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AN ACCOUNTING METHODOLOGY FOR DISCLOSING ENVIRONMENTAL ACTIONS: A STUDY ON THE SOCIAL FUNCTION IN EVIDENCE OF SURROUNDING ASSET PRESERVATION

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ABSTRACT

Discussions regarding the increasing degradation of the environment and its resilience capacity result in a debt incurred by societies and their social units. The use of Accounting Sciences to disclose economic and financial statements may serve as a means of evidencing the contributory actions of social units in relation to the environment. Accordingly, this study sought to identify environmental evidence of surrounding asset preservation in reports and economic-financial statements, through the application of the sociality function derived from the theory of systematic functions of aziendal assets. From a methodological perspective, the research was classified, in terms of objectives and approach, as exploratory, descriptive, qualitative, and deductive. As for procedures and techniques, it employed bibliographic and documentary research, content analysis, and multiple case studies involving social units with high environmental impact. Data were processed using spreadsheets in Microsoft Excel. The results indicated that most of the environmental actions disclosed remained within the social units and society, while the environment itself received only a few actions aimed at preserving surrounding assets, which were characterized as non-operational and long-term. As a scientific contribution, the study holistically emphasized the interactions between social units and the environment.

Keywords: Environment. Sustainability. Environmental Accounting.

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1 INTRODUCTION

The prevailing understanding until the past century was that nature was stable and unchanging, and that human beings were not part of the natural world—they stood outside and above it (Sangari, 2007). This premise contributed to an imbalanced evolution of the relationship between humans and the environment, widening the gap between "human societies" and the "non-human" world. This raises the question of how we can conceive the role of Accounting in supporting the environment, given that the loss of biodiversity is recognized as one of the most serious problems associated with the environmental crisis (Castree, 2001; Ferreira, 2017). With regard to environmental balance, Carson (2010, p. 209) describes it as "a complex, precise, and highly integrated system of relationships among living beings that cannot be ignored without risk." Humans and nature are deeply interconnected each affects the other (Botkin & Keller, 2011). However, the Rule of Law, as a human creation, has become detached from the environment, leaving nature at the margins of collective life (Thomas, 1988; Serres, 1991). According to Cavalcanti (2012), it is nature that sustains us, and upon which we ultimately depend. Economic activity, in the final analysis, is dependent on nature (Bebbington et al., 2021).

Companies, in turn, are considered the offspring of society, bearing both rights and responsibilities. Within them lies the object of study of Accounting: assets—not as isolated entities, but in their relational context (Sá, 2010). Accordingly, the theory of the systematic functions of aziendal assets, particularly the eighth function, the sociality function, presents the external world of the asset, in which the environment appears as both an agent capable of influencing the assets and as one that may be influenced by them. It is therefore essential to understand the relationship between assets and their environments in order to address the need to care for the surroundings of these assets (Sá, 2010). It is recognized that the social unit engages in exchanges with the broader whole, encompassing cultural, political, and natural dimensions, among others (Sá, 2010; Pineda et al., 2020; Mejía e Suárez, 2020).

Therefore, the sociality function has become relevant in identifying the logical relationships within the patrimonial phenomenon[1]. This includes exogenous environmental relationships—those that originate outside the "social unit" as well as those projected outward by the unit itself (Sá, 1997). Consequently, exploring environmental evidence of the social unit's contribution to the environment, through the lens of the sociality function, leads to the following research question: How can the sociality function contribute to revealing environmental practices aimed at preserving the surroundings of social units?

Traditionally, records related to land cleaning, energy, waste, and packaging offer analogs of financial volumes and resources; however, these may not reflect the true values and concerns regarding the environment (Gray, 2013). Thus, as noted by Souza et al. (2015), it can be concluded that, in practical terms of sustainability management specifically in the environmental dimension what is implemented and disclosed remains highly homogeneous. Its interpretation is hindered by the sparse and non-standardized format in which such information is presented in annual sustainability reports.

