

EVALUATION OF SOCIAL HOUSING PROJECTS BASED ON USER PERCEIVED VALUE HIERARCHY

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ABSTRACT

The evaluation of projects plays an important role in the effort to improve value generation in social housing. However, the diversity and dynamics of housing programs and the lack of clarity in project objectives may hinder the evaluation process of this type of product. The evaluation of social housing projects is often focused on product attributes, without establishing a clear connection with the expected objectives. This paper proposes a method for the evaluation of social housing projects, based on a hierarchical model for value generation, which links the product attributes to the consequences of use and intended goals. This method was conceived so that it can be used for comparing projects from different housing programs.. The research approach adopted was constructive research. The main contributions of the study are the development of the method, which uses a conceptual model for representing value generation, and a set of constructs that can be used to represent the main elements of housing projects, the consequences of use and the project objectives.

KEY WORDS

Value generation, post-occupation evaluation, social housing projects, constructive research.

INTRODUCTION

Value generation has been investigated in several fields of knowledge, such as quality, marketing, business management, and design. In social housing programs, value generation is often neglected, based on the argument that the target population live in subnormal conditions and that even a modest upgrade in housing conditions represent a major improvement in the quality of living. However, several post-occupancy evaluation studies carried out in Brazil have indicated that social housing projects⁴ have had many problems regarding the fulfilling of needs and expectations of the population, such as inadequacy of space (Ornstein et al., 2011), lack of housing diversity (Leite et al., 2011); problems related to aesthetics (Reis and Lay, 2010), lack of privacy (Reis and Lay, 2004), inadequate building performance, and ineffective

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⁴ In Brazil, social housing projects are understood as projects developed for beneficiaries with income between 0 and 6 minimum salaries – up to US\$ 2,045 a month. They are entirely or partially subsidised by public funding, through formal housing programs.

facilities management (Lima et al., 2008). Moreover, some of these problems tend to be repeated, despite being pointed out by several post-occupancy evaluation studies carried by the academic community (Formoso and Jobim, 2006; Lima et al., 2008).

The difficulty of getting feedback from post-occupancy evaluations for improving future projects has also been reported in other countries and in other segment of the construction industry (Markus, 2001; Vischer, 2009). Several causes for that problem can be pointed out: (i) the lack of involvement of stakeholders in the design and realization of post-occupancy evaluation studies (Way and Bordass, 2005); (ii) the lack of rigorous statistical methods, and well established constructs, which makes it difficult to perform meta-analysis based on several studies; and (iii) the limited focus of the evaluation studies on the attributes of the products, rather than on the benefits (or values) for the final clients.

The aim of this paper is to propose a method for evaluating social housing projects, mostly based on the perceptions of the final users. The need to understand value generation is strongly emphasized in this method, based on the assumption that there is a hierarchical relationship between means and ends. In this study, the conceptual model proposed by Woodruff and Gardial (1996) was used for establishing a hierarchy of constructs, connecting the product attributes, the consequences of use, and the benefits for the clients. The development of the method have considered the context of social housing programs, such as the need to devise a method adaptable to frequent changes that happen in social housing policies, and the relevance of involving housing providers and funding agencies in the evaluation process as much as possible. This investigation was based on an evaluation study developed in partnership with the Brazilian Federal Savings Bank (CEF - Caixa Econômica Federal), which involved a post-occupancy assessment of three social housing projects from Porto Alegre, Brazil.

CONNECTING PRODUCT ATTRIBUTES AND CUSTOMER VALUES

Construction projects usually deliver a combination of products and services. Lovelock and Wright (2002) define goods as objects or physical devices that provide benefits for customers through ownership or use, and service as an action or performance that generates benefits for customers, although it does not result in ownership. Despite the production of a service is usually linked to a physical product, its character is essentially intangible (Lovelock and Wright, 2002). From the user's perspective, products and services are means to an end, and therefore the delivery of value should be based on a precise understanding of what is desired by customers (Woodruff and Gardial, 1996).

