

VALUE GENERATION IN SOCIAL HOUSING PROJECTS: A CASE STUDY ON THE CITY ENTRANCE INTEGRATED PROGRAM IN PORTO ALEGRE, BRAZIL

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ABSTRACT

The City Entrance Integrated Program (PIEC) is a very large urban project that proposes the urban restructuring of an important area of Porto Alegre City, South of Brazil. This type of project is characterized by heavy investments and very high complexity, since it involves a large number of stakeholders and much uncertainty. They are often designated as integrated housing programs since they not only provide housing, but also infra-structure, environmental improvements, community services and development. In this type of project, understanding value from the perspective of final users is crucial for achieving project goals. The aim of this paper is to describe a way of modelling value generation by using a hierarchy of constructs in integrated housing programs. Case study was the research strategy adopted in this investigation, which was divided into two phases. Phase A had an exploratory-descriptive character aiming at understanding the context of the PIEC development process. In Phase B the study focused on the final users (dwellers) of the program. The main contribution of this article is concerned with hierarchy of values that establishes a connection between the perceived performance of project attributes by the final users and goals of the project from the point of view of different stakeholders.

KEY WORDS

Value generation, requirements, perceived value, social housing projects.

THE CONTEXT: SOCIAL HOUSING PROJECTS IN BRAZIL

Social housing projects (SHP) have been a theme of major social and economic importance in the context of developing countries. In the case of Brazil, some important changes have happened in the last two decades. The housing policy has changed and much more investments have been made in the segment of social housing. The majority of new housing programs have a focus on the population with a monthly income of zero to three minimum wages. According to the João Pinheiro Foundation (2009), this represents 89.4% of the Brazilian housing deficit, estimated in 6.273 million homes. This change in policy has contributed to keeping the Brazilian construction industry booming, despite the international economic crisis.

In this context a wide range of new forms of housing provisions have been proposed, such as the so called integrated housing programs. These programs usually

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have a much broader scope than conventional projects, since they not only provide the physical commodities essential for lodging and shelter (i.e., housing units) but also other goods and services: road system upgrading, environmental recovery, community services (health, school, social work) and development. The ultimate aim of this complex combination of products and services is to promote the inclusion of poor communities in the formal city by means of community participation, work and income generation.

Consequently, a large number of stakeholders are involved, including different local, state and federal government departments, non-governmental organizations, private companies, and the community. This results in requirement conflicts and in the need to spend much effort managing trade-offs. Thus, there is a challenge to improve the product development process in order to deliver housing products that provide more value from the perspective of different clients (organizations responsible for decision making in the product development), including, of course, the population benefited.

Considering the heavy investments involved in such projects and the complexity of the client board, understanding the perceived value for the final clients (dwellers) is fundamental for achieving project goals. Such goals are often expressed in terms of improving the quality of living of the community, in different dimensions: health, education, safety, among others.

This paper explores conceptual and practical contributions of value management in complex, integrated housing programs. The aim is to propose ways of modelling value generation by using a hierarchy of constructs, connecting product attributes to the project higher values. In this study, one of the hypothesis was that population retention is an indicator that contributes to understanding the perceived value by different sets of clients, both the organizations involved in decision making during the product development process and the final clients (dwellers).

VALUE GENERATION

The debate over the replacement of Mass Production by the Lean Production paradigm has created an opportunity to extend the theoretical basis for operations management research. This is the purpose of the TFV (transformation, flow and value) theory proposed by Koskela (2000). According to that author, the value generation view is the least understood among those views, and the development of research to investigate methods, approaches and practices is much needed.

In the academy, there have been several initiatives aiming to understand value generation, and different names have been given, such as value customer driven company (Whiteley, 1991), value management (Green, 1994), customer value (Woodruff, 1997), mass customization (Pine II, 1999) and client requirements management (Kamara et al., 2000). These initiatives make explicit the great interest of different fields to develop approaches for value generation.

In practice, companies from different sectors have changed their strategies to improve value generation. In this context, the product development process (PDP) has become one of the main focal points of global competition. Three functions are central to a product development project: marketing, design and manufacturing (Ulrich and Eppinger, 2000).