Thus, given this motivation, there emerges a clear need to further explore environmental evidence from within the "social unit," distinguishing between the entity's operational actions and non-operational environmental actions. According to Marion and Costa (2007), there is a need for a clearer definition of what constitutes operational and non-operational activities in relation to the environment. This convergence of knowledge (Black, 1999; Flippen, 2024) points to a unified effort toward integrating Accounting with the Environment (Adams & Kaffo, 2022), of which we

[1] The patrimonial phenomenon pertains to the essence of aziendal wealth, derived from direct or indirect factors, whether voluntary or natural to the entity, or involuntary or unnatural, whether external or internal (Sá, 2010, p. 186).

are integral parts (Lessem et al., 2016), whether as individuals or as part of a socio-environmental network to which we are inextricably connected (Will et al., 2021; Vázquez et al., 2020). This article is guided by a re-signification of the question (Parrott, 2017), moving beyond the traditional "USP-centric" epistemological axis (Silva, Bernardino & Gomes, 2017), and follows a critical epistemological foundation as the guiding line of inquiry (Colley, 2014; Lorenzini, 2016; Silva et al., 2017).

2 LITERATURE REVIEW

2.1 Accounting Postulates and Environmental Accounting

2.1.1 Accounting Postulates

The Going Concern Postulate is based on the assumption that entities are considered ongoing enterprises (Tinoco & Kraemer, 2011). For this reason, Iudícibus (2021, p. 27) refers to it as an environmental postulate of Accounting, summarized as follows: "for accounting purposes, entities are regarded as going concerns, unless and until there is evidence to the contrary." Thus, the so-called principle of going concern, according to Hoog (2021), stems from its influence on the economic value of assets. As part of the foundation of accounting, the going concern postulate, according to Iudícibus et al. (2009, p. 75), can be stated as follows: "for Accounting, the Entity is a living organism that will operate for an extended period of time."

The definition of the accounting entity involves identifying the economic unit that exercises control over resources and assumes obligations in conducting economic activities. The concept of entity can assist in determining the most appropriate way to present information pertaining to it (Hendriksen & Breda, 2010). It is within entities, through the actions of economic agents, that operations and events occur, taking into account the relationships among entities (Iudícibus et al., 2009).

The expressions "company," "entity," "azienda," "organization," "economic unit," "enterprise," "institution," and "business" are used deliberately; however, according to Sá (2010) and Pineda et al. (2020), they are not equivalent within the scientific doctrine of Accounting. The term "entity" was adopted by the fundamental principles of Accounting and, according to Sá (2010), is a partial concept. In contrast, the term "social unit" (célula social) encompasses companies, institutions, and even our homes, since whenever there is a purpose to fulfill, continuity of functioning within human society, people, and assets, there exists a social unit . Thus: "A social unit is a dynamic organization that continuously interacts with the environments or surroundings in which it is embedded. It is composed of people and assets, and it pursues clearly defined objectives aimed at meeting human needs of various kinds." (Sá, 2010, p. 156).

With regard to interactivity in environmental relationships or surroundings, the concept of "entity" does not explicitly advocate such interaction, although an internal relationship is implied. In contrast, the concept of "social unit" refers to internal (endogenous) and external (exogenous) relationships, thus characterizing an open and holistic structure, whereas the "entity" is situated within a closed, systemic, and fragmented structure (Sá, 2010; Pineda et al., 2020). In terms of formality, the concept of entity refers to a legally constituted organization, while the social unit may be legally and/or socially constituted (Sá, 2010).

2.1.2 Environmental Accounting

Thinking in a sustainable and environmentally responsible manner requires changes that incorporate the essence of socio-environmental concern (Bandeira, Ott, & Rover, 2022). In the early stages of Environmental Accounting, explicit attention was devoted to the concept of "nature" and the kind of relationship that individuals and society could establish with the natural

world (Bebbington, 2021; Burritt, Schaltegger & Christ, 2023). It was from the 1960s onward that accounting debates related to the environment gained prominence, due to the negative environmental impacts caused by corporations. Academic works also sought to address the external environmental effects of business activities (Bebbington, 2021). Of particular note was the growing scientific and political awareness of issues related to ensuring the integrity of environmental systems such as the 1962 publication of Rachel Carson's Silent Spring, which documented the previously underestimated effects of pesticides (Bebbington, 2021).

