

MANAGEMENT ACCOUNTING: MANPOWER CORRELATION AND SUSTAINABLE ENVIRONMENTAL PROJECTS IN THE CONSTRUCTION OF BRAZIL

Autoria

JULIANA ANDRESSA NEGRI

Ciências Contábeis/Faculdade Avantis

ALOISIO GRUNOW

CIÊNCIAS CONTÁBEIS/FACULDADE AVANTIS

EDSON FRANCISCO FLORIANI

ADMINISTRAÇÃO/FACULDADE AVANTIS

EDEMIR MANOEL DOS SANTOS

CIÊNCIAS CONTÁBEIS/FACULDADE AVANTIS

Resumo

A gestão contábil como ciência social, está em posição de contribuir positivamente no campo da proteção ambiental, através da interação dos dados econômicos e financeiros. O crescimento da população urbana tem gerado impactos negativos sobre o meio ambiente, a exemplo das inundações, que estão se tornando cada vez mais severas devido à impermeabilização do solo decorrente da ausência de um plano de manejo. O mercado da construção civil tem buscado novas possibilidades para o seu desenvolvimento em todo o país, destacando a sua importância e o impacto significativo que tem na modificação do meio ambiente. Entre os muitos projetos sustentáveis desenvolvidos nesse setor destacam-se os telhados verdes, o controle da água da chuva, bem como a promulgação do legislativo para a disseminação de edificações sustentáveis. O objetivo deste estudo é correlacionar à gestão contábil quanto à quantidade de mão-de-obra utilizada na construção civil em projetos sustentáveis na cidade de Balneário Camboriú, Santa Catarina, por meio de licenças expedidas pela Prefeitura Municipal. Quanto à metodologia utilizada, caracteriza-se como um estudo exploratório e descritivo com abordagem quantitativa. Assim, fica possível verificar que o montante de obras inicializadas no município, objeto do estudo tem uma relação direta com o volume exponencial de mão de obra utilizada em obras de natureza sustentável.

MANAGEMENT ACCOUNTING: MANPOWER CORRELATION AND SUSTAINABLE ENVIRONMENTAL PROJECTS IN THE CONSTRUCTION OF BRAZIL

AREA 10 - Sustentabilidade Socioambiental

Abstract

The management accounting as social science, it is in a position to contribute positively in the environmental protection field, with economic and financial data resulting from the interactions of entities that use the exploitation of the environment. The urban population growth has generated negative impacts on the environment, such as floods, which are becoming increasingly more severe because of soil sealing with the lack of a management plan of rainwater, and the excessive use of plumbing. The construction market has been seeking new possibilities for the development of the whole country, highlighting the importance of the construction and the significant impact it has on the modification of the environment. Among the many sustainable projects developed in construction highlight this work green roofs, control of rainwater and its funding, as well as the enactment of the legislature in order to disseminate environmental buildings. The aim of this study is to correlate by Management Accounting, the amount of hand labor used in construction with sustainable projects in the city Balneário Camboriú, Santa Catarina State, South region of Brazil, through permits expedited by Town Hall. As for the methodology used, it is characterized as an exploratory and descriptive study with a quantitative approach. Thus, it is possible to verify that the amount of works initialized in the municipality, object of the study has a direct relationship with the exponential volume of labor used in works of sustainable nature.

Key words: Management, Construction, Sustainability.

Resumo

A gestão contábil como ciência social, está em posição de contribuir positivamente no campo da proteção ambiental, através da interação dos dados econômicos e financeiros. O crescimento da população urbana tem gerado impactos negativos sobre o meio ambiente, a exemplo das inundações, que estão se tornando cada vez mais severas devido à impermeabilização do solo decorrente da ausência de um plano de manejo. O mercado da construção civil tem buscado novas possibilidades para o seu desenvolvimento em todo o país, destacando a sua importância e o impacto significativo que tem na modificação do meio ambiente. Entre os muitos projetos sustentáveis desenvolvidos nesse setor destacam-se os telhados verdes, o controle da água da chuva, bem como a promulgação do legislativo para a disseminação de edificações sustentáveis. O objetivo deste estudo é correlacionar à gestão contábil quanto à quantidade de mão-de-obra utilizada na construção civil em projetos sustentáveis na cidade de Balneário Camboriú, Santa Catarina, por meio de licenças expedidas pela Prefeitura Municipal. Quanto à metodologia utilizada, caracteriza-se como um estudo exploratório e descritivo com abordagem quantitativa. Assim, fica possível verificar que o montante de obras inicializadas no município, objeto do estudo tem uma relação direta com o volume exponencial de mão de obra utilizada em obras de natureza sustentável.

