

What Needs To Be Done To Implement Sustainable Accounting In The Business? Factors Affecting The Application Of Sustainable Accounting

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Abstract

Purpose – The article outlines the content that businesses need to innovate to implement accounting for sustainable development. The article will analyze the attributes that characterize the innovations needed for traditional accounting in enterprises. The article mentions sustainable development accounting models as the basis for businesses to choose when applying sustainability accounting. Through studying data of 198 companies listed on Viet Nam stock market, we research and conduct tests to conclude the difference between two groups of businesses that partially apply sustainability accounting and do not apply sustainability accounting. We also use regression models to identify factors and measure their influence on the application of sustainability accounting in enterprises.

*Methodology*Intending to find suitable internal management accounting methods and processes applied in sustainability accounting, the article analyzes the main characteristics of sustainability accounting to outline what needs to be done to innovate traditional accounting, satisfying the sustainable development goals of the business. Through studying the data of 198 companies listed on the stock market of Vietnam, we divided them into two groups: the group of enterprises that have partially applied sustainable accounting and the group that has not applied sustainable accounting. Businesses that are called partial sustainability accounting are those that have one of the five factors presented later in the article. We research and conduct tests to conclude the differences between these two groups of businesses. We also examine to identify the factors and their influence on the adoption of sustainability accounting in the enterprise. Taking a Survey sample of 198 enterprises in Vietnam because, in the past, some enterprises in Vietnam that have discharge behavior into the environment have invested a significant amount of capital for the goal of sustainable development and the environment. The article uses a logistic regression model to measure the impact of factors on the application of sustainable accounting (AS) in manufacturing enterprises in Vietnam. The dependent variable in the binary system is encoded into two values 0 and 1 to estimate the applicability of the AS. The article will use the logistic regression method, a popular method of The Positive Accounting theory to evaluate the factors affecting the application of new methods.

*Findings*The article outlines what needs to be done to innovate traditional accounting to meet the business's sustainable development goals. The paper will analyze the attributes that characterize the innovations needed for sustainability accounting. Through studying data of 198 companies listed on Viet Nam stock market, we research and conduct tests to conclude the difference between two groups of businesses that partially apply sustainability accounting and do not apply sustainability accounting. We also experiment to identify factors affecting the adoption of sustainability accounting in enterprises. Finally, the article mentions sustainable development accounting models and recommendations for applying sustainability accounting in enterprises in Vietnam.

Research limitations/implications Research focuses only on manufacturing firms, not all types of businesses

Practical implications Point out the possibilities that could apply accounting for sustainable development to manufacturing enterprises and the characteristics of enterprises applying sustainable accounting. The article

also indicates the issues that need to be done to implement sustainable accounting in the business.

Social implications The article studies aspects related to the environment, saving natural resources, and sustainable development. The article points out the issues that need to be done to implement sustainable accounting in the business. Since then, the issue of sustainable development by measuring the consumption of natural resources is mentioned.

Originality/value The article indicates the issues that need to be done to implement sustainable accounting in the business

Introduction

Sustainable development is an urgent requirement in the development of society. Sustainable development is a harmonious development in the fields of the economy - society - environment to satisfy the material and spiritual needs of people without harming the resources, provide the country's resources, without degrading the quality of life of future generations. Sustainable development must ensure social balance, protect the environment, and integrate with the international community.

In sustainability accounting, environmental issues are always raised. Environmental issues and sustainable development in Vietnam today are also urgent and topical. In the past time, many events had happened that seriously affected the environment as many manufacturing enterprises discharged into the environment, causing harm to the health and economic interests of the people. This problem cannot be completely solved if enterprises themselves do not build an environmental accounting system to record, monitor, and manage environmental issues. However, in manufacturing enterprises in Vietnam, there is no sustainable accounting system implemented in parallel with traditional accounting. Businesses that practice sustainability accounting only partially applies sustainability accounting. Creating a sustainable accounting system for manufacturing businesses, helping manufacturing businesses when applying this system will ensure the economy and efficiency in their economic management. Waste treatment aims to generate income from waste, reduce input material handling costs, manage costs, prevent waste from being released into the environment, help the environment become greener and cleaner, and protect the health of people and economic interests is the main task of enterprises today.