The development of environmental accounting intensified in the 1990s, especially following the Eco92[2] Summit. In South America, this evolution was particularly notable in Brazil, Colombia, and Argentina (Villegas, 2009; Carvalho, 2020). Accountants, research institutes, professional bodies, and government agencies in various countries began conducting studies to develop new methodological procedures or improve existing ones, with the goal of obtaining financial information related to the environment and to entities. The implementation of a conceptual framework for environmental accounting within social economy enterprises may represent an opportunity for these organizations, as well as a means of contributing to the achievement of sustainable development goals (Gray, 2013; Carvalho, 2020; Prieto & Yzaguirre, 2021).

Environmental Accounting is a branch of Accounting Science focused on the environmental domain or category (Khan, Bose, Mollik, and Harun, 2021; Tian, and Sarkis, 2023). According to Hoog (2021), among its objectives, Environmental Accounting engages in the "recognition and recording of environmental acts and facts," [3], as well as in demonstrating and disclosing the company's interest in and policies toward the environment, making sustainability one of its cornerstones. According to Sultanova et al. (2020), Environmental Accounting is a tangible tool for the implementation of sustainable development and also a requirement for corporate social responsibility. However, there is still a need to ground the environmental dimension within traditional accounting, which, in its conventional approach, remains largely unaware of this perspective and is limited to recording the existence and flow of economic assets within companies (Soto et al., 2014).

The complexity of the environment underscores the challenging relationship and quantification—particularly valuation—which is a fundamental and technical element necessary for the composition of accounting records and their subsequent disclosure (Gray, 2013; Jones & Solomon, 2017; Carvalho, 2020). The subjectivity involved in valuing interactions with the environment should not be recognized in the balance sheet (Carvalho, 2020). For this reason, conventional accounting commonly referred to as financial accounting continues to operate within the defined boundaries of the entity and is limited to recording transactions that are monetarily priced (Gray, 2013). The theoretical field concerning capital remains rooted in an economic perspective (Furtado & Panhoca, 2021).

According to Prasetyaningsih, Sutoyo, and Sujatmika (2025), the original comprehensive structure of environmental accounting remains a catalyst for research in the field, particularly studies grounded in the pragmatic ideal of enhancing environmental and sustainability performance in practice.

Companies may choose to adopt a position of environmental remediation, which, from an accounting standpoint, entails the internalization of expenses based on ethical or moral

[2] Eco92 Second United Nations Conference on Environment and Development (Carvalho, 2020).

[3] Administrative acts are management procedures carried out by administrators that do not alter the equity value. Instead, they are measures intended to facilitate the circulation of resources in pursuit of a result the objective of the social entity. When an action alters shareholders' equity, it constitutes an accounting event rather than a mere administrative act (Hoog, 2021, p. 55).

considerations—such as cleaning up a degraded area for reputational reasons or in favor of nature itself (Ferreira, 2011; Buckley & Enderwick, 2025).

Regarding the quantitative recognition of natural resources, there is no established guideline, unlike the recording of financial data, which is capable of reporting corporate performance to various stakeholders (Montero & Betancur, 2018).

Therefore, environmental accounting remains a field with numerous unresolved theoretical, organizational, and methodological issues (Sultanova et al., 2020).

2.2 Theory of the Systematic Functions of Aziendal Equity

Considering the doctrinal evolution and the inclusion of new aspects as subjects of inquiry, Sá (2010, p. 415) had originally acknowledged only seven systems within the Theory of the Systematic Functions of Aziendal Equity. However, influenced by two Brazilian researchers, Professor Valério Nepomuceno and Professor Dílson Cerqueira da Silva, an eighth system was later incorporated, referred to as "Sociality." The entire theory is developed on a systemic foundation, which accounts for its characteristic of systematic evolution.