Palavras chave: Gestão, Construção civil, Sustentabilidade.

1. Introduction

Concern for the environment, as well as the degradation of the natural heritage, is approaching the society of companies. Although this is a new subject or by often complex, implies a series of difficulties in accounting, as noted in Tinoco (2010:123), "The terms of environmental accounting, green accounting or écobilan arise sometimes in professionals magazines accounting".

The construction industry is one of the segments of greatest expansion of the state of Santa Catarina, South Brazil, more precisely in the Itajaí Valley Region. It is evident that the current economy is in recession, however, contrary to the presented demand, real estate continues with interesting numbers. Economically, buying a property has always been pegged as a safe investment, thus the impacts in this sector, although eminent can be minimized. Though, what moves this study is the possibility of a direction of current projects to a sustainable presentation in the city of Balneário Camboriú/SC - Brazil.

For Neiva and Pozo (2005), covers represent similar options as the correspondence between passive strategies of energy capture and the various design features allowed by the standard practice. The construction systems must accommodate the prevailing mood, refusing a valid overall construction plan for any region and situation.

Having a sustainable world is not a choice that should be made, but an important decision to resolve the various economic, social, environmental problems, among others, currently found in the world. SOSTHENES (2011). Boosters' practices are actions taken to promote sustainability in construction. This study has among its objectives to survey with the Town Hall city of Balneário Camboriú Santa Catarina State/ Brazil and the requirements relating to sustainable projects established in the legislation for construction activities.

What is proposed would be the use of statistical models that could represent a simplification of reality, when we address numbers of environmental projects in vertical construction and the hand of volume of work involved in this process, which consequently would prove the evolution of the performance of accounting environmental this construction segment identifying the trends that are observed.

2. Theoretical framework

2.1 Environmental management accounting

Accounting is the record source, interpretation and business and government information. Notably entities is committed to transparency and ethics, providing its users a wide range of financial, economic, social and environmental information, which can be monetary and non-monetary nature.

The accounting shows through their statements, the potential benefits to industry and society, among others: identifies estimates, allocates, manages and measures costs, particularly environmental; it allows the most efficient use of natural resources, including energy and water; it provides information for decision making, improving public policy. (TINOCO; KRAEMER, 2004).

Traditional accounting has over the years adjusting the informational needs of the environment where it is located, one of the recent concern is with respect to environmental degradation, the sharp reflection of the greenhouse effect and the time needed to renew therefore arouses concern of accounting professionals in measuring and demonstrating this effect to interested users.

The Environmental Accounting now has new status branch of Accounting Science in February 1998, with the completion of "Financial Reporting and Accounting on Liability and Environmental Costs" developed by ISAR - United National Intergovernmental Working Group of Expert on International Standards of Accounting and Reporting. (TINOCO; KRAEMER, 2004).

Tibor (2006 apud BEER, FRIEND, 2005) confirms that the Environmental Accounting is an area of expertise of traditional financial accounting, an innovative sustainability initiative, which along with other environmental management procedures helps companies measure and improve the environmental impact of its operations.

The purpose of the Environmental Accounting is the publication of the performance of any entity or nonprofit highlighting the performance and attitudes to the environment, ensuring that costs, environmental assets and liabilities are recognized and identified in accordance with the assumptions of measurement. Ferreira (2003:41), determine objectives for the focus of environmental accounting and management when it states that "[...] is greater goal providing benefits to the company in excess, nullify or reduce the costs of degradation caused by the activities of the company and especially the productive area." There is a commitment of the companies to establish forms of management with explicit objectives of controlling pollution and reducing waste rates, minimizing environmental impacts and enhancing the use of natural resources.

According to Santos (2001) accounting, as a communication tool between companies and firms, may be inserted into the environmental cause. This valuation, considering the environmental risks and benefits inherent to the peculiarities of each economic activity, as well as its location, you can educate the various segments of users of financial statements for the administrative and operational management of the company, regarding the commitment of the company on the issue.

