

A SYSTEMS VIEW OF CORPORATE FACILITIES

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ABSTRACT

The experience of corporate facility management in Brazil has shown that FM activities are regarded in different ways by people working in this field. In this paper corporate facilities are presented as a socio-technical system composed of both deterministic/mechanical systems and purposeful system working together. Recognizing the importance of understanding the ends to define actions to be done, the authors show that systems approach to FM is a useful tool. All facilities systems are viewed in terms of Functions, Structures and Process acting to achieve Purposes. Systems view is the basis of performance concept in FM and to commissioning buildings in a superior level of facilities quality. Facilities performance management is also discussed from a systems perspective.

KEYWORDS: CREM/FM, systems, facilities, performance.

INTRODUCTION

Facility Management (FM) is not a new activity as many people think, as for the individuals and the organizations use means and somehow manage them, for a long time. What's new is the importance that means have today in the business context as factor of production, demanding improved efficiency and effectiveness in the operations of FM for support of the core-business. Today it is possible that FM can contribute in a significant way to the business results, collaborating for the reduction of costs and risks, for the improvement of the atmosphere and the quality of work life, for the improvement of the individual productivity and of the work group, as well as in the intervention for assuring the economical, social and environmental sustainability. It is the authors' opinion that the accomplishment of FM in a higher level of performance depends more on the vision from the point of view of all kind of users and on solidly established concepts, than on the methods and tools used. It is not uncommon to find, in Brazil, the adoption of brilliant solutions for the wrong problems. In this sense, the success in FM would depend more on the understanding and definition of the problems than properly of the adopted solutions. In this work, the authors try to evidence the importance of the appropriate formulation of purposes, presenting a systemic and teleological vision of FM.

Facilities and use

Architecture and engineering have had a great role in the development of the construction business in the last century, and this progress was significant and accelerated. The conception of corporate buildings has been made traditionally for some decades based in different hypotheses, generating different results. One can identify along the time, different priorities in the focus of building construction:

- Inputs (materials)
- Construction processes
- Differentiated products and systems
- Adaptation to the market
- Operational cost reduction
- Diversity of functions

In general, the users' needs have been overlooked in reason of technicalities and mistaken reasoning of costs. As so, the construction industry in Brazil has been producing buildings of different types, being conceived from different points of view, resulting from technical challenges according to the practice of the industry in different moments. This reveals an analytical and praxiological view in the treatment of the subject, with different approaches. The consequence of this behavior is that the majority of the buildings built until the 90's demanded adaptation to the users' real needs.

Buildings are means that should assist specific purposes of the interested parties. The identification of the users' needs gains greater importance for the creation of facilities that are, in fact, efficient means for the accomplishment of the business activities. Appropriate facilities must be adequate to the actual conditions of use and never limit the user by inconvenient facilities. This is only possible through the change of the FM approach, definitively given priority to the use and so, developing efficient and collaborative methods for the definition of the actual users' purposes.

The search of efficient means is only justified when the purposes of what is planned are well known. Therefore, when in the planning of the means and of the Corporate Facility Management (CFM) system, it should be recognized the complexity and nature of the considering systems, which demands appropriate methodology of approach. In first place it is necessary to organize ideas and then, the actions. The urgency and the anxiety are, usually, great enemies of the success in FM turning, frequently, *doing* more important than *planning*, resulting in excessively reactive FM operations, and focused just on the daily issues. It is important to put out "fires", but it is better that they don't happen. It is better to prevent than to remedy! This is made with planning, and the essence of the planning is the definition of ends and of the efficient ways to reach them. In this sense, the effective Facility Performance Management system is only made possible if starting from clear and objective definition of desirable references.

Effectiveness versus Cost of the space

The traditional approach in CFM has been the administration of the cost of the space, instead of focusing at the effectiveness of the use. There is need to enlarge and to modernize the vision of the role of CFM in the business context as lever and support of the core business. New concepts have been used in this sense:

- Applying systems approach in facilities planning
- Understanding the dynamics of the systems along the time (life cycle)
- Users' characterization and permanent identification of their needs
- Clear definition of the role of the facilities as factor of production
- Alignment of FM with the business strategy
- Incorporate FM concepts in normative, strategic, tactical and operational levels.
- Use of appropriate tools for the administration of the activities
- Continuous improvement of the services operations
- Minimization of the used inputs without quality loss
- Administration of facilities performance
- Definition of performance indicators
- Establishment of a Performance Measurement System