In the field of marketing, there are many different definitions of value perceived by the customer. However, Woodruff (1997) points out that there are basic similarities between concepts: (i) value is related to the use of a product, (ii) it is perceived only by consumers, and (iii) it involves an evaluation of the relationship between what the customer receives (e.g. environmental comfort, interaction with the community, safety, etc.) and delivers (e.g. money, time) when a product is acquired and used. An important discussion related to the concept of perceived value concerns the distinction between the meanings of value and values. According to Holbrook (2006), value is the result of a judgment, while the term values refers to the standards, rules, criteria or ideals that form the basis for the judgment, reflecting the individual

differences among consumers. Hence, customers' perceptions of the value for the same product may be different (Holbrook, 2006), since they are related to their personal needs and preferences and willingness to make sacrifices (Ravald and Grönroos, 1996).

Woodruff and Gardial (1996) proposed a hierarchical model to connect what is delivered (products and services) to the impacts for the user (values, goals), which is divided into three levels: (a) attributes: this is the more concrete level, which refers to the physical characteristics, resources or components of a product; (b) consequences of use: refers to positive or negative experiences which result of the product in use – such consequences are usually mentioned in the description of experiences with the product; (iii) objectives (or goals) refer to the values of a set of clients - this is the most abstract and intangible level of the value hierarchy. The conceptual structure proposed by Woodruff and Gardial (1996) is strongly based on the means-end model devised by Gutman (1982). This model was developed to describe how consumers categorise product information in their memory as a way to understand the behaviour that leads to a purchase choice (Gutman, 1982). Woodruff and Gardial (1996) extended the applicability of the means-end model, in order to consider not only the value desired upon purchase, but also the value generated during the use of the product.

Value hierarchies can be used to assess whether certain products (means) can generate a set of values (ends) through their attributes (Gutman, 1982). Woodruff and Gardial (1996) highlight that those hierarchies may be used for guiding decision-making concerned with product definition based to the consequences and objectives expected by those customers. This approach may contribute to change the perspective of product development, which, rather than being attribute-based, should to be guided from top to bottom, starting by the project objectives (Woodruff and Gardial, 1996). The idea of using hierarchies of constructs for explaining value generation has already been applied in construction, such as in the models proposed by Benedict (2008), and Spencer and Winch (2002). However, differently of those models, the method proposed in the investigation is grounded on a well-established conceptualization of value generation.

RESEARCH METHOD

The research approach adopted in this study was constructive research, also known as design science. This approach is concerned with devising artefacts that serve human purposes, which should be assessed against criteria of value or utility (March and Smith, 1995). Based on the steps proposed by Lukka (2003) for constructive research, this investigation was divided into five main steps: (a) identifying and understanding existing housing programs, as well how the evaluation of this type of project should be properly integrated in the product development process; (b) analysis of previous post-occupancy evaluation studies on social housing, focusing on the constructs adopted and the data collection and analysis tools used; (c) development and testing of the proposed method through the development of three evaluation studies in different housing projects, in collaboration with staff from CEF; (d) examining the scope of applicability of the solution by doing a cross case study analysis; and (e) analysing the connections previous theoretical knowledge.

The main sources of evidence involved in stage *a* was the analysis of documents and interviews with the CEF technical staff. In stage *c*, the three evaluation studies were carried out sequentially, so that the method could be refined, making it adaptable to different housing programs, and increasing the participation of its potential users. The evaluation itself involved visits to the housing estates, in which a questionnaire to a sample of dwellers was applied. In the same visit, a direct observation of the housing units as well as of the communal areas was made. The perception of social workers involved in the projects provided an additional source of evidence for that evaluation.

The assessment of the method involved internal discussions with the CEF technical staff involved in its development and implementation, and also on seminars in which the results of the evaluation studies were presented to wider audiences, including other technical staff from CEF, technical staff from one of the city councils involved in the study, and academics who had previous experience in this type of evaluation. The technical staff directly involved in the development of the method were engineers and architects responsible for assessing project proposals, and monitoring project execution, as well as social workers who were in charge of supporting community development initiatives for a limited period after the delivery of the project.