Marketing research can be used to determine how each consumer segment values the product (Cook and Wu, 2001). For example, marketing and R&D share responsibilities for setting new product goals, resolving engineering design and customer-need tradeoffs, and understanding customer needs (Griffin and Hauser,

1996). Moreover, this discipline is well established in terms of scientific rigor since it anchors theory on psychology, economics and others theories (Schmenner and Swink, 1998). However, marketing research does not deal with design, which translates into a design solution, and production, where customer value is realized (Koskela, 2000).

In the Lean Construction community, value generation has been a topic of growing interest. Koskela (2000) discussed the value generation cycle through the interaction between a customer and a supplier (producer). In this value generation cycle, requirements are supplied by the client and value by the supplier (Koskela, 2000). Emmitt et al (2005) proposed a value based approach in which the values of the client and the delivery team are separated into: (a) external value, which is the customer value, that the project should end up with the delivery team focusing on achieving; (b) internal value, by and between the participants of the delivery team. Miron and Formoso (2003) and Leite et al. (2005) proposed a set of approaches for managing client requirements, which should be considered in terms of the objectives, needs, wishes and expectations of the client (Kamara and Anumba, 2000).

One of the essential issues regarding value is how to define and measure it (Koskela, 2000). This paper is focused on the concept of perceived value, since this has been scientifically treated in the field of Marketing.

PERCEIVED VALUE

An evolution of the understanding of value is reflected in current marketing approaches, referring to customer value as an organizations' strategy driven to target customer attraction and retention (Monroe, 1990; Woodruff, 1997; Saliba and Fischer, 2000). In this context, the buyers' perception of value represents a cognitive trade-off between the benefits they perceive in the product and the sacrifice they perceive by paying the price (Monroe, 1990). Benefit is what is received and sacrifice is what is given.

Customer's perceived benefits are concerned with the expected product performance as it enables the customers to achieve their goals and purposes in use situations (Woodruff, 1997). By contrast, the total sacrifice includes the sum of the purchase price, exchange costs, start-up costs and post purchase costs, among others (Saliba and Fischer, 2000). Therefore, product value, as it is perceived by the customer, involves complex interactions among the customers trade-offs, facing a large set of positive and negative attributes.

Moreover, there is a complexity around the value concept because customers use to group their values into sets or classes (Gutman 1982). When customers talk about their product experiences, attributes are frequently mentioned, but these attributes are associated to use situations, benefits sought from those situations, and purposes for using the product (Woodruff et al. 1993). Thus, according to Woodruff (1997) "customer value is a customer's perceived preference for and evaluation of those product attributes, attribute performances, and consequences arising from use that facilitate achieving the customer's goals and purposes in user situations". This reveals a hierarchical structure of customer perceived value (Figure 1).

The mean-ends value hierarchy (Figure 1) presents the essence of customer benefits (Gutman, 1982). The means are the product while the ends are the customer/client purpose or goal (Gutman, 1982). This model proposes three levels of customer satisfaction ranging from tangibles, articulated and objective aspects (such as the product desired attribute) until more subtle and intangible level such as

customer goal and purposes. In Woodruff's (1997) model those benefits are defined as attributes, consequences and goals.

Additionally, the concept of customer value suggests a strong relationship with customer satisfaction (right side of Figure 1) due to the fact that both concepts describe evaluative judgments about product in use situation (Woodruff 1997). Thus the satisfaction is an important indicator to understand the client/customer perceived value.