CFM can be well performed measuring the results of the accomplished activities and confronting them with users' expectations. However, without the correct definition of *expectations*, the actual performance of the system cannot be known. This process should be initiated before the conception phase, settling down general orientation documents, such as:

- SoR- Statement of Requirements
- OPR - Owner's Project Requirements
- BoD - Basis of Design
- KPI - Key Performance Indicators
- SLA - Service Level Agreements

The Total Building Commissioning process (TBC) presents itself as an appropriate tool for quality assuring of facilities along the pre-design, design, construction, and also in the facilities operation. It is emphasized at this point that the formulation of users' purposes, in several levels, assumes vital importance for construction and effective operation of facilities, because it turns possible the evaluation of facilities attributes, such as:

Comissionability	Maintainability
Serviceability	Productivity
Functionality	Accessibility
Safety	Sustainability
Operability	Reliability

Manageability: (costs, times, cycles, quality, conformity, satisfaction, performance, people, contracts.)

For that, it is convenient the application of the systems concept in the context of FM, as follows.

SOCIO-TECHNICAL SYSTEMS

The systems approach has been shown useful in countless applications in FM. In this work it is not intended to be exhausting in the treatment of the subject, but just to show the application of the concept of systems in the in the field of FM, particularly those related to purposes

The modern society is characterized by the coexistence, not always peaceful, involving objects and people, because almost everything that we do involves something produced by the man. It is common to use the term *man-machine system* where the mutual dependence accomplishes any action, which it is not possible of being accomplished for just one of the elements. It is like this, for instance, driving a Formula 1 car, where the performance of the group depends so much of the quality and of the performance of the vehicle as of the pilot's ability. The work of FM happens to the similarity of the Formula 1 teams, following up the performance of the group and acting readily when necessary. The performance depends on the action in the development phases, project, construction, test and operation, always seeking the joint performance of the object together with the individual.

Social-technical systems are systems in which people interact with objects, in a way to produce actions (work and communication) transforming matter, energy or information, in certain space, along the time. In this sense, Facilities and Organizations can be here understood as social-technical systems.

Facilities (man-building system) = Building (including FFE) + Services (Operational)

Organization (man-facilities system) = Services (Core business) + Facilities

Therefore, in the modern organizations it is impossible to dissociate the building and their equipments of the individuals that use them daily, without loss of efficiency and effectiveness. Every day the dependence of the objects increases, which requires the adoption of more consequent FM systems and a responsible and broader understanding of the managed systems. The knowledge regarding systems dynamics, as they are the socio-technical ones, can be obtained through the study of the following perspectives:

- Environmental (context of the system)
- Structural (elements of the system)
- Behavioral (process of the system)
- Functional (product of the system)
- Teleological (purpose of the user of the product of the system)

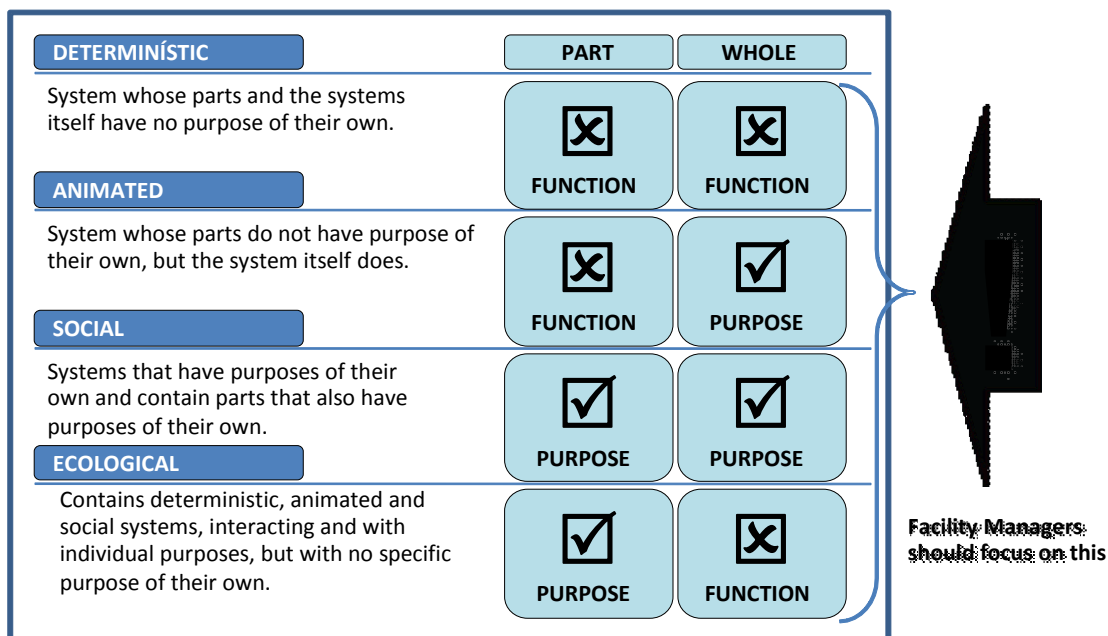
So that the knowledge is comprehensive and for the proper operation of the systems, there is need to identify and to harmonize environment, structure, process, function and purpose for all FM systems. In this work, the teleological perspective of the systems is emphasized, that, for its subjective nature and variety, brings more difficulty for the obtaining of success at FM operations.