RESEARCH OUTCOMES

As suggested by March and Smith (1995), a constructive research project should provide a set of outcomes, which include constructs, models, methods, and instantiations. In the following paragraphs the main outcomes of this investigation are briefly presented.

CONCEPTUAL MODEL

The first step for the development of the method was to establish a conceptual model for assessing value generation in social housing projects. ~~Figure 1~~Figure 1 presents an overview of this model, which is an adaptation of the model proposed by Woodruff and Gardial (1996) to the context of social housing. At the top of the hierarchy the general objective of the project is described in terms of customer values. The consequences of the product in use are assessed at the middle level, based on the perception of the users. Finally, at the bottom level, the social housing project is divided in elements (products and services), which can be further associated to attributes. Table 1 provides an explanation for each of the possible products or services provided, which may vary according to the housing program.

The product scope is the easiest to model among the three hierarchy levels, since it is usually well documented in the program and project documents (e.g. design drawings, standards, contracts). Regarding the consequences of use, some were also identified in project documents, while others demanded the use of other sources of evidence, such as interviews, action plans, and reports. In the evaluation of the projects, some additional consequences emerged from the perception of the users, which had not been foreseen by the CEF staff involved in the evaluations. By contrast, some of the consequences pointed out by CEF as important, turned out to be irrelevant for the final users. The constructs related to project objectives (or benefits) were the most difficult to define, since there are conflicts between different sources of

information on the scope of benefits that each program aims to achieve. Not all the objectives were clear in the documents, and a number of meetings with CEF representatives were necessary before a consensus was established. An important step in the development of the value hierarchy was the establishment of the connections between the product attributes, consequences for the user and objectives. Figure 2 represents a hierarchy of constructs that was devised in project 1, before the evaluation was carried out – this was the basis for customizing the data collection instrument for this specific project.

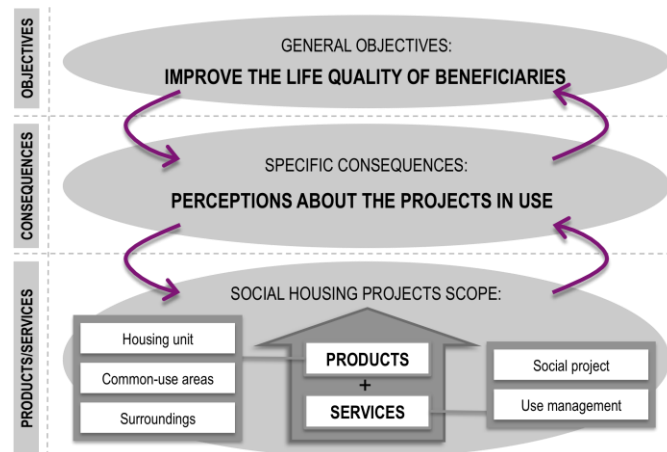


Figure 1 – Conceptual model for assessing social housing projects

Table 1 – Social housing projects scope

Housing unit	A building or part of it, destined to single-family occupancy. Different types of dwellings exist, such as one or two-floor houses and apartments.
Common use areas	These are the areas destined to common use. There may be open or closed spaces or whole buildings, such as communal lounge, parking spaces, playgrounds, and sport facilities.
Surroundings	Intrinsic to the housing project, since it depends on its location and urban insertion. Results from the available urban infrastructure, and access to services.
Social work project	It a wide range of community development activities, such as environmental education, training for facilities use and maintenance, professional training, and income generation.
Facilities management	Related to the operation and maintenance of the housing estates. Some of the projects have a hired facilities management company, while others are self-managed by the community.