The scope of the *social* in *Sociality* refers to the physical measurement of the social unit's capacity for interaction (Mejía & Suárez, 2020). Social units maintain a close relationship with state, social, environmental, and cultural dynamics, reflecting both endogenous and exogenous relationships that go beyond economic considerations. These dynamics encompass more than human interaction, well-being, and wealth distribution (Mejía & Suárez, 2020). Thus, in the *Sociality* system, the focus lies on fulfilling the need to assist the patrimonial surroundings—investments aimed at improving the agents that influence wealth and meeting the needs within which that wealth is situated (Sá, 2010).

Accordingly, given that the social unit is embedded within a broader context—one characterized by a social consciousness that is in constant motion and transformation—an additional patrimonial necessity has been recognized: *Sociality*, which represents the imperative to fulfill a determinism that exists beyond the individual and affects human micro-aggregates (Sá, 2010).

The patrimonial phenomenon has thus been studied in association with three major categories of relationships, conceptually defined as essential, dimensional, and environmental (Sá, 1997; Sá, 2010; Pires & Marques, 2016).

Therefore, the Theory of the Systematic Functions of Aziendal Equity indicates that its functions either influence or stem from equity, with varying effects depending on the level of the systems involved basic systems (liquidity, profitability, stability, and economic efficiency), auxiliary systems (productivity, invulnerability), and complementary systems (elasticity and sociality) (Sá, 2010; Pires & Marques, 2016).

Moreover, according to Sá (2010), equity is permanently influenced by various environments—whether external or exogenous. The author identifies exogenous environments as ecological, social, political, economic, technological, educational, and legal. In addition, external or endogenous influences also emerge from within the aziendal world, particularly as a result of managerial decisions and personal actions. Thus, the relationships that originate from the external world are classified as: (I) more distant (exogenous), and (II) closer (endogenous) (Sá, 2010).

In this sense, it is a flow that enables the circulation of wealth from the social unit to the broader social wealth an emigration from the individual to the collective. "In the Sociality system, the aim is to fulfill a need to assist patrimonial surroundings" (Sá, 2010, p. 419). Since the social unit is part of the larger social organism, it can be inferred that what benefits the whole also tends to benefit the part, even though the effect of the contribution may not always result in a direct return for the contributing Entity (Sá, 2010).

3 METHODOLOGICAL PROCEDURES

This study is characterized as exploratory in terms of its objectives, as it pertains to the field of Environmental Accounting, which requires further methodological development (Lakatos, 2017; Sultanova et al., 2020). It is a doctoral research project, conducted over a period of four years, encompassing the development of a theoretical framework and its application through documentary analysis. It is also descriptive in nature, as it seeks to identify the characteristics and issues related to the disclosure of environmental events (Almeida, 2014; Gray, 2013; Jones & Solomon, 2017; Carvalho, 2020). With regard to its approach, the study is predominantly qualitative (Michaliszyn & Tomasini, 2008; Almeida, 2014; Lakatos, 2017). Additionally, the research adopts a deductive reasoning method, starting from the Theory of the Systematic Functions of Aziendal Equity, specifically the eighth function Sociality to predict the occurrence of particular phenomena (Sá, 2010; Lakatos, 2017).

With regard to research procedures, this study is both bibliographic and documentary, as it draws upon organizational documents such as the Balance Sheet (BS), Income Statement (IS), Explanatory Notes (EN), and the Management Report (MR). Depending on the reporting model adopted by the entity, it also includes either the Sustainability Report (SR) or the Integrated Report (IR), as disclosed in the years 2020 and 2021. This characterizes the study as ex post facto, in which the data collected refer to past publications and cannot be subject to interference (Almeida, 2014). Additionally, the study is classified as a case study, as it enables the observation and understanding of the reality of a group composed of 10 companies (Yin, 2010; B3, 2022).

Regarding the research universe, it consisted of 33 companies categorized within the basic materials market. The sample was narrowed to ten companies, selected based on their classification under Level 2 Corporate Governance and the Novo Mercado segment. According to Bm&Fbovespa (2008), the Novo Mercado requires greater transparency compared to Level 2 and mandates that companies comply with rules similar to those of the Novo Mercado.