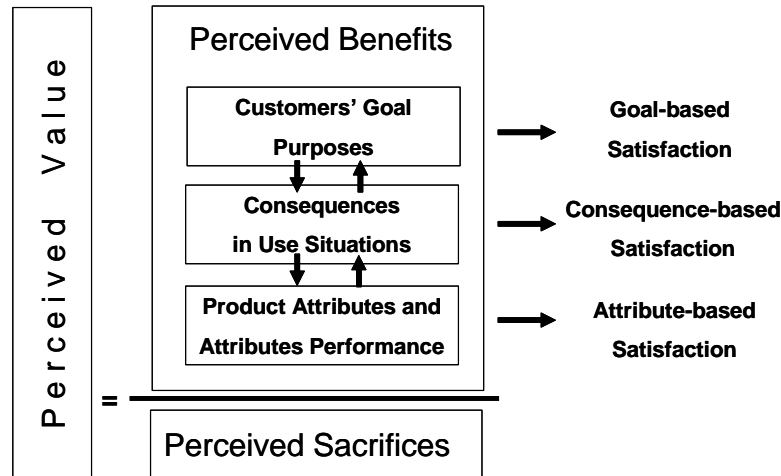


Figure 5: Customer's perceived value hierarchy (adapted from Woodruff, 1997)

According to this relationship, the value concept seems less complex: the perceived value is obtained by the comparison between benefits and sacrifices, while overall satisfaction is given by psychological outcome of the buying and consumption process.

RESERCH METHOD

THE EMPIRICAL OBJECT: PIEC PROGRAM

The City Entrance Integrated Program (*Programa Integrado Entrada da Cidade - PIEC*) started in 2002, in Porto Alegre, the capital of the State of Rio Grande do Sul. This program will benefit 3,775 families who live precariously in 22 informal settlements. In the first phase of PIEC, that has already been concluded, 413 families received new dwellings. The PIEC can be described as an integrated approach to housing provision because it merges five projects for the same neighbourhood: road infrastructure, environmental recovery, housing, social work and planning.

The case study on PIEC was divided in two phases. Phase A had an exploratory-descriptive character aiming to understand the product development process, including the political and institutional background. Data collection was focussed on the perspective of different organizations responsible for the decision making during the product development process. The main sources of evidence were the analysis of design, production control and legal documents, 16 semi-structured interviews carried out with professionals involved in the conception, design, production and financial management of PIEC projects. During this phase the main stakeholders were identified and the program goals (objectives and requirements) were made explicit.

In Phase B, the study was focused on the final clients (dwellers), particularly the 413 families resettled in the first stage of the Program, by March 2004. A post occupancy evaluation (POE) was carried out in the three housing estates, in which the dweller's perception on satisfaction, importance and retention was captured. The survey questionnaire was divided in three parts: (a) data on dwellers' profiles; (b) thirty-four closed questions concerning the PIEC sub-products (allotment and communal areas, housing unit, urban infrastructure services and social work services); and (c) open questions aiming to identify the five most positive and the five most negative characteristics of living in the new housing estates. The closed questions were divided into two main sections: dweller's degree of satisfaction and dweller's retention (including reasons for leaving and important attributes for staying).

MAIN RESULTS OF THE CASE STUDY

DESCRIPTION OF THE PRODUCT DEVELOPMENT PROCESS

The product development process was very complex, which lasted for around 6 years. The intervention area involved five neighbourhoods in the city of Porto Alegre. The selection of the area was made according to indicators concerned with the quality of living in that area, which was among the lowest in the country.

The size of the program demanded much effort for integrating the work of the professionals from the various public institutions and private organizations. The first phase of PIEC was financed by Habitar Brasil IDB³ (HBB). One of the most important requirements of HBB is the creation of a Municipal Executive Unit. This Unit was composed of eight City Council secretariats: planning cabinet, department of housing, mayor's cabinet, regional administrative centre, road system, industry and commerce, environmental and urban planning.

Table 1 presents the main governmental institutions that took part in the Program. Among these, the City Council had the most important role because of its involvement in the conception and development of the entire program and in the management of the housing projects after occupation. Moreover, the City Council was the legal owner of the housing projects. Thus, the City Council has simultaneously played the role of developer, design and delivery team, and owner. The private organizations involved are social work service providers and construction companies, both hired by the City Council.

During the interviews with professional of public institutions, the dwellers' retention was pointed as a major metric of success for the program. Several interviewees considered that if most of the population remained in the housing estates the main program goal was likely to be achieved: to improve the quality of living of this population (Figure 2). Besides, it is a project that attempts to achieve an effective social inclusion of the beneficiaries, although this is a long-term goal, difficult to access only a few years after delivering the project.

