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Project Management: Towards an Emphasis in the ´Conception-Operation` Interface

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Abstract
This paper highlights a point of view seldom researched in the project management field: a wider approach to its processes and participating players; regarding its whole life cycle and the integration between the stages of 'planning', 'conception', 'production' and, mainly, 'operation and maintenance'. The aim of this paper is to improve the performance of these projects, specifically of the hospitality sector, whose patterns must be established according to the values of the players in the process, above all, consumers and users, actually, the ones who use it during its operation. This approach results in the higher efficiency and effectiveness of projects in their initial phases; and, in addition, in the rise of its performance under use and operation. The methodology foresees theoretical revision considering the related subjects, which are critically examined together with results of case studies carried out in hotels in operation. Finally, we suggest a tool of integrated action that involves the 'management of technology' and 'quality planning' alongside the operation of related projects.

Keywords
Quality, quality planning, management of technology, building maintenance.

INTRODUCTION

Taking into account the contemporary paradigm regarding building construction and operation, we must emphasize a strand according to which its project is associated to an 'investment' put to the service of its users. Therefore building performance must be in line with the use it will be put to and contribute to productivity of organizations based in it. Inadequate planning or operation will bring about shortcomings that will set back activities performed in the building, as well as onuses that can be over and above the resources available to organizations involved, thus reducing intended benefits. Therefore, it can be concluded that adequate planning and execution are not enough to guarantee building's adaptability to use: appropriate use must be guaranteed, which involves planning its facilities operation. Along with this and also as a result of this, there is a need for consolidating, during conception, values associated with operation, since the considerations of data, setbacks and good practice at this stage are conveyed by important data on its conception, the steady increase in its performance, and, above all, the full satisfaction of its users. Within this context, the study focuses on how different phases of a hospitality project relate, mainly conception and

operation. Such choice is justified by the relevance of building management to its performance itself and users satisfaction. To support this proposal, the methodology foresees theoretical revision on 'building projects construction and operation' and the interfaces involving these two stages; on 'building performance'; on 'quality planning' and on 'management of technology'; which are critically examined together with the results of case studies carried out in hotels in operation, using Post-Occupancy Evaluation (POE) tools. Finally, we suggest a tool of integrated action that involves the 'management of technology' and yhe 'quality planning' along the operation of the hospitality projects.

The concept of building construction and operation projects was born from its analogy with the other economic sectors, representing the non-routine innovations and problems that occur in any organization, distinct from its functional activities, "a temporary effort to create a unique product or service" [PMI, PMBOK (2002)], them being projects that repeat themselves but that, every time, have a different outcome form the previous ones. In this sense, the act of projecting a building configures a complex process characterized as "a whole succession of stages, generally with decisions taken from different hierarchical levels, great dispersion of responsibilities and low level of interaction among its players." [Melhado (1994)], all this added to the high risk of the process. The stages it undergoes are promotion and planning, conception, production, building operation and rehabilitation (or retrofit).

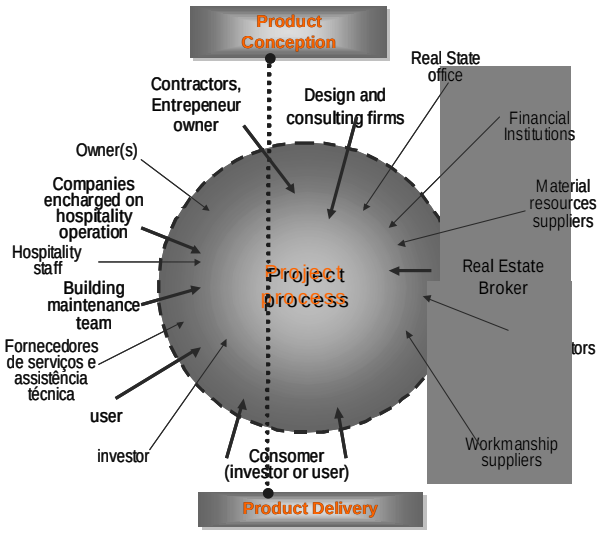
The **planning stage** is related to the choice and purchase of the plot, feasibility study, planning and promotion in the real estate market; and the players involved are developers, real estate agents and investors. The **conception stage** involves the activities related to the design and consultancy, aiming at defining the characteristics of the "product-building", the people in charge of which being the designers and consultants. The strategic role of this stage – that involves conception-operation interface – is concerned to the extent to which the decisions made by these people will affect the gains in the building operation and anticipate and solve critical problems when innovations are implemented, along with the reduced cost that configures its global cost; on the other hand, when these activities fail to go according to plan, this stage may become the main cause for the pathology in buildings, which can occur in about 40% of the cases [Josephson, Hammarlund (1999)]. **Production** is the construction of the building and its management, involving activities conducted in different ways, which take into account the levels of technological and managerial knowledge of the constructive processes, reflecting on the quality of the "product-building" and the satisfactory performance during its operation. In addition, we highlight the importance of the thread of building lifecycle flowing through both conception and production stages, with effective lines of communication between client, designer, contractor and those in charge of building operation and maintenance. Outdated administrative procedures often result in the various parties of building contract failing to appreciate the significance of other functions in the overall concept. The **operation stage** configures the time when the building is put to use, its conditions are adequate for occupation, use, and its facilities are performing [ABNT (1999)]. This stage sets the boundaries for its useful life, which involves the physical and functional durability of the construction, with due maintenance services. This demands flexibility and capacity to get up to date users needs as they appear [John et al (2001)]. The consumer and the user, respectively the one who buys and the one who uses the product, end up by footing the use and maintenance bill; and the people responsible for the performance of the building are merely the maintenance team that act upon building management methodologies [Gomes (1992)]. Such 'attributions' show that it is at this stage that the building will reveal the extent to which it is meeting the needs of its users, whereas the previous stages (conception and execution) condition their performance when they are being used.