The sectoral classification and sample companies, according to B3 (2022), were as follows: a) wood and paper: Klabin S.A., Duratex S.A./Dexco S.A., Suzano S.A.; b) chemicals: Vittia Fertilizantes e Biológicos S.A., Fertilizantes Heringer S.A.; c) steel and metallurgy: Parapanema S.A.; d) packaging: Irani Papel e Embalagens S.A.; and e) mining: CSN Mineração S.A., CBA – Companhia Brasileira de Alumínio S.A., and Vale S.A. According to Law No. 10,165 (2000), these sectors are classified as having a high environmental impact.

For data collection, investigative variables were used (Almeida, 2014), meaning terms that capture information related to the company's interaction with the environment. The variables identified were drawn from the CFC resolution (2004) and included: environment, environmental (plural and singular), ecology, legal reserve, preservation, restoration, and education. It was also necessary to develop a research variable referred to as “context reading,” aimed at identifying excerpts referring to company-environment interactions not explicitly covered by the previously defined variables. The association of context units with recording units was based on the theoretical framework presented in Figure 1, as well as on the researcher’s interpretation, which, according to Bardin (2016), may fluctuate between the rigor of objectivity and the richness of subjectivity.

Figure 1
Definition of recording units, conceptual basis, and context unit

Recording Unit	Adopted Theoretical Framework		Context Unit
Operational	Investments and expenses related to maintenance in operational processes aimed at environmental improvement;	Operating expenses can be understood as those necessary for the performance of a company's core activities (Maracrida, 2019).	The text is segmented based on the recording unit.
Non-operational Exogenous Sociality (society).	Investments and expenses for environmental education targeting employees, contractors, freelancers, and the entity's administrators; Amounts of fines and compensations related to environmental matters, determined through administrative and/or judicial decisions; Environmental liabilities and contingencies;	Non-operating expenses, although common, are those that do not form part of the company's main objectives and may be considered complementary to its core activities (Maracrida, 2019). According to Sá (2010), equity is subject to ongoing influences from various environments, whether external or exogenous. Exogenous environments include ecological, social, political, economic, technological, educational, legal, and others. Additionally, the aziendal world gives rise to external or endogenous influences on wealth, especially those stemming from managerial decisions and personal actions. The author concludes that these relationships originate from the external world, whether in a more distant or closer scope, as described: "these relationships originate from the external world that surrounds wealth: I – the more distant (exogenous), and II – the closer (endogenous)" (Sá, 2010, p. 186).	
Exogenous Sociality (environment).	Number of environmental proceedings, both administrative and judicial, filed against the entity; Investments and expenses for environmental education targeting the community; Investments and expenses for the preservation and/or restoration of degraded environments; Investments and expenses related to other environmental projects.		

Source: Adapted from CFC (2004).

Accordingly, a structured database was created using Microsoft Excel, containing the following fields: company, sector classification, year, research variable, recording unit (operational, non-operational endogenous, exogenous sociality – social, influential/defluent; exogenous sociality – environment, influential/defluent), material, instrument, page, and context unit. The identification of the context unit based on previously defined recording units was carried out by assigning a value of 1 (one) for associated and 0 (zero) for not associated, composing, according to Bardin (2016), the content analysis as a set of communication analysis techniques.

4 RESULTS AND DISCUSSIONS

As dez células sociais, antes de suas existências factíveis, passaram pela mente humana em decorrência da percepção de uma necessidade, compondo a relação lógica essencial, tornando-se filhas da sociedade (Sá, 2010; Pires & Marques, 2016), conforme Tabela 1. Já o continente da

relação lógica dimensional envolve a célula social, o local onde o patrimônio atua em constante movimento, sob um contexto hierárquico, em limites denominados de endógeno (Tabela 1). Segundo Sá (2010), os fatores dimensionais sempre foram objetos de observação da tecnologia contábil. Em complemento, Pires e Marques (2016) pontuam que a análise das relações lógicas dimensionais possibilita identificar a origem do evento, o que resultou dele, a caracterização dos elementos entre si, a medida do fato, a época de sua ocorrência e o local em que ocorreu.

