

SICOGEA Method as a Sustainability Calculation for Condominiums

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Abstract: This paper aims to improve the knowledge in environmental accounting for condominium management, developing a sustainability calculation which follows the method established by the Environmental Management Accounting System (SICOGEA). Therefore, a verification sheet was created, focused on the condominium reality, which allows the extraction of results from its environmental culture. Thus, the SICOGEA method was adapted and applied in a horizontal residential condominium in the city of Feira de Santana, State of Bahia, during April, May and June 2019, to verify whether the environmental sustainability index can be measured and determined. At the end of the study, the condominium sustainability index of 62.38% proves that, in addition to complying with the current legislation, there is a pursuit to value the environment, although there is still room for improvement in its environmental management. The research result clearly indicates the possibility of applying SICOGEA for condominiums.

Key words: condominiums, sustainability, SICOGEA

1. Introduction

A condominium, by concept, whether residential or commercial, refers to possession/ownership applied simultaneously by one or more people. So, this institute reflects the society where it operates, using rules and norms that regulate social, administrative and even financial relations.

In this context, the society's concern for concepts such as sustainable development, as well as the use of environmental valuation methods is observed. One of these methods is the Environmental Management Accounting System (SICOGEA) to calculate environmental sustainability in the business sector. SICOGEA is an environmental management tool, with emphasis on environmental accounting and controllership, with the purpose of generating

information to the manager about the impacts of the company's actions on the environment [1].

For that reason, in this article a verification will be developed on the possibility of establishing criteria that can calculate the environmental sustainability of a residential condominium and are based on the SICOGEA method.

In Brazil, people crave for safety, leisure and privacy. Consequently, the search for housing in gated communities has grown in the last 30 years. Several condominium models were created, such as horizontal, vertical and club condominiums with large leisure infrastructure, in order to meet the specific needs of the Brazilian population who can afford this housing option.

As Brazilian residential condominiums bring together a large number of people, environmental concerns need to be a priority. Thus, the question is: is it possible to develop, through the SICOGEA method, a pattern of application to the various condominium modalities? Does the application of the SICOGEA

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method in condominiums bring important results in resource sustainable management?

The adopted hypothesis is that SICOGEA adapted for condominiums can be useful from the point of view of environmental management and the appreciation of environmental culture actions in condominiums, since the method has already been applied to other business segments [2].

The study will use as theoretical reference the concept of environment present in the Brazilian Federal Constitution of 1988, Brazilian environmental laws and public policies, accounting principles of SICOGEA and the organizational prerogatives of Brazilian residential condominiums.

2. Material and Methods

The SICOGEA method was adapted and applied in a horizontal middle-class condominium with 210 houses and approximately 630 people in the Papagaio neighborhood of Feira de Santana, State of Bahia, during April, May and June 2019. The condominium has a leisure area that includes a swimming pool, a barbecue grill and a party hall, outsourced employees and a condominium manager who is also a resident and hires the services of a condominium management company.

It was also evaluated whether the condominium complies with the Brazilian environmental laws and if it has plans and goals that aim to improve the environmental sustainability. In addition, it was observed how environmental defense awareness is stimulated among the residents.

The sustainability percentage was assessed by a check sheet, which represents the first stage of SICOGEA third phase, containing questions based on six criteria: 1) Document Legitimacy (it checks if

there is formalization of the condominium and rules of coexistence appropriate to the environmental balance), 2) Products and Services Suppliers (it evaluates the choice for suppliers engaged with the environment), 3) Essential Services (it assesses energy consumption, water, waste generation and disposal), 4) Condominium Management (it verifies the qualification and financial availability for investments in environmental management), 5) Social Responsibility (it analyzes the relationship with society and financial sustainability), 6) Human Resources (it observes the appreciation of labor and employee legislation and the application of safety and occupational health standards).

It was established in the first criterion eight questions, in the second criterion seven questions, in the third criterion 12 questions, in the fourth criterion 11 questions, in the fifth criterion six questions and in the sixth criterion seven questions, which totals 51 questions. Each question has three-answer options for the researcher: A (adequate), D (deficient), and N/A (not applicable) [3]. There is also a space for observations deemed necessary, such as the fact that the condominium has not yet implemented selective waste collection, but it has future prospects for such measure.

The formula for calculating environmental sustainability is as follows: [4]:

$$\frac{QA (\text{adequates total}) \times 100}{QT (\text{items total}) - QN/A (\text{not applicable total})}$$

The priority criteria are set from the lowest to the highest percentage obtained with the above equation. The percentage obtained with the equation can be analyzed according to the following criteria [5] in Table 1:

Table 1 Environmental sustainability criteria.