³ This is a housing program that is partially financed by the Inter-american Development Bank (IDB)

Table 1: The main Clients Involved in PIEC and their Responsibilities

	CLIENTS	RESPONSIBILITIES
Public Institutions	CITIES MINISTRY	Establishes directives according to HBB Program, and contribute to program goal definition
	BRAZILIAN PUBLIC SAVINGS BANK (<i>Caixa Econômica Federal</i>)	Manages the first and the second phases of the program – HBB financing
	CITY COUNCIL- Municipal Executive Unit: Planning Cabinet, Municipal Department of Housing, Mayor's Cabinet , Road System Municipal Secretariat, Environmental Municipal Secretariat, Urban Planning Municipal Secretariat, Industry and Commerce Municipal Secretariat, Regional Administrative Centre	Developers the PIEC (conception, design, planning, budget, building inspection, post occupancy supervision, maintenance), housing projects' legal owner, contribute to program goal definition, define the social interest housing product and the social services
Private Organizations	PRIVATE PARTNERS , community associations, public institutions, universities and NGOs (non-governmental organizations)	Help City Council in the social work services: Community organization and mobilization, Environmental and sanitary education, Work and income generation
	CONSTRUCTION COMPANIES	Build housing projects, infrastructure, equipment, squares, road system
Final Clients	POPULATION BENEFICIATED (dwellers) - families from informal settlements who earn between 0 and 3 minimum wages	Participate of PIEC development, sign the adhesion term, pay the occupancy expense (a kind of social leasing)

Data on the beneficiaries of the Program was collected in 2001 by the Municipal Department of Housing, providing information concerning the dwellers profile while living at the informal settlements. Differently from other housing programs, in PIEC there is a clear definition of the population to be served. Based on this information the design team identified requirements, and defined product attributes, as well as some of the goals of the Program. As a result, some additional housing types were proposed: (a) accessible house unit for the handicapped; (b) mixed units (house and commercial); and (c) possibility of enlargement from the two-floor house to a three-floor house.

Figure 2 presents a hierarchy of values that outlines the means-end relationships between lower level outcomes (results and short term outputs) and higher levels outcomes (program goals or impact). In other words, this structure provides an overview of the product attributes and actions, and displays public institutions' requirements in a hierarchical way. This structure can be used as a reference for analysing the perceived value by the final clients.