Table 1
Operational and Non-Operational Endogenous Environmental Evidence, and Exogenous Social and Environmental Evidence

Essential Logical Relationship	Dimensional Logical Relationship		Environmental Logical Relationship		Totals
Social Unit	Operational	Non-operational	Exogenous Social Sociality	Exogenous Environmental Sociality	Years 2020 and 2021
Irani S.A.	29	15	16	4	64
Duratex S.A / Dexco S.A.	43	42	11	2	98
Klabin S.A.	33	14	25	9	81
Suzano S.A.	46	33	13	6	98
Companhia Brasileira de Alumínio	53	23	5	9	90
Vale S.A.	39	51	10	30	130
CSN mineração S.A.	41	22	8	33	104
Vittia Fertilizantes e Biológicos S.A.	23	25	1	0	49
Fertilizantes Heringer S.A.	16	2	0	0	18
Paranapanema S.A.	20	16	3	0	39
Totals	343	243	92	93	771

Source: Research data, 2024.

Also within the dimensional logical relationship, it was possible to observe two "continents": the "continent" of patrimonial actions and the "continent" of actions on the patrimony representing, respectively, the operational and non-operational environments. For this reason, Sá (2010) notes that from the aziendal world emerge external or endogenous influences on wealth, particularly those resulting from administrative decisions, classified as non-operational, such as the one reported by CBA (2020b, p. 92) regarding waste management: "in 2020, a specialized team for coproduct management was created to enhance the environmental and financial gains from these materials." This contrasts with operational actions, such as the one reported by Vittia (2021b, p. 81): "environment – water and effluent: in this way, we ensure an environmentally appropriate destination and reuse part of this water in the production process."

Therefore, the dimensional logical relationship encompassed both operational and non-operational domains, represented respectively by direct and indirect actions. It is within this dimensional logical relationship that CFC (2004) established the notion of "interaction" between the entity and the environment. In this interaction with the environment, one can observe the difficulty of establishing valuation methods to account for the environmental impacts associated with business activities, due to the complexity of environmental systems (Lomas & Giampietro, 2017; Ribeiro, 2010; Jones & Solomon, 2017; Pietro, 2020). As a result, the subjectivity in valuing the interaction between the entity and the environment remains.

Marion and Costa (2007) had already highlighted the need to better define what constitutes operational and non-operational activities related to the environment [4]. Thus, there are 343 operational pieces of evidence identified within the dimensional logical relationships, and 243 are classified as non-operational actions within the same framework. Together, they total 586 instances, representing 76% of the data.

As examples of operational evidence, we highlight Duratex (2020b, p. 94): "effluents are discharged in accordance with the conditions stipulated by environmental regulations [...] meeting the required parameters and the characteristics of the receiving water bodies." Also, in the case of CBA's environmental disclosures (2021a, p. 76): "environmental provisions [...] established environmental policies and procedures aimed at complying with environmental laws." With regard to non-operational actions, CBA (2020b, p. 90) reports: "[...] a recycling task force is responsible for planning, approving the purchase and sale of scrap, and managing related actions and inventory".

Thus, the environmental expenses outlined by Ribeiro (2010) and Tinoco and Kraemer (2011), such as contamination prevention related to operational activities; waste and discharge treatment; emission treatment; decontamination; restoration; auxiliary materials and service maintenance; equipment depreciation; environmental exhaustion; personnel involved in production; development of cleaner technologies; environmental auditing; purchase of inputs and anti-pollution equipment; or even performance reports on the use of elements such as water, energy, carbon, and emissions (Bebbington et al., 2021; Charnock et al., 2021; Russell, 2021), constitute operational expenses and occur alongside the operations of social units.

Environmental actions that are non-operational are also genuinely endogenous, similar to operational environmental actions, and belong to the dimensional logical relationship, though they do not make a successful contribution to the environment. However, they can be associated with environmental management [5], and help compose sustainability indexes.