As shown in Figure 2, the main objective of social housing projects is to improve the quality of life for the beneficiaries. However, the type of improvement that is expected depends on scope of products and services provided in each social housing project. In resettlements, for example, the improvement in life quality may be more related to habitability issues, while when the program is targeted to beneficiaries who have previously lived in rented accommodation, one of the main improvements may be related to a relative increase of the share of the family income spent in leisure and education (not for housing), for instance. Set of constructs for evaluation

Another important contribution of this investigation is the set of constructs that were used for producing value hierarchies (see Figure 2). Although, some of these constructs have already been used in previous studies, an effort was made in this investigation to clearly define each one of them, and to understand the connections

between them. This effort should be continued by future research studies, with the aim of refining and extending the set of constructs. The clear definition of those constructs is import for comparing the results of different evaluations, or even for building much larger databases of project evaluations, which could be used for carrying out some more robust statistical analysis, ~~similar to the ones that are used in other fields of knowledge, such as in evidenced-based medicine (Drake et al., 2004).~~

Based on these constructs and on the connections between them, the evaluation items to be included in the data collection instrument were defined. This sequence of steps contributes to make explicit a connection between constructs and sources of evidence, making the evaluation study fairly traceable. Table 2~~Table 2~~ presents an example of a set of generic constructs for the evaluation of the surroundings of one of the projects.

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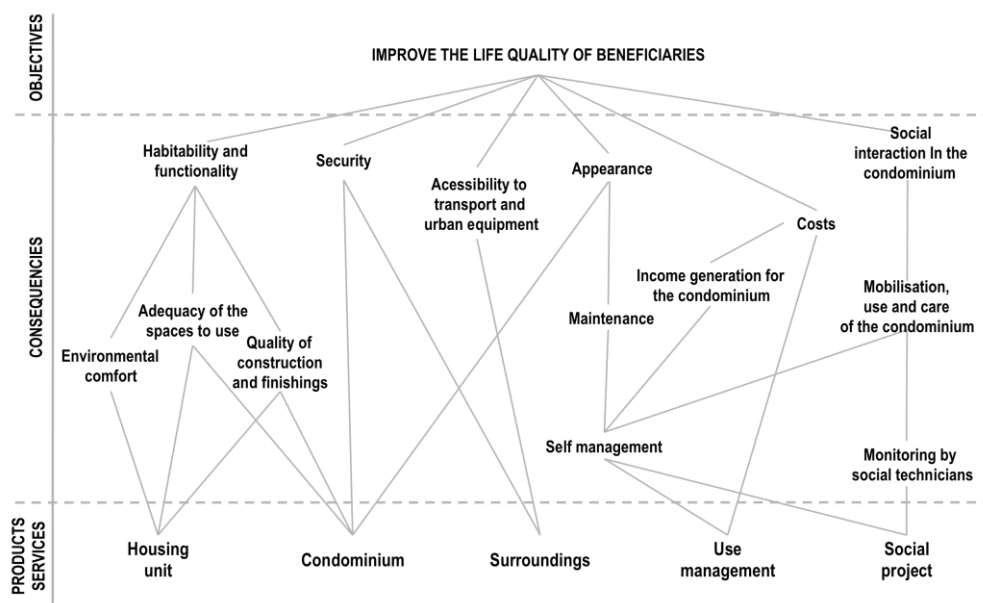


Figure 2 – Value hierarchy devised before the evaluation in project 1

Table 2 – Example of the set of constructs to evaluate the surroundings

		Consequences of use	Items for evaluation of satisfaction
PRODUCT	SURROUNDINGS	SECURITY	a) Safety in the surroundings of the condominium
		LOCATION	a) Location in the apartment block/housing estate
		ACCESSIBILITY TO TRANSPORT AND URBAN EQUIPMENT	a) Accessibility to the apartment block/housing estate by public transport
			b) Proximity to shopping areas
			c) Proximity to leisure and sports areas
			d) Proximity to day-care centers and schools
			e) Accessibility to health-care units and/or hospital

EVALUATION METHOD

The proposed method was divided into three main stages: (a) preparation of the evaluation; (b) implementation of the evaluation; and (c) discussion and dissemination of results. The first stage consists of identifying the scope of the social

housing project, the expected consequences and objectives and the customisation of the data collection tool. This stage is very important, since the product scope changes, depending on the housing program, or sometimes even within the same program. Therefore, there is no point in establishing a standard evaluation method for all housing projects. However, the fact that the project is defined in terms of a set of product and services, make it possible to compare projects with different scope. After the definition of the product scope, the consequences in use and the expected objectives are defined, and an initial version of the value hierarchy is built (as shown in Figure 2).