Avoiding the occurrence of problems such as constructive pathologies or excessive consumption of resources costs little, but correcting the problem at the production stage is more expensive; but if

the problem is transferred to the user the cost will be far higher. This sometimes causes frustration and annoyance to the maintenance personnel when they find lack of basic information about the building and its services. It is important to point out that the players are still pretty much concerned with the challenges at the planning, conception and production stages [Hendriks et al (2000), Gomes (1992), John&Cremonini (1989)]; over all, designers, who, unfortunately, rarely have a long-term interest in the buildings they have designed, tend to stand apart from operation and maintenance problems that came from bad design [Seeley, (1987)]. There is still a need of systematic analysis on the impact of the decisions taken at the initial stages as a result of operational needs, as well as the integration between the conception and operation stages. Closing the cycle, the end of the operation opens a **retrofit stage** that will involve remodeling and or demolishing [Hendriks et al (2000)].

It can be observed, after the brief description of the stages, that a project can be compared to a group of independent 'companies' working to a single end: the production and maintenance of a building. This idea is represented in Figure 1, which also illustrates 'two teams of players' involved in the lifecycle of a building: people who work in the planning, conception and production stages, and people who work during the operation stage. This creates a very difficult 'barrier' to overcome, thus preventing interaction between these two teams. It can be understood that closer interaction can be the first step towards the so desired integration between project stages.

Figure 1: Group of companies and players involved in the production process, delimitated by the project .



Projects in the hospitality sector

The hospitality sector is a subsystem of the tourism industry, which seeks to meet needs of people in transit and far from home for accommodation and shelter. According to Petrocchi (2003), such projects are systems that integrate multifunctional spaces around them, including events; in its totality this system must pursue the satisfaction of its clients. Receiving guests in a hotel involves comfortable, well dimensioned, well equipped suites, and pleasant ambience; added to this there are the administrative and industrial activities (catering and laundry), commercial activities (restaurants and shops), central systems (cold and hot water, energy, transport, air conditioning, etc), maintenance and a number of other activities related to events, entertainment and leisure. Here we emphasize the importance of the planning and the conception stages in these projects. The architectural design must bring about relevant and unique differences, thus contributing to project success in the market, besides the building's adequacy to the specific ends of the hospitality sector, which is translated into competitive advantages [Andrade *et al* (2003)]. Once the operation practices are taken into consideration at the moment it is conceived and executed, it also starts playing a decisive role in assuring the proper building performance and its users satisfaction.

The building performance in the hospitality sector

The high performance levels of the building and its capacity to meet the needs of its users are

essential factors in the attribution of quality levels. In this sense, the idea of building performance must be understood as a technical vision, by which "the behavior of the building and its different parts is the result of the dynamic balance between the conditions to which it is exposed and how it is going to react to harmful agents" [Lichtenstein (1985)]. In this way, performance is associated with a building conceived to offer the user comfort, productivity, economy and safety, integrating it with the society and the environment around it; a system that involves a whole lifecycle.

It is important to emphasize the structural role played by users satisfaction in the performance of the buildings, whose evaluation occurs in a *rational and intuitive* way, when it is being used. *Rational* can be translated into safety (structural and intrusion-free), habitability, durability and economy, as described in ISO 6241 norm (International Standard Organization, 1984). *Intuitive* appropriates the Soen's concept [Soen, (1979)] of users satisfaction: "a clear statement of the items that comfort it, or by complaints against problems occurring in the unit, considered either in isolation or together".