One of the contributions of accounting science to environmental issues is the disclosure of economic and financial information of an environmental nature, to better inform users about the effects of the entity's activities that directly or indirectly affects the environment and therefore the heritage of this entity; for that it is necessary to fulfill the identification procedures, measurement and recording of events related to this area, such procedures are the objectives of environmental accounting. (RIBEIRO, 2010).

2.2 Construction sustainable in Brazil

Sustainable development can be understood as one that meets the needs of the present without compromising the ability of future generations to meet their own needs (ONU, Brundtland Commission, 1987).

In Brazilian law, art. 225 of the Constitution of the Federative Republic of Brazil where it states that: "Everyone has the right to an ecologically balanced environment [...] which is binding upon the Government and the community the duty to defend and preserve it for present and future generations."

Willes (2008) states that define what is sustainable is easy, but to define what should really be, implies reviewing all the historical and cultural process of production of the built space, and economic and social.

Currently, it is common to find in the Brazilian real estate market supply of sustainable buildings said. In some cities of the country such as Rio de Janeiro and Recife

are already laws that establish the requirement for construction projects with sustainable contributions, seeks to minimize the long-term impacts.

2.3 Composition of sustainable projects in Brazil

2.3.1 Green roof

One consequence of the growth of cities is a decrease in vegetation cover, which has implications on the quality of urban life. In this context, we note the increase in the flow of water in water courses due to the sealing of the land contributes to massive flooding, the high rate of air pollution that fosters the emergence of heat islands generating expenses with air conditioning and excessive consumption of electricity. Therefore, generate a charged landscape of buildings, totally common dense and monochromatic in large cities. (CRUZ; LEONI, 2008).

Freitas (2000), the thermal properties of the urban construction materials also facilitate heat conduction faster than the soil and vegetation in rural areas, contributing to the increase in temperature contrast between these regions. The heat loss at night by infrared radiation into the atmosphere and into space is partially offset in the cities by the release of heat from buildings and streets. During the day, the tall buildings of the relatively narrow streets imprison solar energy through multiple reflections from sunlight. In the city, the rate of typically lower evapotranspiration further accentuates the temperature contrast to its surroundings.

Green roofs are known to convert the surface of a conventional roof in a multifunctional space, using, for this, the vegetation. The use of plants on the walls and roofs is one of the newest fields of environmental research and seeks to find an ecological and sustainable solution to improve the quality of urban life. A green roof consists of a soft substrate and suitable vegetation planted on an impermeable base. (WILLES, 2014).

According Baldessar (2012) in Brazil prevail two models of green roofs. A more extensive projects an underbrush mat on the slab of the building, ranging from 5 to 15 cm thick. Rarely exert excessive load on the structure. The greatest care is with the waterproofing of the slab and the drainage of accumulated water by vegetation. Already, intensive works as a hanging garden, including adding small trees. The thickness can reach 50 cm and results in structural overweight. In this case, it requires landscape design, accompanied by architectural plan and evaluation of civil engineers, if the building is built. On developments to be made possible, the project should include the green roof. Observed by several construction industry professionals, the green roof has some considerable benefits aimed at sustainability.

In recent studies can analyze that to achieve the established goals is important to consider the long-term, project green roofs would get only effective if applied in many projects simultaneously. Singer (2008) states that even though the amount of water retained by a green roof is measurable impact in the bowl of storm water drainage system would be the combination of a series achieve a significant.

2.3.2 Rainwater - Catchment of roofs in urban areas for non-potable

The concept of conservation of water by the Environmental Protection Agency of the United States Environmental Protection Agency - EPA addresses any beneficial reduction as the rational use of water resources, restricted to basically three levels: (1) the

conservation of water in the basin hydrographic, (2) conservation systems in public water supply and Sanitation, and (3) conservation in building systems. (EPA, 2004). Thus, according to the agency, water conservation actions in supply systems aim to minimize the loss of this feature.

In addition, as Borges (2003) losses may be of an operational nature or leaks, and occur in the section between the capture of raw water and the bridge of the economy.

Among some of the technologies used in environmental buildings we found to capture and store rainwater for use with non-potable purposes. Thus, the rainwater captured and treated, and can be used principally for non-potable purposes receiving treatment due established by law.