An initial version of the value hierarchy was devised by the researcher, based on existing program and project documents, and also on some interviews with technical staff from the organization involved, such as funding agencies and housing provider. This hierarchy was validated in a meeting before the development of the data collection instrument. The fact that the value hierarchy is represented in a fairly simple way made it easy for CEF technical staff to understand it and validate it before the data collection stage. Based on the constructs that were identified as relevant, a different data collection instrument was devised for each project, although all of them had sections that produced comparable results. The structure of this tool was strongly based on previous evaluation studies, carried on in this type of project (Leite et al., 2011; Lima et al., 2008; and Miron et al, 2010). It was divided into seven sections: (i) identification of the project; (ii) customer profile; (iii) critical incident technique; (iv) customer satisfaction survey on the performance of products and services; (v) changes introduced or intended in the dwellings; (vi) comparison with previous accommodation; and (vii) intent to stay.

The second stage consists of data collection and processing. After that stage, some changes are introduced in the value hierarchy, based on the perception of the final user about the product. It is particular important for this revision the results of the critical incident technique, in which the interviewees state what are the five best and the five worst characteristics of the project. The relationships between the project attributes, the consequences of use, and the project objectives are revised at this stage, mostly based on the qualitative data collected in the visits. An important analysis that can be made is the comparison between the two value hierarchies, before and after data analysis, since they reflect the different perspectives, from one hand, of the house providers and funding agencies, and, on the other hand, the final users. This can be regarded as a comparison between the desired value that was established at the conception of the project, and the value perceived by the user (Woodruff and Gardial, 1996). Finally, at the third stage the information generated in the evaluation process should be analysed by the organisations involved in product development, and widely disseminated in the social housing sector.

INSTANTIATION OF THE METHOD

As suggested by March and Smith (1995), one of the main outcomes of a research project in the constructive research approach is the instantiation, or the realization of the artefact in its environment. According to those authors, such an instantiation plays a key role in that research approach, since the constructs, models and methods are implemented in a real situation.

Table 3 presents a summary of how the evaluation process was undertaken in the three projects. It shows that a substantial reduction in the evaluation time was

achieved. That was due to less re-work in the stage 1 of the method, mostly due to a gradual improvement in the definition of the constructs. The evaluation process in the first two studies was fairly similar. However, in study 3 there was greater involvement of CEF technical staff, as shown in Table 3.

Table 3 – Summary of the evaluation process in the three studies

	Study 1	Study 2	Study 3
(a)	Product scope identification: meeting with social technician from CAIXA; interview with community leader Compiling of the evaluation by the researcher	Product scope identification: meeting with social technician from CAIXA Compiling of the evaluation by the researcher	Compiling the evaluation at a meeting with social technicians from CAIXA and a multidisciplinary development team (social workers, engineer and educational psychologist)
(b)	Data collection: 2 researches Collection time: 2 days (27 questionnaires) Processing by researchers	Data collection: 5 researchers Collection time: 1 day (80 questionnaires) Processing by researchers	Data collection: 1 researcher and 3 social workers from companies hired by CEF Collection time: 2 days (67 questionnaires) Processing by researchers
(c)	Presentation and discussion of the results with social workers from CEF		Presentation and discussion of results with professionals development team and social workers from CEF
Time	Over one month	Around two weeks	Around one week

Figure 3 presents a visual device that was used to present the final version of the value hierarchy, combined with the results of the evaluation by the final users. This figure highlights the most important constructs that should be considered in value generation, and the relationships between them. For instance, in study 1, the good performance of self-management (i.e. the management of the facilities by the community itself) had a widespread impact in value generation, and the overall level of satisfaction in this project was fairly high, despite several drawbacks that existed in the performance of the dwellings. The positive impact of the participation of the residents in the level of satisfaction has already been suggested in the literature (Sanoff, 2008). It is also important to point out in that figure some important relationships between constructs were only identified after data analysis.

CONCLUSIONS

This study has proposed a method for evaluating value generation in social house building projects, based on the conceptual framework proposed by Woodruff and Gardial (1996), and on the means-end model devised by Gutman (1982). By adopting this hierarchical perspective, the evaluation method was focused on aspects beyond the attributes of the products, such as the consequences use and project objectives.