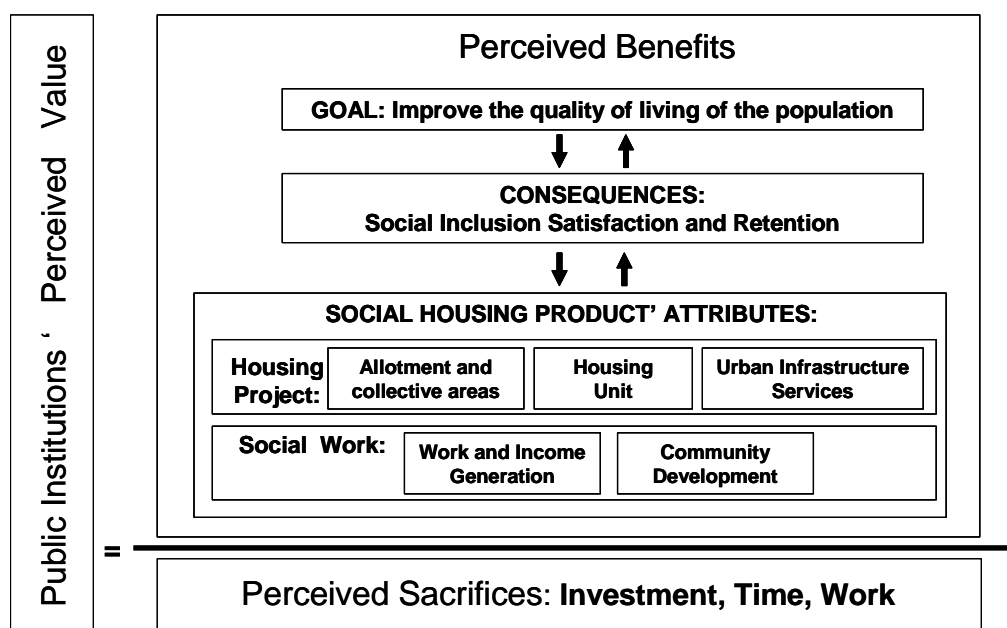


Figure 2: Public Institutions' Perceived Value Hierarchy

THE PERCEIVED VALUE BY THE FINAL CLIENTS (DWELLERS)

The social housing projects were deployed into four sub-products: allotment and communal areas, housing unit, urban infrastructure services and social work. The performance of attributes, and their ability to achieve a desired consequence, was assessed based on the dwellers' perception by using two constructs: satisfaction and importance. The satisfaction construct was analyzed by a two points scale: high satisfaction level and high dissatisfaction level. The importance construct was analyzed considering the same housing product structure utilized in closed questions.

Table 2: Outcomes of Dwellers' Perception of Importance and Level of Satisfaction

PIEC HOUSING PROJECTS (3)	IMPORTANCE (Qualitative Data)		SATISFACTION (Quantitative Data)	
	Positive Characteristics	Negative Characteristics	High satisfaction level	High Dissatisfaction level
1	Allotment (3) - : location, neighbours, equipment	Allotment (2) – security, neighbours, equipment U. Infrastructure (1) pavement	U. Infrastructure (3) Garbage collecting ≥ 70% Water supply ≥ 97% Energy supply ≥ 95% Sewage treatment ≥ 60% Quality pavement ≥ 75%	Allotment (2) – Parking ≥ 56% Housing Unit (1) Kitchen = 59%
2	U. Infrastructure (3) - garbage collecting, electricity/lighting	U. Infrastructure (1) cleanliness Housing Unit (1) - space Allotment (1) - neighbours,	Housing Unit (2) Bedrooms ≥ 69% Allotment (1) Security = 58%	Housing Unit (2) Kitchen = 34% Stairs = 49%
3	Housing Unit (3) – quality	Housing Unit (2) – space, taxes Infrastructure (1) – cleanliness	Housing Unit (1) Bedrooms = 77%	

The survey results indicated that the attributes concerned with urban infrastructure services had the highest level of satisfaction (Table 2). The urban infrastructure services as well as allotment and communal areas attributes were also extensively mentioned in the open questions (importance). Finally, the attributes of allotment and

communal areas and housing unit sub-products had higher frequency in the dissatisfaction categories (Table 2).

Table 3: Outcomes of Dwellers' Perception of Retention (quantitative data)

PIEC HOUSING P. (3)	REASONS FOR LEAVING (frequency)	IMPORTANT ATTRIBUTES FOR STAYING (rank)
	1 <input type="checkbox"/>	Project adaptation (2) > 30% Taxes and Bills (1) = 52%
2 <input type="checkbox"/>	Project adaptation (1) = 28% Taxes and Bills (1) = 20% Violence and crime (1) = 17%	Allotment – relationship with neighbours (2) Housing Unit (1)
3 <input type="checkbox"/>	House selling (2) > 13% Problems with neighbours 171%	Participatory Process (2) Social Work (1)

The retention construct was placed at the consequence level in the customer value hierarchy model (Figure 2) proposed by Woodruff (1997). The retention rate varied from 71% to 79% in the three housing projects. The urban infrastructure services attributes were the ones that have most contributed for increasing the retention level. By contrast, the most frequent reason for leaving the allotments was the need to pay taxes and bills (house leasing, electricity and water bills) and problems related to design adaptation (Table 3).

Considering the results, it is possible to infer that on the one hand the most important set of benefits are related to urban infrastructure services (supply of water, electricity and sewage systems). On the other hand, the most important sacrifices were obligation to pay taxes and bills and difficulties to adaptation to housing unit and allotment design. The cognitive trade-off between the benefits and the sacrifice perceived by dwellers (population benefited) is presented in Figure 3.

