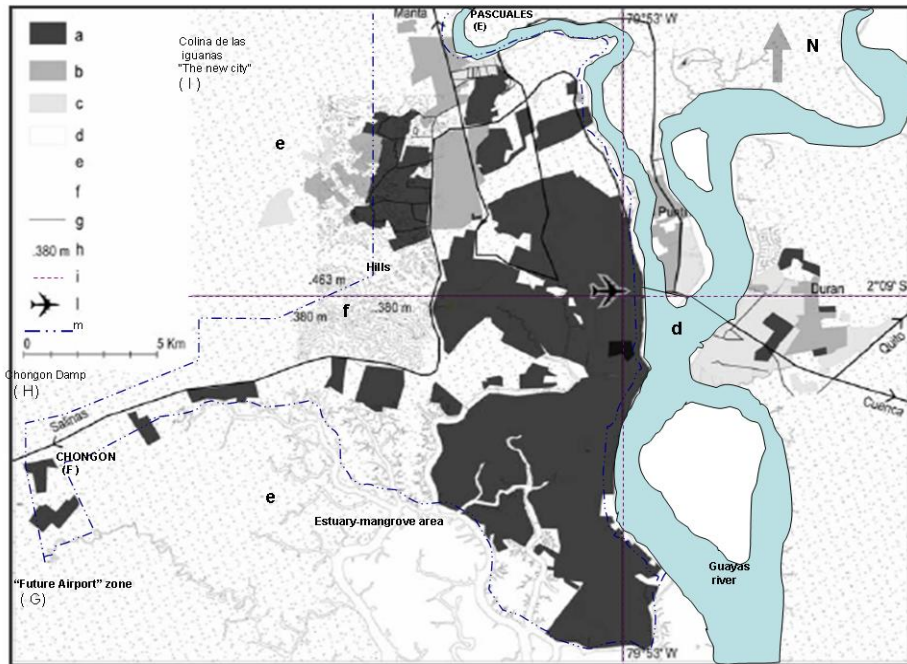


Figure 2: Guayaquil Metropolitan area, 2007. a. Developed, b. 50% of plots developed, c. Less than 10% of plots developed, d. Water bodies, e. Mangrove and rural area, f. Hills, g. Main paved roads, h. Height, i. Geographic coordinates, l. Airport, m. Urban limits of the city-administrative borders (Regulative norm 2001) Planning zones of the city: (E)Pascuales, (F)Chongon, (G) "Future airport", (H) Chongon Damp, (I) "New city"

Sources: Cristina Armando outline on MG 2002-2007 satellite image-Maurizio Tiepolo, *The barrio Marginado, Guayaquil. Working paper no.27, 2007, Politecnico de Torino*

The Municipality, in its role of planning the urban development of the city, has not continuously been able to control the unprecedented urban growth. This resulted of a *bipolar* model of development at the level of the country. This bipolar model of development has fostered concentration of main resources and economical capitals in two main cities, Quito the capital of the country and Guayaquil. Thus, political parties and illegal "*dealers of lands*" took their turn in running the urban development of peri-urban settlements in the city. The provision of basic infrastructure for these areas also many times surpassed the capacities and resources of the companies providers of the service (Joyner E., 2007). The provision of some of these services is privatized, as the water supply (Interagua,2006) and garbage collection, in an effort to provide a better service for the city, but outputs are controversial. In accordance with Tiepolo (2007) 70% of the population still lacks drinking water and the provision of basic services.

THE CONCEPTUAL AND METHODOLOGICAL BASIS FOR THE INTEGRATED COST-QUALITY APPROACH

The present study uses an **integrated approach** (Makoba, 2008) since different stakeholders are addressed and the complex interactions between different housing variables in the whole process of urban housing development are included, like: housing and urban design parameters, location, green areas, basic services and infrastructure. A demand curve is also considered taking into account the reduction of the selling price of units if, per period, a larger number of units are delivered on the market. The main parts of this **integrated approach** can be summarized as:

- Housing costs predictions

- Quality evaluations based on a hierarchical classification of housing characteristics
- Phasing possibilities for different housing types
- Housing finance considering different income groups

The aim of this paper is to describe a simulation tool that will help to achieve stakeholder's expectations regarding urban and housing projects. The possible users and corresponding objectives can be characterized as follows:

- The designers: to evaluate the influence of their options on the final quality and cost of the housing development
- The Government: to define urban and loan policies as a function of quality levels and people's preferences in order to promote the construction and acquisition of higher quality housing.
- To the financing entities: to promote financial plans accessible to low income groups
- The promoters: to adjust projects to consumer profiles
- Local municipal agencies: to promote adequate urban policies based on quality evaluations and preferred urban developments adequately inserted in the urban structure of the city.
- The consumers: to select a house in accordance with their financial capabilities and preferences.