The objective of the study

- 1) The article focused on finding suitable internal management accounting methods and processes to support making the decision, and implement sustainable activities and projects, to improve the operational efficiency of the enterprise. The article outlined what needs to be done to innovate traditional accounting to meet the business's sustainable development goals.
- 2) The article mentioned sustainable accounting models.
- 3) The study identified and measured the factors affecting the application of sustainability accounting in manufacturing enterprises in Vietnam.
- 4) Through data of 198 companies listed on the stock market of Vietnam, divided into two groups: The group of businesses that have partially applied sustainable accounting and the group that has not yet applied sustainable accounting. The study carried out tests to conclude the difference between these two groups of businesses.
- 5) Finally, the study gave recommendations to apply sustainability accounting in enterprises in Vietnam.

2. Literature reviews

Collins C. Ngwakwe (2012) studied the accounting profession's sustainability initiatives to supporting sustainable development. They investigate sustainability initiatives contained in the web portals of selected accounting agencies. The results indicate a significant level of accounting initiatives towards sustainability; however, the lack of uniform accounting standards, regulations, and programs still create a challenge that has prevented contemporary sustainable accounting from being widely adopted. The paper concludes that accounting requires a more realistic response to sustainability, as this will facilitate government and institutional policies towards sustainability. They also recommend that important aspects be taken include carbon accounting standards, regulated sustainability accounting, and the formation of 'technical accounting' to address the challenges of climate change.

As the social and environmental impacts of human activity become more evident, the role of sustainable development as an organizational principle in the enterprise. First, ethical issues need to be addressed, requiring innovation in the way the business is managed. Secondly, it is necessary to have the coordination of all sectors and areas of activity, with changes in institutional and policy. One outcome of these trends has been the emergence of a stream of work (sustainability science) that investigates how disciplines might develop knowledge that progresses sustainable development (Hamoud Ismail, A., Abdul Rahman, A. and Ahmed Hezabr, A., 2018). Beyond this opposition, and without wishing to defend the idea of the neutrality of accounting models, this paper shows that sustainable development accounting models are the creation of dialogical spaces of action for the actors concerned by the practices sustainable development of the

organization. The study of this question is particularly important to the extent that accounting models of sustainable development as a business model for measured action. They firstly presented accounting models for sustainable development. Then, to understand what leads organizations to adopt such models, the study proposed a framework analysis that draws on the cultural analysis of organizations. From there, we will see what sustainable development accounting models can be a space for reconciliation of divergent logics. And finally, we will examine how these spaces' dialogues are in line with the precautionary principle, which is central to the question of sustainability.

To ensure the sustainable development of an entity, a sustainability accounting report, trustfulness, and properly made is mandatory for financial users. As a fact, the entities have to reveal social and environmental information to increase the creditworthiness in the activity they realized. According to Nasreen, S., Anwar, S., Ozturk, I. (2017), the purpose of their research is to point out how the sustainability accounting report influences the financial performance of the companies, by quantifying the social and environmental elements in a score variable. The analysis was carried out based on the data of the first listed companies of the Bucharest Stock Exchange. They tried to identify how sustainable development could be ensured. The results are based on a linear regression model and find a direct positive correlation between the score variable and the financial performance of the companies (Bebbington, Jan, Carlos Larrinaga. 2014).