Considering that social units are connected to the external world, exogenous relationships exist within the "continent" of the environmental logical relationship (Table 1). According to Sá (2010) and Padoveze (2012), these influences tend to lie within the "continent" of societies and influence wealth. The relationships with the external environment, exogenous and referred to by the CFC (2004) as society, were identified as non-operational actions, categorized as exogenous sociality, totaling 92 actions, with a predominance in the cultural and socio-environmental areas. This is reflected in evidence from Klabin (2021a, p. 31): "[...] 14 cities are benefited by the initiative, with more than 600 properties receiving technical consulting and over 2,000 people involved [...] more than 200 training activities." Similarly, CBA's evidence (2020b, p. 118) shows: "in the activity of spring and public park restoration, over 50,000 trees were delivered to various municipalities in Goiás," and evidence from CSN (2021b, p. 138) highlights: "[...] 4,424 people were attended to in environmental education initiatives through 153 activities conducted throughout the year".

Finally, as in the third tier, the evidence of non-operational actions, referred to as exogenous environmental sociality (Table 1), totals 93 actions, characterized as investments in the environment. One such example is the Reserva Particular do Patrimônio Natural (RPPN) de Monte Alegre, located on the Monte Alegre Farm in Telêmaco Borba, Paraná (Klabin, 2020b). According to Klabin (2020b), this area is designated for scientific research and the protection of local biodiversity and water resources. Similarly, CBA (2021a, p. 100) states: "[...] it is one of the

[4] Economically, the environment is considered a source of common resources (Cechin, 2010; Cruz et al., 2018).

[5] Several management systems have emerged to control the performance of industrial processes and activities, such as the Total Quality Management (TQM) system, the Environmental Management System (EMS), and the Socio-Environmental Management System (SGSA) (Kassai et al., 2019, p. 224).

founders of the Legados das Águas (31,000 hectares of Atlantic Forest in São Paulo).” The institution also established a perpetual environmental servitude: “[...] carried out in already preserved native areas, preventing any environmental intervention” (CSN, 2020b, p. 88), as well as Areas of High Conservation Value (AAVCs), which, according to Irani (2020b, p. 137), “[...] are areas with high biodiversity presence and conservation, including native restinga vegetation that stabilizes sand dunes, of great regional importance and representativeness.” Furthermore, according to CSN (2021b, p. 112), “[...] Integral Protection Conservation Units (Serra do Ouro Branco State Park - Ouro Branco - MG).” These actions have materialized the environmental evidence of social units as providers of environmental investments, with benefits that may be communal, including other forms of life, predominantly non-operational.

Consequently, the maintenance of the surroundings constitutes the satisfaction of a need within the sociality function. Therefore, the entity benefits the surrounding environment in which it is embedded, but the surroundings also benefit the entity, in a process of constant interaction that includes the natural, cultural, and social dimensions (Sá, 2010; Prieto & Yzaguirre, 2021). The maintenance of the surroundings is considered a premise of the accounting postulate of Continuity (Tinoco e Kraemer, 2011; Carvalho, 2020; Iudícibus, 2021).

4.1 An accounting methodology for recording exogenous environmental actions

Thus, for an accounting entry to occur, the existence of five essential elements is necessary (Carvalho, 2020), as well as the interaction with the environment, which presupposes a subject that elevates it to the condition of an accounting entity (Cuckston, 2017). The interaction referred to here is based on the acquisition of resources; if these resources are derived from the environment, the entity's figure does not exist. When the valuation of the acquisition operation is mentioned, the lack of a defined guideline emerges, as seen in the recording of financial data (Montero & Betancur, 2018). The evidence of contributory environmental practices—"capacities to generate future benefits"—and the maintenance of the surroundings of entities, evidenced as exogenous environmental actions (according to Table 1), are defluent actions that originate from the entity but also have community effects. These practices found the main elements for composing the record, given the intermediary representation with the environment, whether it is fixed assets or the personification of agents.

Thus, in the evidence of an exogenous environmental sociality action, defluent, as found in the report by Irani (2020b, p. 132), which states: "Created in 2018 by Ordinance IMA No. 83/2018, the Private Reserve of Natural Heritage (RPPN), Prof. Yara C. Nicoletti, has 285 hectares of well-preserved native vegetation typical of Mixed Ombrophilous Forest [...]", we find, by analogy, the five essential elements: 1) location and date “Vargem Bonita - Santa Catarina, 2018”, account to be debited “environmental asset”, account to be credited “source of resources”, historical note “RPPN”, and the amount spent on the reserve “all expenses, including acquisition costs and necessary expenses”.