This standard provides the requirements for rainwater utilization coverage in urban areas for non-potable purposes, applying for toilets, irrigation of lawns and ornamental plants, washing vehicles, sidewalks and street cleaning, cleaning of patios, mirrors water and industrial uses. (NBR, 15527, RAINWATER/BRAZIL, 24.10.2007)

In a Brazilian study (EcoCasa, 2016) and, considering the climatic conditions of Brazil and its current water tariff, investment in a rainwater utilization system usually return in about two years for industrial monitoring and five years for residential. This return is calculated according to the savings that the system generates and can reach most of the cases in a 50% reduction in the volume of drinking water consumed in the municipal / local.

3. Methodological procedures

This article was produced with traces of an exploratory and descriptive study. Gil (2008) clarifies that an exploratory research is to develop, clarify and modify ideas and concepts. The same author adds that a descriptive research is concerned with describing the characteristics of a given population, a phenomenon or establishes relationship between the variables.

Because it is a complex issue and little explored by Accounting, the field research presents quantitative characteristics. For Marconi and Lakatos (2004) the quantitative nature of the research is linked to the statistical control of information in order to provide data for verification.

Beuren et al. (2003) report that the descriptive search within the object of study, identify its variables, report and compare, without further clarification, as hypotheses formulations. In this sense, the objectives to identify and describe the environmental projects in construction meet literature.

Hypothesis: What is the correlation between the volume of employee labor, work in construction with sustainable projects in South Brazil?

4. Background and analysis

4.1 Diagnosis: Construction sector in the state of Santa Catarina - south Brazil

What to expect for the construction industry from 2018? This question, which can be observed in various sectors in the Brazilian economy, has become relevant to different segments. However, contrary to this issue, the real estate sector continues with interesting figures on the volume of vertically integrated enterprises. Economically, buying a property has always been pegged as a safe investment, thus the impacts in this sector, although eminent can be minimized with today's investor profile.

To offer this product, the construction of the state of Santa Catarina - Brazil, bet on a conservative policy regarding the expansion of its investments, to be addressed. However, and according to data collected by the Union of Construction Industry - Sinduscon / SC (2017) there is steady growth in the number of buildings, according to figure 01.

Figure 01: Square meters built in the city of Balneário Camboriú/SC – Brazil.

YEAR	M ₂ CONSTRUCTED
2008	1.041.777,48
2009	822.971,36
2010	896.671,28
2011	874.423,45
2012	1.435.267,76
2013	1.670.656,63
2014	1.290.171,30
2015	1.090.369,69

Source: (CREA-SC, 2017).

In Santa Catarina, more precisely in Balneário Camboriú region is well known that we speak of a fully vertically integrated city, with an area of 47.000 square meters. In publication of the magazine Exame S/a (2015), the square footage can cost about US\$ 4000 dollars, behaving as the region of greatest value to a property in the state.

In this context, the policy of the region is signaling the execution of works with sustainable projects, seen in Organic Laws of the Municipality, as Law n°. 3533, (2012), and Law n°. 2505, (2005). Thus, the construction entities seek through projects such as capturing rainwater, green roofs or recycling of solid waste decrease environmental impact and add value to their products.

In the study sequence, and trying to answer the hypothesis of the research, data collection is initialized in the amount of Permits Construction, issued from 2008 to 2015 in the city of Balneário Camboriú/SC - Brazil, figure 02.

Figure 02: Licenses ART CREA-BCSC e Licenses Sent by the Town Hall of Bal.Camboriú/SC-BRA

YEAR	LICENSES ART	LICENSES EXPEDITED
2008	664	397
2009	568	216
2010	560	251
2011	602	290
2012	639	382
2013	354	236
2014	502	167
2015	445	192

Source: (Adaptation CREA-BCSC/ Brazil e Town Hall of Balneário Camboriú/Sc - Brazil, 2017).

Permits are mandatory documents to any initiative to construct a property, it is up to each civil engineer responsible for issuing a document titled ART, which must be presented to the CREA of the respective locality, though, and not all works with License

art. as for License Expedited, it is characterized as authorization in the project initialization process linked the city's Town Hall.

Among the licenses issued from 2008 to 2015, it was found growing startup projects with proposals for sustainability among the residential, commercial and commercial-residential buildings, seen in figure 03.

Figure 03: Licenses expedited by type.

YEAR	LICENSES EXPEDITED	COMMERCIAL	RESIDENTIAL	COM.RES.	SUSTAINABLE CONSTRUCTION
2008	397	84	219	94	128
2009	216	41	137	38	34
2010	251	46	149	56	54
2011	290	61	166	63	57
2012	382	78	162	70	79
2013	236	68	107	34	32
2014	167	57	80	28	17
2015	192	59	78	44	39

Source: (Town Hall by city of Balneário Camboriú/SC - Brazil, 2017).