SYSTEMS AND PURPOSES

In the organizations, as already said, objects and people interact continually. There is need to identify with more detail the objects and the people, while systems, seeking the appropriate formulation of purposes.

When the understanding is not just looked for ‘what’ composes a system and of ‘how’ a system behaves, but of the ‘reason’ of this behavior, a teleological study, or a study of the system purposes, is been made. The concept of *purpose* implies the possibility of choice, in other words, for a system to have purpose, it is necessary that the same has conditions of doing choices as much of means as of ends, in different environments. This choice depends on [i] cultural, [ii] rational and [iii] emotional aspects, being evident, therefore, the need of the existence of *people* in the system, so that the same can have *purposes*. As so, through choices, the systems with purpose can modify their ends, therefore elapsing the choice of the necessary ways for obtaining of these ends.

Once the existence or no of purpose in the parts of a system and in its whole is considered, a hierarchy of models of systems can be established (fig 01), according to the work of Ackoff, R. L. (1999). Once it is role of the facility manager the proposition of appropriate solutions for service of people purposes, it is essential that the same ones have an appropriate vision of each sub-system that composes the socio technical system of which makes part, their functions or purposes, establishing the appropriate treatment (means) for each problem depending on its nature.



01. Teleological analysis of FM systems

Figure

The socio-technical systems represented by the organizations and their facilities evolved in such way that the use of deterministic models' solutions doesn't produce efficient results. The facility manager erroneously consider, and usually do it, that each component of the socio technical system is a simple mechanism without purpose and usually tries to obtain the expected behavior starting from their parts, not from the whole view. This inadequate posture can be the origin of several problems experienced by FM professionals. It is of great importance therefore, that the FM professional makes a teleological study of the systems that the organization is composed.

Deterministic

In CFM, the systems considered deterministic are, essentially objects (buildings, machines and equipments), as well as the elements and pieces that compose them. These objects present certain and expected behavior (function), independent of choice, and they assist to the purpose of external systems. In this sense, the role of the facility manager should be to establish specifications for these systems and to control the operation in use, in agreement with standards and procedures. A typical example of this situation is the programming and control of the maintenance of the building systems and equipments according to standards and technical specifications.

Animated

The animated systems are organisms, whose parts just carry out functions (i.e. heart), and the whole has purposes (an individual). Like this, in the extent of CFM, the consideration on animated systems concerns the service of the individuals' functions (biological, physiologic, ergonomic), as for the service of these same individuals' purposes. For so much, it can be used the theory developed by Abraham Maslow, according to which the needs of the individuals to be satisfied are hierarchy-ordered from the most pressing to the least one. A person will try to satisfy the most important needs, first. Later, the next one and so on. In their pressing order, those needs are:

- physiological needs
- safety needs
- social needs
- esteem needs
- self-actualization needs

The facility manager owes, in this case, to identify the needs of the people while individuals, and to look for appropriate solutions for satisfying them. For that, it is convenient that similar groups of individuals with the same needs, such as same gender, age (child, elder) and special needs persons were identified in such way to facilitate the identification of the needs peculiar needs of each individual.