3. Theoretical framework of research

When applying sustainable accounting models, the accounting profession is mandated to help the public to make more informed decisions and resist arguments that are not rational and documented. Thus, accounting models of sustainable development, just like traditional accounting models, are presented as neutral models and universal: rationality would be on the side of accounting and irrationality on the side of the community. In addition, although accounting models for sustainable development are innovators, they contain two key concepts of traditional accounting: Return on investment (ROI) and cost/benefit comparison. These two concepts come under the financial logic and hinder its reconciliation with ecological logic, from this perspective, the social responsibility of the company goes far beyond the advantageous situations.

3.1. What improvements to accounting for sustainability

To achieve the sustainability of the business, it is necessary to analyze the following contents: 'Target', which represents the overall results the organization wants to achieve through its innovation processes; 'Approach', which refers to the type of output or outcome of the innovation; 'Tools', corresponding to the technical, creative and financial resources required for innovation; 'Social context', referring to any social entity, system or group of people involved in the innovation process or the environmental factors influencing it; 'Phase', which includes all the steps taken in the innovation process, usually begins with the conception of an idea and ends with its dissemination and wide adoption to most organizations.

What accounting methods and procedures should be applied?

To implement sustainable accounting, it is necessary to focus on developing a new method or process of information generation and testing it in a case study. So, there is a need to create software to assist in the effective collection of environmental information or establish a guideline or standard. accounting innovations of this kind increase the comparability and efficiency of information management and reporting at a granular level (Example: material flow cost increases resource efficiency). From a broader sustainability perspective, approaches reveal and visualize the impacts and relevance of a company's activities on its goals in the sustainable development of society. Most current corporate accounting methods lack oriented, intuitive, and embedded methods. To improve the way that accountants are using, we can use the LCA method. Life cycle assessment or LCA (also known as life cycle analysis) is a methodology for assessing environmental impacts associating with all the stages of the life cycle of a commercial product, process, or service. For instance, in the case of a manufactured product, environmental impacts are assessed from raw material extraction and processing (cradle), through the product's manufacture, distribution, and use, to the recycling or final disposal of the materials composing it (grave). Businesses should apply real-time environmental management accounting, which generates high-quality environmental sustainability reports beyond the environment in relevant areas, company size, across regulatory agencies different management and collaboration bases as well as in the supply and value chains: Internet of Things, Internet of Services, Cyber-physical Systems, Transdisciplinarity Background. The ecological footprint (Wackernagel and Rees, 1998) is also an inspiring assessment approach to visualizing environmental impacts. In addition, with the goal of sustainable development, Businesses need to pay attention to forecasting issues, to achieve science-based or socially relevant goals. Developing additional target costs, useful for such back-forecasting could be a widely applicable method. Furthermore, identifying and visualizing links (cause and effect or system) is needed to assist in the management of drivers and indicators of social-environmental impacts. Enterprises can apply environmental management accounting methods that focus on specific issues that are relatively easy to measure (such as materials, energy, carbon, and water). In addition, sustainability is a global issue so linkages between different levels of accounts are mentioned, for example, for carbon accounting at the corporate, national, and global scientific level (Schaltegger and Csutora, 2012).

An example of a new management accounting approach that has been developed to improve the environment and has also influenced business practices is material flow cost accounting (MFCA) (Christ and Burritt, 2015; Jasch, 2009; Guenther et al., 2015). MFCA allows to calculate and visualize inefficiencies of material flows and production uses. Currently, social issues and efforts to achieve far-reaching goals such as zero-emission production are big issues for sustainable development goals. Another example of sustainability-oriented management accounting innovation is the Sustainability Balanced Scorecard (Figge et al., 2002; Hansen and Schaltegger, 2016; Tsai et al., 2009), which addresses the relationships between key issues and indicators from different perspectives on financial, market, internal processes, learning, and growth as well as non-market aspects. Currently, businesses should link with the usual accounting system to perform daily accounting content.