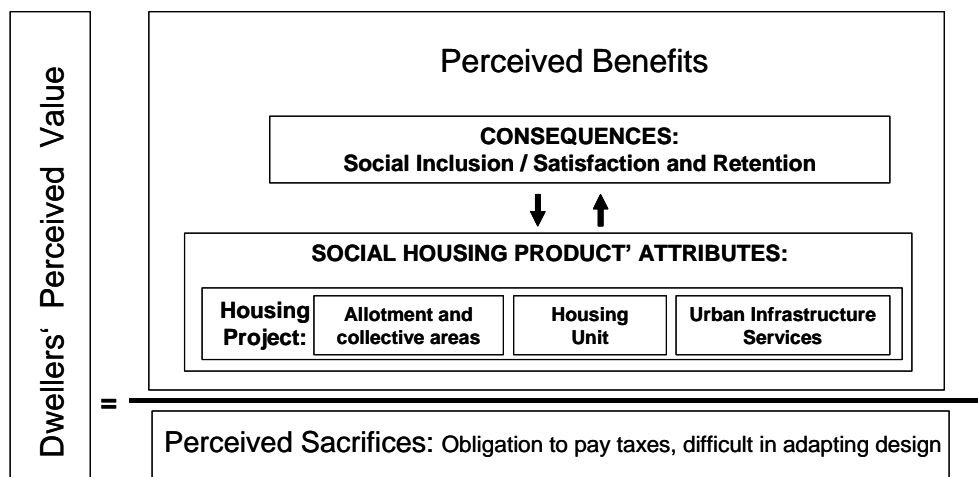


Figure 3: Dwellers' perceived value hierarchy

CONCLUSIONS

This paper has presented the evaluation of a complex urban project, whose results were organized by using a hierarchical structure of values (Figures 2 and 3). In this structure a connection between the perceptions of final clients (dwellers) on the attributes of different sub-products to the project goals was presented. The goals were defined by a set of stakeholders, mainly state organizations. This framework enables a comprehensive assessment of project effectiveness and can be compared to the customer value hierarchy model (Figure 1) proposed by Woodruff (1997).

At the lowest level of the hierarchy the desired attributes (and performances) of the product may be displayed. In the case study, the product was divided into four sub-products: allotment and communal areas, housing unit, urban infrastructure services and social project. The second level was conceptualized as the social inclusion consequence. The dwellers' retention and satisfaction makes a connection between the lowest level, performances of the product attributes with the highest level, the desired goals (i.e., improve the quality of living).

The retention construct plays a fundamental role as it creates this link between the attributes performance and the project goal. If the retention has a high rate this suggests that the Program is to some extent accomplishing its goal, once population beneficiated are having access to shelter and urban infrastructures services. Considering that the target population of the Program previously lived in informal settlement with precarious living conditions, this upgrade can be considered as an improvement in the quality of living of this population. The accomplishment of this goal was partially assessed based on the retention, which can be considered an important indicator of the Program effectiveness. This supports the hypothesis proposed in the case study: that population retention is an indicator that contributes to the understanding of perceived value by two different sets of clients, the state organizations involved in the product development process and the final clients (dwellers).

This logical structure also enables an additional use for post-occupancy evaluations or satisfaction evaluations, besides identifying dweller satisfaction with attributes of the housing product. As they usually address attribute-based satisfaction (Woodruff, 1997) they can also provide basis for assessing house building projects effectiveness, if they are adequately designed.

The marketing concepts such as perceived value and satisfaction were also useful for creating the logical connection between the three levels of the logical structure (attributes, consequences and goals). The satisfaction and importance constructs were used for assessing the performance of the sub-product and their attributes, providing results at an attribute based level (Table 2). The analysis of these results enabled the identification of the major sacrifices and benefits perceived by dwellers related to the housing product, forming the perceived value construct. The retention construct combined with the major benefits and sacrifices perceived by the dwellers and the key reasons for staying or leaving the allotments, have provided indications of the accomplishment of the project goal and major obstacles encountered.

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