Social

A social system is composed by parts that have specific purposes (people) and the whole, in other words, the defined social groups in the organization, also have purposes. Like this, in this case, unlike the individual needs of people, the needs of the groups are identified in agreement with its purpose in the organization. The organizational purposes usually can be grouped in 4 levels:

- Normative
- Strategic
- Tactical
- Operational

Accordingly with these purposes, to the people (individuals) are allocated positions that identify them inside as a specific group of the organization, such as: shareholders, CEO & executives, managers, technical, administrative, staff. Therefore, studying purposes of each group, the facility manager should plan the appropriate means to satisfy those needs.

Ecological

The ecological system class regards systems whose parts present purposes or functions; however the group doesn't present a purpose by itself. Like this, it is treated as a larger system in which the deterministic, animated and social systems are integrated, however without assisting to a specific purpose. In this case, the facility manager can use the sustainability concept to study the organization, and to identify specific needs that should be satisfied, in the environmental, economical and community perspectives.

It is obvious the appearance, in an international extent, of standards and evaluation systems of the sustainability of the built environment and space, developed in the sense of minimizing the current environmental impacts of the facilities operations. However, it should be emphasized that such standards still privilege the environmental perspective of the sustainability, being usually given less attention to the economical and community perspectives. Regarding the economical perspective, the FM professional possesses a vast instrumental to calculate economic and financial indicators for the operation, which should be used as reference for monitoring and controlling their operations. As for the community's perspective, it is necessary to previously identify the organizational objectives regarding the community; the corporate image, vision and mission, and the way that the relationship of the organization with other external organizations is sensed.