In addition, sustainable development needs more involvement of stakeholders. Businesses need to design accounting and reporting for sustainability as a collaborative process involving stakeholders rather than a process of own normal accounting system in the company. To tackle sustainability more effectively, new and even broader accounting approaches are needed to consider the syndromes of unsustainability (such as climate change, the development of slums, poverty, desertification) and social sustainability goals in a more inclusive way. While this may not be contested among sustainability scholars, the question is, are radical innovations created in isolation by academics and then implemented in practice? are radical innovations the result of incremental processes involving multiple stakeholders?

Tools for accounting innovation for sustainability

Schaltegger et al. (2002) have composed an extensive list of tools and concepts for controlling for sustainability in organizations. The list consists of 46 sustainability accounting tools which are categorized in three dimensions; social, environmental, and integrative based on the nature of the tool.

Table 1 – Tools for management sustainable accounting

<i>Environmental tools</i>	
Environmental budget	A future-oriented planning tool which determines the funds available for environmental issues for the coming period. It helps to set environmental targets (Gray and Bebbington, 2001)
Environmental cost accounting	It records and measures direct and indirect environmental costs to determine production costs for different products/services (Parker, 2000)
Environmental life cycle assessment	It addresses the environmental issues of a product and its environmental impact during its life-cycle. It includes all the production phases, from raw material acquisition to the disposal of the product at the end of its life. It forecasts environmental consequences and a timely identification of precautionary measures inside and outside an organization (Gray and Bebbington, 2001)
Environmental performance indicators	Internal indicators which measure environmental issues (water use, GHG emissions, waste management, etc.) and the links between the company business and the environment. They are represented by financial and non-financial numerical data which provide key information about the organization's environmental issues such as the environmental impact of its operational activities (Henri and Journault, 2008)
<i>Social tools</i>	
Social budget	A future-oriented planning tool that determines the funds available for social issues for the coming period. It helps set social targets (Schaltegger et al. 2002)
Social performance indicators	Internal indicators refer to the measurement of social issues. They supply information on what activities can be regarded as socially effective and efficient. They are represented by numerical measures (monetary and non-monetary) and they provide key information about employee health and safety, equal opportunities, diversity management, and the social assessment of the products (Schaltegger et al, 2002)
<i>Integrative tools</i>	
Eco-efficiency analysis	It develops and optimizes product characteristics and operational activities concerning the relationship between their economic value-added, the use of natural resources, and the firm's objectives (Virtanen et al. 2013)
Sustainability report	It communicates a firm's environmental, social and economic results to external stakeholders to demonstrate the firm's commitment to sustainability issues and to increase its level of transparency (Joseph, 2012)
Sustainability balanced scorecard	It is an extension of the conventional Balanced Scorecard (BSC) to sustainability management, in that it integrates environmental and social

aspects in the BSC. The aim is to identify, systematize and measure the strategic central economic, ecological, and social objectives (Hansen and Schaltegger, 2016)