The investigation was based on the evaluation of three projects, from different social housing programs. The cross comparison between the results of the evaluation indicated that the strategy of dividing the set of products and services of each project into its core elements, make it possible to compare projects form different programs, despite the differences in their scope.

In order to implement the proposed model, a set of constructs was established, after a process of successive refinements, in order to make them properly grounded in

the literature and understandable for the project stakeholders. An important element of the proposed method is a data collection instrument that can be customized, depending on the scope of the project.

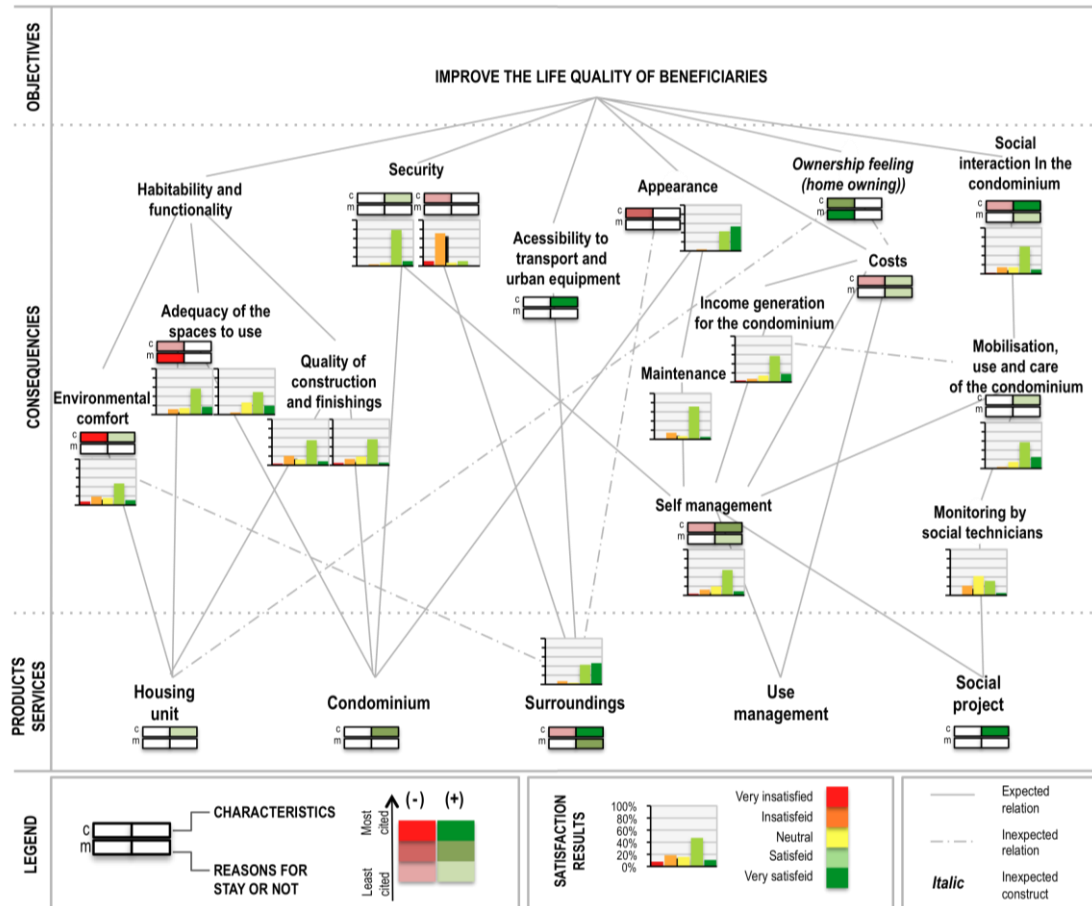


Figure 3 – Visual display of the value hierarchy for Study 1

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REFERENCES

- Barlow, J. and Ozaki, R. (2003) “Achieving ‘customer focus’ in private house building: current practice and lessons from other industries”. *Housing Studies*, 18 (1), 87-101.
- Benedikt, M. L. (2008). *Human needs and how architecture addresses them*. Austin, TX, USA: University of Texas Press.
- Bordass, B., & Leaman, A. (2005). Phase 5: Occupancy- post-occupancy evaluation. In W.F.E Preiser and J.C. Vischer (Eds.) *Assessing building performance*, (pp. 72-78). Boston, Elsevier.
- Eggert, A., Ulaga, W. (2002). “Customer perceived value: a substitute for satisfaction in business markets?”. *J. of Business & Industrial Marketing*, 17 (2/3), 107-118.