Similarly, the same essential elements required for accounting records can be found in the statement made by Irani (2021b, p. 109), referring to “the seedlings are donated to the local community upon request, with the purpose of enriching and restoring areas designated for environmental preservation [...]”. The five elements present are: location and date “local community, in 2021”, account to be debited “non-operational expenses related to the environment”, account to be credited “native seedling inventory”, historical note “donations for environmental preservation in the surrounding community”, and, finally, the value “cost of the seedlings”. It is observed that the transacted entities refer to the company Irani S/A, and the other is the requesting entity, whether an individual or legal entity, with a requesting party.

The maintenance of the surroundings can be characterized as a holistic approach to the socially constituted accounting entity. According to Bebbington et al. (2021), similar research on

defluent actions considered a river and its watersheds as a "relationship entity," with the parties operating around this "entity" producing a variety of reports.

The Private Reserve of Natural Heritage (RPPN), according to Law No. 9,985 (2000) and Decree No. 5,746 (2006), can be created through a voluntary act by the property owner, who undertakes the commitment to conserve local biodiversity in perpetuity, through a commitment term registered in the property's land title. According to Broering (2011), the intense social changes and their consequences on the landscape, which affect the surrounding areas of Conservation Units, are unquestionable. The RPPN is detached from economic entities in the records of entries, focusing instead on the outflows directed towards contributing to the environment, as part of the sociality function, which includes maintaining the environmental logical relationship continuum. The benefits, in part, can be communal. Thus, the asset represents one of the most important items for accounting, and, according to Iudícibus (2021), it is tied to the multiplicity of relationships. With the goal of conserving the environment, revenues and expenses, termed environmental, are obtained, defined by the nature of the asset, making it non-operational.

5 FINAL CONSIDERATIONS

By observing the sociality function, whose scope is social, it directed environmental actions with effects and reach extending beyond the social units. The evidence of environmental actions demonstrated a two-way path, where one path traditionally focuses on the capture of natural resources, accounting for 76%, which highlights the lack of objectivity in valuation. The other path was oriented towards investments in social matters, including the environment, which, when combined, account for 24%. The path aimed at capturing resources focused on the operational aspect, while the path for investments in social matters remained in the non-operational domain with community effects, focused on the long-term maintenance of the surroundings.

The evidence of investments was made possible through the "lens" of the sociality function, where the maintenance of the surroundings, such as the existence of RPPNs or Areas of High Conservation Value, with actions considered to have a perpetual nature, also took into account other forms of life. It was also possible to identify other environmental actions with a societal application, where indirectly, through the characteristics of actions titled as environmental education, the environment tends to be reached through the promotion of awareness, also indicating a long-term action.

Thus, environmental action evidence was considered, ultimately recognizing contributions to the environment either indirectly through social agents or directly as environmental assets for conservation purposes, which are subject to recording through accounting technology, by virtue of their intermediary representation with the environment, whether through fixed assets or the personification of agents. Society and the environment were the recipients of investments aimed at maintaining the environmental surroundings of the patrimony, permeated by the sociality function in environmentally contributory practices, collaborative with the environment.

When encountering the RPPN with attributes of perpetuity, not all social units possess assets of this nature, as it was not directly related to the objects of this research. Therefore, future research is suggested to explore the territory of environmental logical relationships, linked to exogenous environmental actions, with the aim of investigating the reasons why companies promote perpetual investments in the environment. Investigating these reasons will be relevant to identifying the driving force behind this phenomenon.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest regarding this submitted work.

AUTHOR CONTRIBUTIONS

Roles	1st author	2nd author	3rd author	4th author
Conceptualization	♦			
Data curation	♦			♦
Formal analysis	♦	♦	♦	♦
Funding acquisition				
Investigation	♦			♦
Methodology	♦		♦	♦
Project administration	♦			♦
Resources	♦			
Software	♦			
Supervision				♦
Validation		♦	♦	♦
Visualization				
Writing – original draft	♦		♦	♦
Writing – review & editing	♦	♦	♦	♦