Pursuing the success of the hospitality sector, by way of its management

Within a context of fierce competitiveness, the success of these projects is associated with the paradigm related to performance and the profits made from the operation, and capacity to meet the users demands. Actions to improve performance and quality have been taken; however, such actions are mainly focused on gaps identified in the *conception and production* stages, and not on the users needs. As a result, these studies led to ineffective building performance. And as these issues start to appear at the operation stage, they lead to lower users satisfaction levels. The decisions taken are mainly directed to construction costs to the detriment of the global building cost [Gomes (1992)]; buildability (easy and quick execution) thus overlooking the environmental impact the building may have [John et al (2001)] and its proper performance, functionality and maintainability (easiness to perform maintenance work) [Mesquita, Melhado (2003), Buoro et al (2003)].

This is the reason why we highlight two vital concepts in our proposal: *Quality and Technology*. According to Juran (1992) *Quality* must initially be understood as the combination of the product attributes, continuously improving, that behaves so as to perform in such a way as to meet the purposes it was meant for and go beyond satisfying clients. It is also important to mention the efficiency of the processes used in its production and operation [Gehany (1998)], close to the concept of aggregated value when such processes are coupled with a set of activities of technological nature, capable of adding value to the product. In Brazil, the movement for quality was characterized by a large-scale implementation of Quality Management Systems (QMS), which are the ultimate global management of quality policies for the organizational structure of the companies. In the case of the building construction segment it was restricted to the universe of property developers and some design company contractors. Santos (2003) made an assessment of the outcome of the implementation of QMS in this segment in different countries and concluded that such systems are tools that can improve companies performance, but only if coupled with other tools; the implementation of norms in an organization may lead to red tape, higher costs and can be time consuming; such norms are not adapted to the actual practice in the building construction segment; the people who implanted them are not involved in planning the project or its stages.

It can be observed that however important a tool like quality certification systems may be, they sometimes fail to yield satisfactory results; and, more often than not, integration between certification process and users real needs is incipient, and are not geared to their aims. Within this picture, if the idea is to ensure building quality, an exclusive plan ("definition of a desired future and effective means to attain it" [Ackoff (1975)]) for the project must be considered as an alternative along with QMSs. The application of the plan to product quality is understood as "the

activity that sets quality goals and develops the products and processes necessary to the attainment of such goals ... demanded in order to meet customers needs, involving a series of universal steps" [Juran (1992)]; an approach shared by NBR ISO 10005 standard [ABNT (1997)]. In the case of buildings, Project Quality Planning (PQP) involves delimiting quality goals to its stages processes and to the product, coordinated in a systemic and harmonious way. Therefore PQP elaboration should formalize "collaboration among project (all) players in order to attain the goals foreseen, defining responsibilities, procedures and specific control as well as providing means for its management, thus maximizing the quality of the solutions and their results in terms of users satisfaction". [Melhado (2000)].

Technology concerns the sum of originally scientific knowledge, making it possible for lower-cost and better-quality products to be generated by means of increasingly sophisticated processes, representing "a whole set of knowledge, means and know-how, geared to some production or operation" [Ribault *et al* (1995)]; and including 'eight essential points': "products, production or operation processes, intellectual property, data processing, promise (of quality and confidence), people and their skills, project and planning, being a pioneer for financial gains" [Gehany (1995)]; the authors associate technology with the promise of competitiveness and the pursuance of greater productivity and yield in the use of the product. According to this, the technology applied to buildings must be understood as technology of products (materials and construction systems), of constructive processes (production technology), and building operation, comprehending the facilities and solutions for greater functionality and comfort for its users, and increased productivity for the organizations based on it.

This idea of technology gives rise to another issue that takes into account its interaction with integration with QMS. Based on the picture given, the question is whether QMSs and PQPs are really capable of guaranteeing buildings quality as a result of the use of technology in its lifecycle. Many times the implementation of a QMS proves to be unable to guarantee a 'technological culture' in the organization. If the system decides that product quality will be reached by means of traditional processes, or even crafted, so thus it will be done, and no technological gain will come from it. The result is the appearance of another gap in the context being described: *Owing to their particularities, products generated by building construction and operation projects sometimes fail to have a high aggregated value; such as innovation, technology and intelligence incorporated to buildings.* In view of the situation, it is wise to guarantee the adequate adoption of factors associated to the aggregation of value to project processes, whose particular characteristics are at the basis of the need for such values. However, since they are taken as 'abstract' their management is regarded as difficult, which will allow the organization that knows how to deal with them efficiently to stand out in the market. In building construction segment, such a factor has become a matter of survival, since the changes that have occurred in the last few years dictate that acquired experience is put to good use.