Presenting the data was sought through a sample of 96 months explain the evolution of Sustainable Works from variables such as the number of permits issued in the covered period, followed by hiring volume of people following the civil construction.

According to the concept of correlation, found in Sell (2005), shows how far the values of a variable are related to each other, a co-relation proposed in figure 04.

Figure 04: Comparative table.

YEAR	SUSTAINABLE CONSTRUCTION	LICENSES EXPEDITED	ADMISSIONS EMPLOYEE
2008	128	397	360,75
2009	34	216	364,66
2010	54	251	430,50
2011	57	290	539,42
2012	79	382	549,41
2013	32	236	517,58
2014	17	167	501,58
2015	39	192	427,42

Source: (Adapted according to data from CREA-BC/SC, the Town Hall of Balneário Camboriú/SC - Brazil and Ministry of Labor and Employment-MTE, 2017).

In sequence, it applied a quantitative management model, known as Multiple Regression, causal explanatory statistical tool in the treatment of time series data. As their statistical base comes from the Linear Regression is restricted only two variables in a functional equation of the first degree, according to Martins (2001).

So mathematically, the relationship of these variables can be described by:

$$Y = a + bx_1 + cx_2$$

Y = Sustainable works evolution
a = Fixed technical coefficient
b = Technician variable coefficient number of Licenses Expedited
X1 = Permits issued
c = Technical variable coefficient labor hiring
X2 = Admission of employees in construction in the region

This methodology can be used to assess the effects of explanatory variables predictor as response variable, namely, present responses.

Figure 05: Variable analysis: Sustainable Works; issued permits; Number of admissions in the construction of the city Balneário Camboriú/SC.

SUMMARY OF RESULTS

Statistical Regression	
R multiple	0,336076321
R ²	0,112947294
R ² adjusted	0,093870891
Standard error	807,01048998
Comments	96

ANOVA

	<i>gl</i>	<i>SQ</i>	<i>MQ</i>	<i>F</i>	<i>F signification</i>
Regression	2	7712012,283	3856006,142	5,920785903	0,003798816
Waste	93	60567731,55	651265,9306		
Total	95	68279743,83			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>Stat t</i>	<i>value-P</i>
Intersection	40867,39983	291,1291021	140,3755225	4,5583E-110
Sustainable construction	-51,108245	17,250372	-2,9627329	0,0038712
Admission of workers in construction	0,564142233	0,54312052	1,038705429	0,301634801

	<i>95% below</i>	<i>95% above</i>	<i>Below 95,0%</i>	<i>Above 95,0%</i>
Intersection	40289,27513	41445,52453	40289,27513	41445,52453
Sustainable construction	-85,36406666	-16,85242517	-85,36406666	-16,85242517
Admission of workers in construction	-0,514387481	1,642671946	-0,514387481	1,642671946

Source: (Adapted , 2017).

The analysis of the results presented by the Multiple Regression, table 05, it is concluded that the dependent variable is presented by the development works in the city Balneário Camboriú/SC, also represented by the intersection worth 40289,27513. Independent variables first find the number of sustainable buildings by issuing their permits, which correspond to the volume of uninitialized works on a sample of 96 months

in the period January 2008 to December 2015, followed by the number of employee admissions in the sector.

The slope (b) verified by the number of enterprises in the region is 1, so the evolution of sustainable works, correlated with the initialized and resulting constructs the number of issued permits. For the slope (c) back to the number of employees hired each month in construction activity was found the number 1, so their employment is linked to activity to start up a sustainable work.

The number of permits issued has the range of 95% confidence values from 1, which indicates that zero is not contained, rejecting the null hypothesis that the slope is equal to zero. Thus, it is possible to verify that the amount of uninitialized works has a relationship with the works of sustainable nature. Still, it is estimated that the population of that can vary by 100% as the number of admissions in the construction of sustainable enterprises, which according to the model indicates none of this variable in the event.

In Stat t, the slope (b) of the sample is (12.0290758) deviations distant patterns of population coefficient. The region has a critical acceptance rate observed in (1,13687E-13), found (-1,13686837721616E-13/1 / 1,7857E + 15). This statistic magnitude for (Downing & Clark, 2006), tests the null hypothesis, where the values might reject or assign as true the value of the constant is zero.