Main methodological parts of the quality evaluation

The methodology used in the model for the quality evaluation integrates three main parts: (i) first the identification of main housing characteristics and housing attributes, (ii) the weighting of each of those housing attributes and (iii) the introduction of *quality points* in order to obtain a market price.

Identification of main housing characteristics for quality evaluations

A provisional list of housing characteristics was made, based in an extensive literature review, primary sources (as national journals, magazines), secondary sources (as informal interviews to public policy makers, private developers, housing users), policy statements from the Municipality, the Master Plan for the city. For this also the multi-criteria decision analysis approach was used (Natividade-Jesus E, Coutinho R, Hengger C, 2007). The importance of identifying these housing characteristics is strongly related with the context (Greene M, Ortuzar J., 2002). In fact, defining a good *value for money* is a question that for Guayaquil has neither been posed explicitly nor answered in a satisfactory way.

This provisional list consists of three main housing attributes and 34 sub-attributes. The main attributes are:

- Layouts of houses and urban environment
- Technical choices: materials
- Location of the project

Later, this provisional list of attributes is going to be validated through additional surveys or a **pilot project**. For **layouts** different possibilities for the layouts of houses and plots have been considered. This attribute is further subdivided in: design of houses and design of urban environment. Design of houses relates to housing typology, size, shape and expansion possibilities and design of urban environment refers to green and sports areas, communal services, schools, health centres, commercial centres, and circulation.

For **technical choices**, just those main attributes that could have a significant influence on the selling price have been considered: floors, walls, roof, bathrooms and kitchen.

The **location of the project** includes sub-attributes as: distances to city centre by public transportation, existing road infrastructure; infrastructure provision as water supply, sewage system, electricity, garbage collection. The effect upon costs (Wayne, R, Archer, Dean, Gatzlaff, Lin, 1996) of following items is considered: landscape – environmental qualities, closeness to contamination sources and main urban projects, soil conditions,...

1 LAYOUTS	2 TECHNICAL CHOICES			3 LOCATION OF THE PROJECT
1.1 Housing Level Size of the plot Housing typology Number of floors Number of rooms Internal functional design Expansion possibilities 1.2 Urban environment level Urban equipment: Green areas Sports facilities Communal centers Heath centers Schools Commercial areas Stop buses Road infrastructure-typologies: Asphalt Asphalt with green areas Adoquines with green areas Concret with green areas	Element Floors: Walls: Roof Ceiling Bathroom Kitchen	Sub-element Finishes Main material Exterior finish Interior finish Walls Walls Kitchen inn	Material Cement Tiles Ceramics Prefabricated cardboard Prefabricated concrete Concrete blocks Bricks Without finish Plaster Plaster and painting Without finish Plaster Plaster and painting Fiber-cement sheets Metallic sheets Clay tiles Asbest cement Cardboard Gypsum Without finish Plaster and painting Ceramic tiles Sanitary appliances Economic Semi-economic Without finish Plaster and painting Ceramic tiles Without finish Plaster and painting Ceramic tiles	Distance to the center of the city by public transportation Between 30-40 minutes Between 40min and 1 hour More than 1 hour Embebbment in the urban fabric Road infrastructure Basic infrastructure Water supply Electricity Sweage system Drainage system Telephone Garbache recolection Natural conditions Landscape characteristics Soil conditions Natural drainages of rain water Micro-climate Contamination sources Main projects

Figure 3: Provisional list of attributes and sub-attributes.

The characteristic of soil is directly related with the cost of foundations. This cost depends of the location of the project. Areas at the South of the city or nearby mangrove areas are too expensive for building, due to the presence of underground water in some areas just one meter below the surface.. By contrast areas at the North of the city have more stable soil conditions and the cost of foundations can be significantly reduced

Weighting the relative importance of housing characteristics

Once those main housing attributes have been identified it was necessary to “weight” their relative importance. This “weighting” refers to the maximum amount of money people will be willing and able to pay for the different housing attributes. For this a “basic” price for a housing unit was determined. Corrections to this basic price by changing different housing characteristics have been elaborated.

Quality evaluation for a market sales price and further analysis: quality points (QP) The quality evaluation will allow to determine provisional sales market values for the different housing typologies.

Profitability margins and housing annuities

The number of houses to be provided is taken into account via a demand curve in order to predict a reduction price in accordance with the number of units supplied on the market per period. The profitability margin for private contractors will be increase or decrease by:

phasing the project or either predicting the cash flow of an urban project or changing housing and urban variables in the model. The affordability for the population is considered through housing annuities for different income groups, considering their financial possibilities and willingness to pay for the houses.