3.2. Accounting model for sustainable development

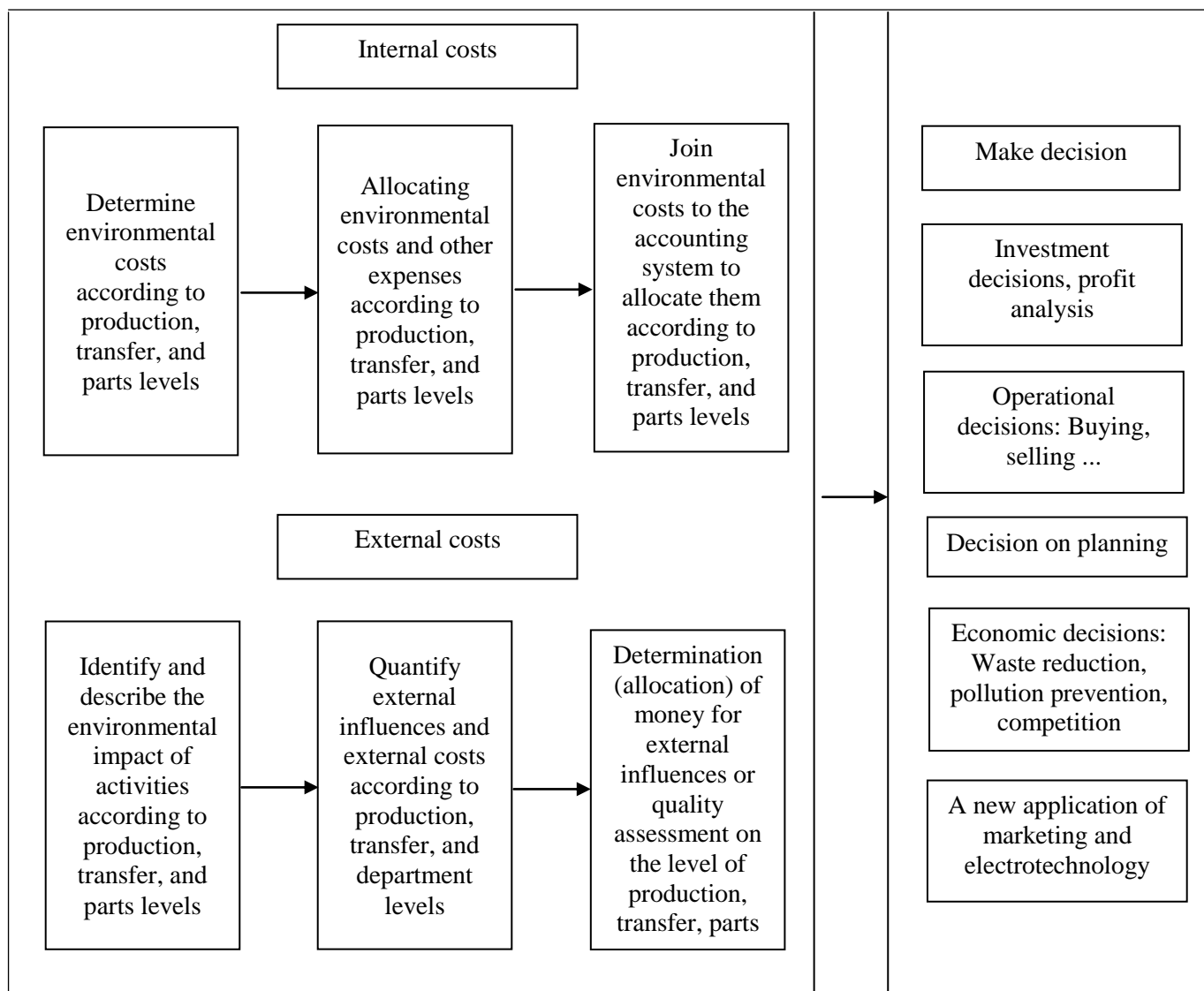
All the attributes analyzed above can be expressed in sustainable development accounting models. Within the scope of this paper, the author makes the models of sustainable accounting: a model for cost control, for 3 Perspectives, for 3 Dimensions, for Business Strategy, and Operations.

3.2.1. Sustainable accounting model - cost control

This model is not an accounting system in the usual sense of the term, but rather for internal (private) and external costs and benefits (for the environment and human health) activities of the organization. These model offer therefore to take into account externalities activities of the organization, translate them into costs, or evaluate them qualitatively when the financial evaluation is not possible (Epstein et al. 2011 De Beer, P. and Friend, F. 2006), and to integrate them into the decisions of the organization, or even to help the community to judge its social responsibility.

This is a model of categorizing into internal costs and external costs. The enterprise needs to identify environmental costs, quantify them, allocate them according to production, transfer, and department levels. For external costs, the enterprise determines the environmental impact of its operations at the level of production or division. After that, the enterprise quantifies the impact of the activities, related expenses according to the parts, and allocates these costs to each activity according to the level of impact on the environment. Since then, businesses make decisions on operations, investments, new technologies ...