In the Value P, we evaluate the hypothesis that the two samples have the same average (Downing and Clark, 2006) comparing the level of significance rejecting the null hypothesis. In other words, the value of F is the ratio between the model and error. In the table 05, estimated at 1,17662E-20 the Value P compared to (b) 0 and (c) 0. When a higher number to absolute zero, is rejected (b) and (c) under no circumstances " $h = 0$ "but" $h \neq 0$ ". According to Value P compared to the slopes, there is no influence on the startup works and manpower recruitment in the formation of sustainable buildings.

Measured by the R-Square Adjusted, is best result 1 following the same value for the R-Square, is 100%. In Sell (2005: 05) "[...] displays R^2 Adjusted coefficient of multiple determination to sample data, which is a measure of the degree of adjustment of multiple regression equation to the data sample." Also according to the author, a perfect fit is to $R^2 = 1$, that is, when the value of the R-Squared is as close to 1, resulting in a perfect fit, the case where the value is close to zero determines a model weak. Multiple factor in making the R-Squared is a measure adherence of multiple linear regressions for the submission of sample data.

Overall, this regression is missing (2,61982E-14) as seen in the standard error. The test provides a support $F = 1,67187E + 33$ indicating that regression has a positive pattern and the influence of the variables, volume of issued permits and hiring employees in the construction sector participation in sustainable construction.

5. Conclusion

This study sought through a statistical application known as multiple regressions; provide a tool for the benefit of environmental management accounting, body managers in the construction sector organizations in the city Balneário Camboriú/SC Brazil.

Following, every enterprise that intends to add environmental denotation in the production of housing units, should first of all submit to the new enforcement procedures. In the municipality covered by the survey, in addition to witness a representative estimate of the volume of completed buildings, their properties add high selling price when compared to other regions in the country. Another striking aspect was the presence of

legislative norms that encourage a new type of construction, found in the Laws n°. 2505/05 which deals with solid waste from construction and law n°. 3533/12 which establishes mechanisms for rain water harvesting.

What was proposed was the use of statistical models that could represent a simplification of reality, when we address numbers of environmental projects in vertical construction and the hand of volume of work involved in this process, thus demonstrating the evolution of the environmental accounting acting in this the construction segment, identifying the trends that are observed.

As for the proposed combination of sustainable works, one can observe a standard decision-making, after all, the tool "multiple R is 1" indicating a strong model. However, the perception, first observe a relationship between the startup of buildings and the growth of sustainable works. In employee hiring process there was little affinity with sustainable projects, as the indicators of statistical tool.

Thus, what is happening is that although labor is very important in the composition of the costs in environmental projects its effectiveness does not indicate a strong relationship.

Thus, if the standards remain the same, especially the legislative incentive as the formulation of laws which have this type of construction and the demand for differentiated vertical projects by entrepreneurs, multiple regressions can act as an important tool for aid decision-making process.

Reference

BALDESSAR, SILVIA M. N. **Telhado verde e sua contribuição na redução da vazão da água pluvial escoada** – Dissertação (Mestrado) – UFPR, Setor de Tecnologia, Programa de Pós-Graduação em Engenharia de Construção Civil. Curitiba, 2012.

BRAGA, CÉLIA (organizadora) **Contabilidade Ambiental: Ferramenta para a gestão da Sustentabilidade**, São Paulo. Atlas, 2007.

BRASIL. **Constituição: República Federativa do Brasil**: 1988. Brasília: Centro Gráfico do Senado Federal, 1988.

BEUREN, Ilse Maria (Org.) *et al.* **Como elaborar trabalhos monográficos em contabilidade**: teoria e prática. São Paulo: Atlas, 2003.

CÂMARA MUNICIPAL DE BALNEÁRIO CAMBORIÚ. <<http://www.camb.sc.gov.br/leis>>. Available from: 18/02/2017.

CONSELHO REGIONAL DE ENGENHARIA E AGRONOMIA DE SANTA CATARINA. <<http://www.crea-sc.org.br/portal>>. Available from:10/02/2017.

CORNÉLIO, SÓSTENES C. **Sustentabilidade no Setor de Construção Civil da Região Oeste do Paraná** - Dissertação UFPR, Setor de Ciências Sociais Aplicadas. Pós-Graduação em Administração, Curitiba, 2011.