THE TOOL: COST AND QUALITY SIMULATIONS-AN INTEGRATED MODEL

The cost simulations

Cost simulations (Tuts,R, 1996, Bowen, P.A., Edwards,P.,J., 1985) are developed based in the *Element Method of Cost Control* (De Troyer, 1996). This method is based in an extended database of prices for the different elements and sub-elements required for the estimation of

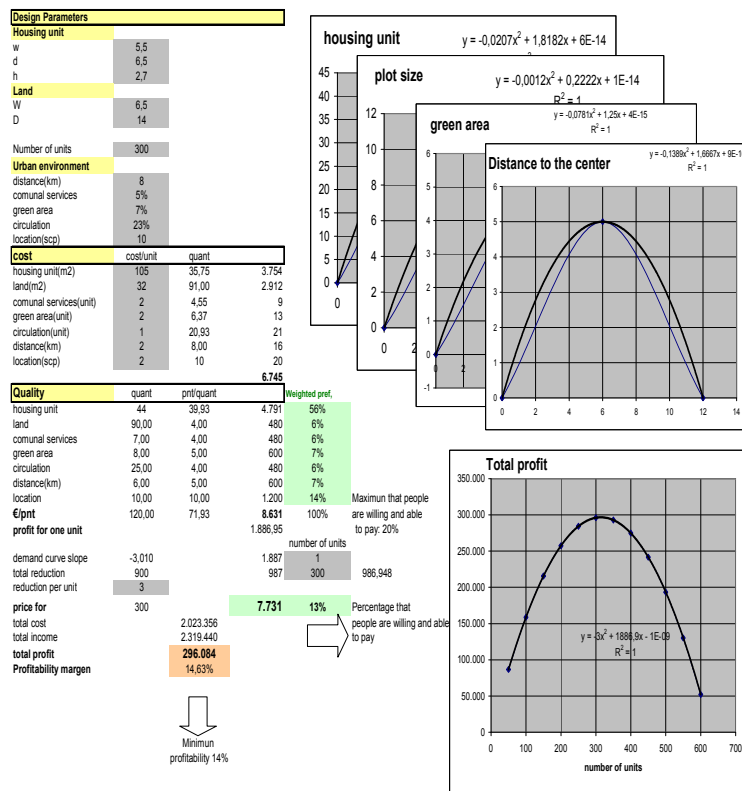


Figure 4: Spreadsheet showing some possible parabolic links of main urban and housing attributes, other links are also possible.

Quality evaluations (QE)

Quality evaluations are carried out for each of the main provisional set of housing attributes, assigning points per quantities of housing attributes and then multiplying each point with the price of a point in order to arrive to a market sales price for a specific housing type. In order to establish the points per quantities for each characteristic, two ways are considered: as a score function or by direct rating.

Phasing possibilities - Using different housing types

In a first part the different parameters for the area provided for communal services, green areas are inserted. In a second step the number of houses of the different types provided per period is simulated.

Based on a demand curve per type the sales prices are included. The different housing types considered in the first part of the model of the Element Method of Cost control are also included. Phasing possibilities for investments are tested upon the profitability margin for the developer over the total urban project. The allocation of public spaces is analyzed upon the profitability and posterior recovery of investments.

Housing annuities - For different income groups

Based in the housing types considered in the first part of the model, different possibilities of housing annuities for different income groups are considered based for this in their economic capacity and willingness to pay for the different housing types and their characteristics.

MAIN FINDINGS

Simulations with provisional data allowed us to analyze the impact of some parameters over the profitability margin for the private contractor and for the public or private developer and the affordability for the population. Any change that is made on the size of the house, plot size, finishes, width of a house, distance to the city centre, allocation of green areas and infrastructure is automatically reflected in the model.

CONCLUSIONS AND FURTHER RESEARCH

The urban development of regions and cities in the last decades via urban projects, involved a change in the role of urban and housing projects stakeholders. A more participatory approach is claimed, as from the private, formal and informal sectors of society as well as from the public sector and professionals. It is essential in regard of urban projects, cities and locations to find innovative ways, like a guided urban land development through infrastructure development, supported by methodologies and techniques that allowed new ways of cooperation and associations between the different stakeholders involved.

The methodology and simulation tool presented in this paper aims to provide more insights into the desired balance of cost and quality for an urban development, considering people's preference as the added value that could ensure private contractors, public and private developers and providers of basic services and infrastructure an adequate profit. This will also help developers with the identification of priority public spaces and provision of basic infrastructure needed by the population. Besides adding value to urban developments, the approach can contribute to a better and more coherent urban growth of the city.

Furthermore, this approach can be also used in other cities of the country or nearby the metropolitan region of Guayaquil in order to try to reduce the height rate of migration and extreme concentration of population and resources in the main city, encouraging in that way the planned urban growth and economic development of other regions within the country. Further research and simulations with more housing types, urban development and income groups will allow to appraising and validate some points presented in this paper.

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