Result	Environmental Sustainability	Performance: control, incentive, strategy
Less than 20%	Terrible	It may be having a big impact
Between 20.1% and 40.0%	Weak	It may be causing damage, but few initiatives appear
Between 40.1% and 60.0%	Regular	It meets legislation only
Between 60.1% and 80%	Good	In addition to legislation, it seeks to value the environment

Greater than 80%	Excellent	High environmental appreciation
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3. Results and Discussion

From the data analysis the condominium reached 62.38% of environmental sustainability which allows to classify its environmental sustainability as good. In other words, in addition to complying with the law, there is a pursuit for environmental appreciation. It is noteworthy that the main Brazilian legislations on the subject concern the National Environmental Policy of 1981 [6], Article 225 of the Federal Constitution [7] and the National Policy of Solid Waste of 2010 [8].

The Document Legitimacy criterion reached 100% of environmental sustainability which means the sixth and last priority order of environmental interventions in the condominium. In this criterion, considered as excellent, the records that prove the existence and regularity of the condominium rules are very important. The environmental thinking is perceived with the creation of some rules that limit the use of essential resources as energy, by regulating the use of the sports court, and water, by regulating the use of the swimming pool. The condominium, when it has its full postulatory capacity, may charge the compliance of its rules to its owners and these rules, provided they are registered, become opposable to third parties.

The Essential Services criterion reached 70% of environmental sustainability, which means the fifth and second to last priority order of environmental interventions in the condominium. This criterion, considered as good, includes the most relevant services for the condominium (second only to the legal and managerial parts) which are linked to public service providers. Thus, the relation of the condominium with the consumption of water, electricity and waste collection was verified. In all essential services there is some kind of sustainable procedure. However, the condominium needs to improve and plan measures for rainwater utilization as well as investing in solar energy.

The Products and Services Providers criterion reached 57.14% of environmental sustainability, which means the fourth priority order of environmental interventions in the condominium. This criterion, considered to be regular, is the hiring and provision of non-essential services. The questions answered showed attention to the specialties, purchase of recyclable and biodegradable products and use of personal protective equipment. The deficiency in this case is related to the technical training of the service providers, the seal and certification of the contractors.

The Human Resources criterion reached 57.14% of environmental sustainability, which means the third order of priority for environmental interventions in the condominium. In this criterion, considered as regular, the employees contribute and help with what is already defined in the ecological organization of the condominium. The adjustments are related to the workers' commitment to environmental projects and also to the care with their health and safety, since being healthy and fit to work demonstrates respect for this natural resource of the condominium. However, the shortcomings are related to courses and professional training for the employees in the environmental field.

The Social Responsibility criterion reached 50% of environmental sustainability, which means the second order of priority for environmental interventions in the condominium. In this criterion, considered as regular, the social interaction between the residents and the condominium with the region it occupies was evaluated. Some campaigns for proper use of water and electricity were verified, as well as proper disposal of construction debris. The interaction with the region, mainly, was considered deficient.

The Condominium Management criterion reached 40% of environmental sustainability, which means the first priority order of environmental interventions in the condominium. Considered as weak, it reached the lowest percentage. In this criterion, the condominium governing body will define the guidelines and take the

necessary adjustments. The biggest deficiency was in the context of environmental accounting, which was verified in the interview as something unknown.

The average environmental sustainability of the condominium was 62.38%, which proves that in addition to complying with existing legislation, the condominium seeks to value the environment. However, it also demonstrates that the condominium has much to improve in its environmental management. The majority of the non-compliance aspects concern the Condominium Management criterion, as all environmental accounting requirements were classified as deficient.

Thus, it is evident how recent is the consideration of sustainable management for condominiums. Despite the poor environmental sustainability of the Condominium Management criterion, one cannot detract from the merits of those leading the management of the condominium. On account of them, the other criteria achieved environmental sustainability higher than the regular reference.

The condominium management is wrong regarding the provision of environmental accounting management reports. This situation can be easily corrected if, from now on, the product of this research is taken into consideration.

4. Conclusion

From the study it was concluded that the objective was achieved, since the criteria proposed for the partial method SICOGEA had the appropriate application for condominiums.

Therefore, this study can be conducted in several other condominiums to measure their environmental sustainability. The intention is that from the results on environmental sustainability, decisions are made aiming at assertive environmental improvements.

With the application of SICOGEA, in its partial form, the bias of environmental culture practiced in the condominium is also extracted. Hence, it is perceived a great benefit to the researched group,

because its result may promote a behavioral change in the individuals that will affect the local society.

The SICOGEA method, in its partial form, is very suitable for measuring the sustainability of residential condominiums. It can be applied periodically for diagnosis and improvement suggestions through environmental management plans based on its information. T. N. Muza et al. (2014), F. S. da Rosa et al. (2008), J. Bacelo (2012), and K. E. P. Freitas (2015) [2-5] suggest, for example, summarized environmental management plans based on the 5W2H tool (What? Where? When? Who? How? How Much?), which is very interesting because it is simple and practical and can be applied beyond the business environment. However, the possibilities for preparing an environmental management plan are numerous, as in Refs. [9] and [10], and it is up to the condominium manager to use whatever is most convenient for the researched scenario.

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