Figure 1 - Sustainable accounting model for cost control



3.2.2. Sustainable accounting model - 3 Perspectives

In this view, the sustainability framework reinforces the key aspects of integrating sustainability into an organization and applies to entities of all sizes and complexity. This sustainability framework is based on three perspectives: business strategy, operations, and reporting. Each aspect is designed to address a different accounting group. For example, accountants working at senior levels of management may be more focused on the view of business strategy. Accountants - managing performance (including planning, budgeting, costs, and measurement performance) can direct their attention to the operational perspective. Those who prepare business, finance, sustainability, or integrated reports, or engage in providing audits and guarantees, can find reporting views of most uses (Anon n.d, 2019)

From a business strategy perspective, the model emphasizes the importance of adopting a strategic approach, so that sustainability is integrated into vision and leadership, strategic planning, goals, as well as combining, management, accountability, and risk management. Thinking about strategic sustainability issues is an opportunity for an organization to establish or re-establish. This calls on the board and management to articulate and leverage the benefits of that strategically, ideally using a language that resonates with the organization.

Terms such as sustainability, responsible corporate societies, and climate change can be interpreted in many different ways, and are seen as representing additional costs. Clearly define what they mean to be sustainable, how it relates to the organization and its key stakeholders, and how it can organize successfully and in the long run. The organization may find it easier to introduce new sustainability goals and initiatives, especially those related to carbon reduction programs to meet carbon obligations or impose reduced commitment.

Accountants can play a leading role in establishing jobs for sustainability by ensuring the appropriate governance structure were to enhance implementation, monitoring, and accountability, and effective participation of stakeholders and suppliers. Accounting can also lead the way in setting goals and goals and integrating risk management and assessment. Organizations that have succeeded in sustainability derive from a perspective strategy that tends to transform those who increase sustainability performance into corporate advantages. They can do so in many ways: Gaining first market advantage with a new product or service; partner with others, such as partner supply chains, or even competitors, to enhance sustainable performance; and respond to sustainable trends and emerging laws, including the development of market mechanisms, such as carbon emissions schemes or carbon taxes.

From the operations perspective: The sustainability model through operations is the one that uses accounting activities to assist the organization in selecting operational decisions that help businesses grow sustainably.

Profits can be achieved by reducing waste, including improving energy efficiency and reducing waste and water consumption. Organizations can simply improve environmental performance and use inexpensive measures, by applying a control method based on the complete production and consumption model. In addition, accounting can be used to calculate an organization's carbon footprint or product, better manage greenhouse gas emissions, reduce production time, and report information to related parties. out. The quality of carbon accounting will depend on the power of data collection, data on process organization. Meanwhile, good accounting helps develop carbon management plans to reduce project carbon, quantifying them, reducing the number of emission locations, saving costs and energy. To further improve, sustainable and environmental accounting practices can help provide the environmental, social, and financial information needed to support decisions in investment, production, and business matters.

From a reporting perspective: In this view, organizations, and managers feel the need to employ sustainability accounting and reporting. This need follows from the pressure of internal users (managers at various levels of management and of various operational specializations), the pressure of external stakeholders (the public, the media, political pressures, customer preferences, and financial markets pressures) as well as from opportunity recognition (improving an organization's reputation, competitive abilities, political and market situation). Therefore, it is necessary to create procedures that will provide information about corporate sustainability to those users who require this information for their decision-making. Sustainability accounting and reporting systems may be further developed using three approaches: outside-in, inside-out, and twin-track approach (Schaltegger, Etxeberria, and Ortas 2017 Nasreen, S., Anwar, S. and Ozturk, I., 2017). The outside-in approach is based on the needs of external stakeholders, focuses on issues discussed publicly and on an organization's contribution to these issues. On this basis, adequate measures and managerial activities are devised to fit sustainability accounting and reporting. This approach is embodied in the GRI guidelines to corporate sustainability reports. The inside-out approach follows an organization's business strategy and focuses on issues that are relevant for the effective implementation of the strategy. The sustainability accounting and reporting system is devised in such a way that the collection and processing of information and its reporting will support internal decision-making processes (of managers at all organizational levels) to achieve sustainability. The results of these activities are presented to external parties as well. The twin-track approach combines both above-mentioned approaches. The purpose of sustainability accounting and reporting data is to monitor an organization's compliance with environmental policy and legal regulations.