Within this picture, the management of technological knowledge, Management of Technology (MoT), represents a tool to be coupled with PQP, once it provides the *structure for the attainment and use of technology in an organization or project* by taking into account the factor necessary to guarantee the quality of their products. Ribault *et al* (1995) described it as "the process of development, choices, and diffusion of technology within the context of a project" and Gehany (1998) as "the configuration of the management system, policies and procedures, which defines the strategy and operationality of the project so that it achieves its aims". Therefore, we delimited as the universe of MoT, *the development and application of directions for projects, aiming at selecting, developing, applying and operationalizing technology in their processes, so as to add value to the building.*

CASE STUDIES

This item shows the partial results of four case studies concerning four construction projects in São Paulo, whose structure takes into account the elaboration of a comparative matrix (Table 1) including essential data on the projects, such as their characterization, QP and MoT practices (during operation stage) and building evaluation by its users. The criteria adopted for the case selection included the building time extent of operation, products of an economic nature geared to business tourism; whether it meets the criteria that delimit its minimum acceptable performance; and samples of hotels managed by three distinct hospitality companies. The tools used in the elaboration of the diagnosis were technical visits, semi-structured interviews with the main players involved and questionnaires to determine how the guests saw the performance of the building. [Ornstein; Romero (1992)].

A brief analysis of collected data lead to the following conclusions: location contributes to high occupation levels, with an annual average of above 70% in all cases (1); hotels run by different groups tend to find it more difficult to manage budgets and make decisions on maintenance activities (2); QP and MoT tools are not used, only QMS tool is used in the projects by company A, involving preventative maintenance procedures, and the development of an operation manual by company C (3); Projects 3 and 4 were not incorporated by their final owners, who were not involved in the conception stage and ended up by presenting a larger number of inadequate solutions (4); some solutions geared to buildability have not contributed to the maintainability or to the comfort of the users (5); some decisions that do not provides good performance in use, originated in the design stage, affect both the personnel (in terms of operationality) and the guests (implantation functionality and comfort) (6).

Table 01: Matrix of data on the projects studied and the results obtained.

	CHARACTERISTICS	QP & MoT	BUILDING MAINTENANCE	GUESTS
PROJECT 1: company A	Strategic location close to the city's arterial access road, near convention centers. Four years of operation, large sized and diversity of services offered. Company contracted by administration, belonging to one single investor, also responsible for the construction of the building.	No specific tools for building maintenance processes. The company implemented QMS (ISO 9000:2000) in their projects (economic class), whose scope comprehends accommodation and restoration services. Among its procedures, the management of resources foresees: a Preventative Maintenance Plan (PMP); maintenance and renovation of small materials; and maintenance of process software.	Economic category of the hotel demands reduced teams and investment on preventative maintenance, despite the great demand for the activity. More rigid criteria are needed to specify equipment; it was observed that some design solutions were inadequate to provide environmental comfort or maintainability. Constructive technologies gave priority to buildability.	Well evaluated, but assessment of indispensable requisites places it as presenting the worst performance of all. Dissatisfaction with air renovation, and internal acoustic insulation.
PROJECT 2: company A	Strategic location near busy airport and convention and commercial centers. Three years in operation, big-sized, diversified services offered. Company contracted by administration, the construction company (that built it) and a pool own the place.		SAME AS PROJECT 01. A pool of investors prevents decisions to be taken regarding the resources to be spent on maintenance. Inadequate design solutions jeopardize hotel's maintainability and functionality.	Well evaluated, but assessment of indispensable requisites places it as presenting the worst performance of all.
PROJECT 3 company B	Strategically located, near a famous university and hospitals. Three years in operation, small, offering basic hotel services. Company is owner of this project together with a pool of investors, and manages this project with relatively independence.	No QP or MoT tools. There is a pro project for manual maintenance and management of the building occurs upon the project manager's initiative.	The manager of the hotel, in charge of managing the building, regards its maintenance activities as quite easy. The exceptions are adequacy to budget and personnel available to perform tasks, and some inadequate solutions in the design.	Well evaluated, but assessment of indispensable hotel requisites indicates it as good.
PROJECT 4: company C	Strategically located in an important business and commercial micro region. Two years in operation, offering basic hotel services. Building used for commerce and the hotel, with separate entrances. Middle-sized, franchised, owned by a group of 8 big investors a pool holding 75 dwellings.	No QP or MoT tools, just a manual for preventative maintenance and programs for the operation of services, with procedures contributing to the maintenance of the building.	Difficulty to run budget foreseen for this activity and a reduced team to perform these tasks. Inadequate solutions in the project affect hotel's maintainability and functionality.	Good level of satisfaction. Just a few problems with the acoustic insulation of the units looking on the avenue.