- Formoso, C. T., Jobim, M. S. S. (2006) "Challenges in improving customer focus in small-sized house-building companies in Brazil". *Journal of Construction in Developing Countries*. 11 (2), p. 77-101.
- Gutman, J. (1982) "A means-end chain model based on consumer categorization processes". *Journal of Marketing*, 46 (2), 60-72.
- Holbrook, M. B. (2006). "Consumption experience, customer value, and subjective personal introspection: An illustrative photographic essay". *Journal of Business Research*, 59, 714–725.
- Leite, F. L., Formoso, C. T. and Miron, L. I. G. (2011) "Client requirements management in social housing: case study on the residential leasing program in Brazil". *J. of Constr. in Developing Countries*. Paper accepted for publication.
- Lima, L. P., Formoso, C. T. and Echeveste, M. E. S. (2008) "Client requirements processing in low-income house-building using visual displays and the house of quality". *16th An. Conf. of the Intern. Group for Lean Construction*, Manchester.
- Lovelock C. and Wright, L. (2002). *Principles of Service Marketing and Management*. 2nd Edition. Prentice Hall, New Jersey.
- Lukka, K. (2003). The constructive research approach. In L. Ojala, & O.-P. Hilmola, *Case Study Research in Logistics* (Series B 1: 2003 ed., pp. 83-101). Publications of the Turku School of Economics and Business Administration.
- March, S. T. and Smith, G. F. (1995) "Design and natural science research on information technology". *Decision Support Systems*, 15, Elsevier, 251-266
- Markus, T. (2001) Does the building industry suffer from collective amnesia? *Building Research and Information*, 29(6), p. 473–476
- Miron, L. I. G. and Formoso, C. T. (2010) "Value generation in social housing projects: a case study on the City Entrance Integrated Program in Porto Alegre, Brazil". *18th Annual Conf. of the Intern. Group for Lean Construction*, Haifa.
- Ornstein, S. W., Villa, S. and Ono R. (2011) "Residential high-rise buildings in São Paulo: aspects related to the adequacy to the occupant's needs". *Journal of Housing and the Built Environment* (2011) 26:73–84
- Ravald, A. and Grönroos, C. (1996) "The Value Concept and Relationship Marketing." *European Journal of Marketing*, 30 (2), 19-32.
- Reis, A. T. L. and Lay, M. C. (2004) "Privacy in the dwelling: attitudes, visual and functional connections". *18th Conference of the International Association for People-Environment Studies (IAPS)*, Vienna.
- Reis, A. T. L. and Lay, M. C. (2010) "Internal and External Aesthetics of Housing Estates". *Environment and Behavior* □, 42 (2), Sage, 271-294
- Sanoff, H. "(2008) Multiple Views of Participatory Design". *International Journal of Architectural Research*, 2, (1), 57-69.
- Vischer, J. C. (2009) "Applying knowledge on building performance: From evidence to intelligence". *Intelligent Buildings International*, 1 (4), p. 239-248.
- Way, M., Bordass, B. (2005). "Making feedback and post-occupancy evaluation routine 2: Soft landings - involving design and building teams in improving performance". *Building Research & Information*, 33 (4), 353-360.
- Woodruff, R.B. (1997) "Customer value: the next source of competitive advantage." *Journal of the Academy of Marketing Science*, 25 (2), 139-153.
- Woodruff, R. B., Gardial, S. (1996). *Know Your Customer: New Approaches to Understanding Customer Value and Satisfaction*. Blackwell Publishing.