CRUZ, W.; LEONI, A. **Coberturas verdes na região metropolitana de Curitiba – barreiras e potencial de estabelecimento na visão dos profissional da construção**

civil. Outubro de 2008. Programa de pós-graduação em Const. Civil, UFPR, Curitiba. Disponível em: <http://piniweb.com/datapini/bancomateriais/imagens/ENTAC2.pdf>>. Available from: 24 Jan. 2017.

DOS SANTOS, L. P. R., & de Souza, L. D. **Contabilidade Ambiental: uma contribuição da ciência contábil a sustentabilidade da gestão ambiental.** 2006.

ECOCASA <<http://www.ecocasa.com.br/aproveitamento-de-agua-de-chuva>> Available from: 20/05/2017.

ENVIRONMENTAL PROTECTIONS AGENCY. Guidelines for reuse. Technology Transfer Manual, EPA/625/R-04/108 September 2004, Washington D C.

SANTOS, Adalto de Oliveira et al. **Contabilidade ambiental: um estudo sobre sua aplicabilidade em empresas brasileiras.** Revista Contabilidade & Finanças, v. 12, n. 27, p. 89-99, 2001.

DOWNING, Douglas; CLARK, Jeffrey. **Estatística aplicada.** 2ed. São Paulo: Saraiva, 2006.

FERREIRA, A. C. de S. **Contabilidade ambiental: uma informação para o desenvolvimento sustentável.** São Paulo: Atlas, 2003.

FREITAS, Edmilson D. de; SILVA DIAS, Pedro L. **O Efeito da Ilha de Calor Urbana sobre os Fluxos de Calor Através da Utilização do Modelo RAMS (Regional Modeling Atmospheric System).** In: XI Congresso Brasileiro de Meteorologia, 2000, Rio de Janeiro - RJ.

GIL, Antônio Carlos. **Métodos e técnicas de pesquisa social.** 3. ed. São Paulo: Atlas, 1991.

MARTINS, Gilberto de Andrade. **Estatística geral e aplicada.** São Paulo: Atlas, 2001.

MTE – Ministério do Trabalho e Emprego. <<http://www.mte.gov.br>>. Available from: 10/02/2017.

NBR-15.527 < <http://licenciadorambiental.com.br/wp-content/uploads/2015/01/NBR-15.527-Aproveitamento-%C3%A1gua-da-chuva.pdf>>.

PREFEITURA MUNICIPAL DE BALNEARIO CAMBORIU. Secretaria Municipal de Planejamento e Execução. Balneário Camboriú, 2017.

REVISTA EXAME S.a. <<http://exame.abril.com.br/revista-voce-sa/edicoes/186/noticias/2015>>. Available from: 10/06/2017.

RIBEIRO, Máisa de Sousa. Contabilidade ambiental. São Paulo: Saraiva. 2010.

SELL, Isair. **Utilização linear como ferramenta de decisão na gestão de custos.** IX Congresso Internacional de Custos, Florianópolis, SC, Nov. 2005.<www.ime.usp.br>. Available from:15/02/2017.

SINDUSCON/SC - Sindicato da Indústria da Construção Civil: Perfil imobiliário de Balneário Camboriú e Camboriú. Balneário Camboriú- SC. 2013. 1. CD.

TINOCO, João Eduardo Prudêncio. **Balanco social e o relatório da sustentabilidade.** São Paulo: Atlas, 2010.

TINOCO, J. E. P.; KRAEMER, M. E. P. **Contabilidade e gestão ambiental.** São Paulo: Atlas, 2004.

TEIXEIRA, L. G. A. **Contabilidade ambiental:** a busca da eco-eficiência. In: CONGRESSO BRASILEIRO DE CONTABILIDADE, 16. 2000, Goiânia. Anais do XVI Congresso Brasileiro de Contabilidade. Goiânia, 2000.

WHITE, L. **Arquitetura Sustentável.** Publicado em 06.mar.2008. <<http://pt.shvoong.com/writers/louiswhite>>. Available from: 24 jan.2017.

WILLES, Jorge Alex. **Tecnologias em telhados verdes extensivos: meios de cultura, caracterização hidrológica e sustentabilidade do sistema.** 2014. Tese (Doutorado em Fitotecnia) - Escola Superior de Agricultura Luiz de Queiroz, University of São Paulo, Piracicaba, 2014. <http://www.teses.usp.br/teses/disponiveis/11/11136/tde-03122014-171411/>>. Available from: 2017-02-05.