There was a broad consensus that most of project's pathologies or inadequacies originate in decisions made at the design stage, whose control is associated with the estate developer or investor, who, even when they are the owners, tend to hold back investments at initial stages, thus bringing down building potential performance to levels below those initially expected and therefore increasing operational costs, to the detriment of operationality and customer satisfaction. In some cases these players show great concern with global costs and maintainability without, however, abandoning cost-benefit studies when adopting solutions. Another significant factor leading to inadequate solutions is that many designers lack technical experience of hotel buildings. To solve this problem, one of the solutions found by company A was to opt for working with professionals with experience of hospitality buildings, and develop a manual containing directions for designs, by taking into consideration maintainability and operationality of the implementation of the project: in the plot of land; construction technologies and specification of systems capable of reducing the consumption of resources, materials that contribute to maintainability and an architectural program inducing operationality. It is understood that effective and efficient design processes may stem from coordination by the very company, which, besides yielding a more transparent process, is more experienced in finding better solutions for the enterprise. Thence, the importance for companies, whose expertise includes hotel operations, to make more accurate decisions and providing feedback for new projects.

Considering guests' evaluation, and having in mind their stay (business), their level of satisfaction with the buildings performance is good. Location is the factor that mostly influenced hotel choice, whereas 'environmental comfort' and 'functionality' are factors that contribute to guest fidelity,

since they are actually evaluated and configure requisites that results from decisions made during design stage. It is important to mention how the guests evaluated the services offered, which proved to be an implicit requisite during the evaluation. In projects 1 and 2, for which the company developed a manual with directions for designs, dissatisfaction with check in and check out services is latent, which led places such as Lobby to be put down as 'bad' or 'very poor'; a fact which was also observed in features such as restoration and governance. Contrary to the hypothesis at the beginning of research, guest satisfaction with hotel buildings is not associated with its performance in isolation; this is part and parcel of 'building performance + services rendering', both as result of adequate choices during the design process. Departing from the value attributed to services rendering, it is important to highlight the influence exerted by building maintenance: a building that offers adequate work conditions to its personnel will always lead to effective and efficient services. In all projects it was observed that the so desired implementation of software and tools to aid building management is faced against limited budgets, besides the need to dedicate more time to planning these activities. Finally, it was concluded from the answers given by project managers that the guest opinion is not taken into account in the elaboration of the project guidelines, and there is a need to provide feedback for new projects from the values of the operation.

Based on the initial reports and conclusions, it is important to point out that design process coordination conducted by companies operating in the hospitality sector (1), the establishment of directions for hospitality design processes (2), the qualification of the planners geared to the hospitality sector (3), and, the greater participation of agents involved in the building operation during design process (4) configure important actions taken to heighten the interface between the conception and operation stages.

CONCLUSION

This article, depicting the diversity and complexity involved in management of construction and operation in hospitality sector, highlights the need to give special attention to the operation stage, by considering building management and integration between 'operation and conception' as a feedback on the values of both stages. The results of the case studies confirm the initial hypothesis that values of their users fail to be adequately responded; and they reveal a lack of tools capable of improving the building performance in operation, such as QP or MoT; except in one of the cases, in which there were defined procedures for building maintenance. It was also noted that, despite some efforts made by hotel enterprises to change this situation, high levels of decision-making power of the developers and investors at conception stage while that maintainability does not appear as an important requisite along design process. In view of this picture, the proposal is to develop a model to be adopted in building operation, which will include MoT alongside the precepts of QP, defining a strategic tool capable of improving projects operationality and allowing greater integration in the interface 'operation-conception', due to wide participation of users opinions and the consideration of maintenance best practices, as well as the identification and removal of inadequate practices; until the moment when these values will be incorporated to management system and will be available in the moment of design conception, even throughout the participation of operation players in the design stage.

This proposal finds support in systemic approach, by which the analogous processes between these two tools undergo a 'fusion' process, based on MoT models, whose processes regards each one of those as being inherent to the scope of QP. The elements of this tool at the outset are building better performance, its maintainability, user satisfaction and the so desired feedback on the design. To conclude, if proposed model becomes more accurate, the scope to be covered in building operation must be established in conformity with the 'users voice, the action mechanisms to reach

the aims must be defined and the proposed model controlled, particularly relating to the feedback to the conception stage. These issues are being developed in the PhD research that gave origin to this paper.

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