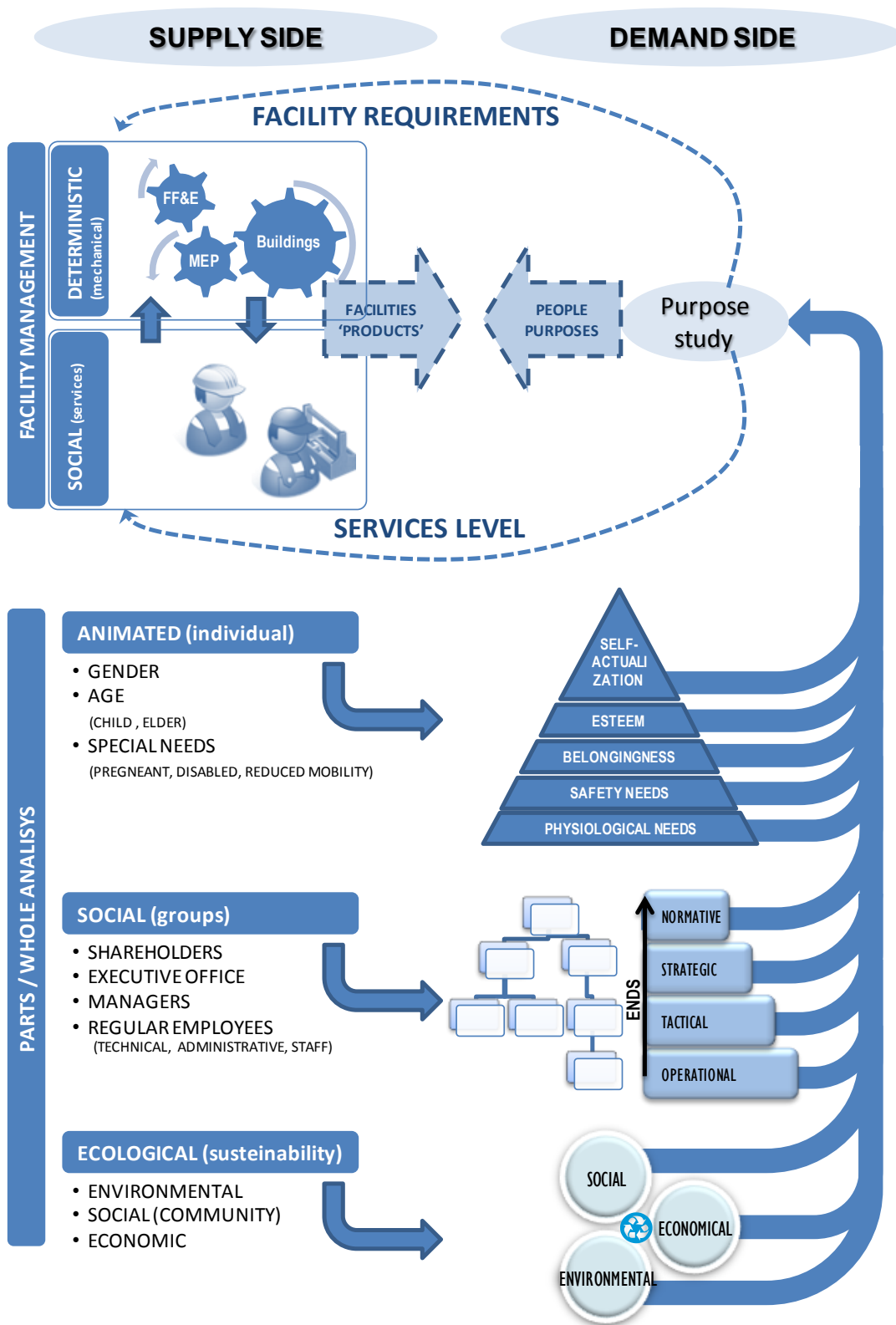


Figure 02. Teleological analysis: FM purpose identification and fulfillment

SYSTEMS MODEL OF CORPORATE FACILITY MANAGEMENT

The quality of CFM depends directly on the specification of the purposes and of the subsequent definition of the means to reach them. This strategic study defines the appropriate model of Facility Management to be implemented, as the definition of the purposes will serve as reference for the decision process for the solution.

This could be interpreted as *ends planning* and *means planning*. As ends planning, it is important to explain that, for Corporate Facility Management, the three types of organizational ends (ideals, objectives and goals) are needed, as for to get an accurate purpose identification and definition. Bad definition of purposes implies in inadequate facilities. Therefore, a systems view of the purposes of the system is very much needed.

Ends

After the identification of the systems elements and definition of the purposes, and only after that, the facility manager can efficiently plan the means to fulfill those purposes, or to attend the needs identified. Therefore, means planning involves the development of the plans needed to reduce de gaps between what the facility actually offers and the organizational needs. For that, and more specifically for the building and its parts (or the deterministic systems of corporate facilities), it can be used the serviceability concept (understood as the capacity of the means of a certain organization, for them to carry out the function or purpose for which they were designed or intended).

Functions

As for the *functions* of this system, one can use different criteria for classify all the different activities performed under the FM scope, but there are four categories that are commonly used for that: Technical Facility Management (hard FM), Support Services Management (soft FM), Commercial (managerial) Services, and Space Management.

Processes

The FM discipline involves a number of different functions, and one can understand it as a purposeful, information bounded system. Once the functions are established and categorized, with each scope defined, it is time to draw on the processes that should be used to provide those functions. Those processes can be *throughput processes* (directly related to the deployment of the FM services), and *organizational processes* (related to the alignment, integration and synergy among the systems' elements)

Structure

Finally, once the functions are defined and processes established, it is time to look at the structure that will give support to all of this. For that, a *multidimensional design* is best employed, as for it gives a clear view of the organization, the hierarchical relationship of authority and also the functions performed by the elements of the system.

Environment

The definition of ends, functions, processes and structure makes sense after an accurate diagnosis of the environment of the CFM system. This can be done before the ends definition but, it was not the authors' intent to discuss environmental issues in this paper.

CONCLUSION

Corporate Facilities Management system design is considered by the authors as the basis for good performance and purposes achievement, and this is very important to the success of a facility management operation. Adopting systems approach as a method to think about facility management is very useful, because it disciplines the thinking and creates a holistic view of the system considering all of its parts and its environment. The systems approach gives to the designer a complete knowledge of the system, and this imply in better facilities performance. The knowledge of the system is the basis to the establishment of good metrics, as a way to control and improve performance every day. A good metrics system needs also a computer system and a well defined process to assure that indicators are consistent and reliable.

The systems approach in facility management is the key to implement good operations that must be improved through continuously monitoring of the environment, the purposes, the functions, the processes and the applied resources, through good metrics and measurement systems.

Finally, to recognize the complexity and velocity of change of world affairs, and its effects in corporate real estate management, as well as use new concepts and modern methods to improve whole organizations performance, is the main objective of the responsible facility professional.

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