3.2.3. Sustainable accounting model - 3 Dimensions

Sustainability has three important dimensions: (a) economic viability, (b) social responsibility, and (c) mission environment. While swaps can occur between them, these dimensions are interconnected in different ways. For example, being socially and environmentally responsible (to employees, the community, and other stakeholders), leads to increase trust, and, therefore, makes good business sense. Social and environmental responsibility cannot stand isolated from economic capacity. Organizations must continue to provide products and services that people want to generate profits, growth, and new jobs. While pursuing a commercial imperative, the organization must also take into account their social and environmental impacts as part of creating sustainable value. To serve sustainable accounting under this model, businesses need to divide it into social accountancy accounting, environmental accounting, and financial accounting. (Bennett, Schaltegger, and Zvezdov 2011 El Serafy, S., 1997)

4. Research methods and hypothesis

4.1. Data and methodology

According to Özokcu, S., and Özdemir, O. (2017) and Nasreen, S., Anwar, S. and Ozturk, I. (2017), for an estimated variable, the minimum sample size needed for this study is n with $n > 50 + 8 \times$ number of variables = $50 + 8 \times 18 = 194$, we decided to choose 198 for the sample size.

The sample in the official study was conducted by a non-probability sampling method, collecting data from 198 enterprises out of more than 1800 manufacturing enterprises (According to the Securities Commission of Vietnam). The basic data of businesses are taken from the General Statistics Office data through the website: www.cophieu68.vn. We surveyed 198 enterprises, of which: 18 rubber processing enterprises, 42 mineral enterprises, 32 plastic packaging enterprises, 25 fertilizer enterprises, 26 steel manufacturing enterprises, 55 food processing enterprises. Of which, 41/198 enterprises applied environmental accounting for sustainable development.

Questionnaires were distributed to each enterprise with a total of 198 questionnaires collected. Subjects of questionnaire delivery are business leaders, chief accountants, and accountants. The survey period is from September 2020 to April 2021.

Table 2 - Statistics of surveyed firms by industry sectors.

	Scope of activity	Number of firms	Proportion
1	Rubber processing	18	9,1%
2	Mineral	42	21,2%
3	Plastic packaging	32	16,2%
4	Fertilizer	25	12,6%
5	Steel manufacturing	26	13,1%
6	Food processing	55	27,8%
	Total	198	100%

4.2. Research models and hypotheses

Accounting for sustainable development (AS) becomes the best tool for businesses to understand and manage the potential relationships between traditional economic goals and environmental goals. The implementation of accounting for sustainable development may depend on the legal system, the qualifications of the accountant, the characteristics of the business, the technological process of product production. From there, it can be considered that AS is an important element of resource efficiency for companies. Therefore, AS depends on the company's strategy, the level of clean and sustainable production and the views of its leaders and shareholders.

4.2.1. Research models

The paper uses a logistic regression model to measure the impact of macro factors on AS application in manufacturing enterprises in Vietnam. The dependent variable in binary is encoded into two values 0 and 1 to estimate the applicability of AS. When the dependent variable has 2 values, it is assumed that the remainder with a normal distribution will not match, but will have a binomial distribution, so the statistical test in the normal regression does not match. Therefore, the paper will use the logistic regression method, a popular method of the positive accounting theory (The positive accounting theory). Hamoud Ismail, A., Abdul Rahman, A. and Ahmed Hezabr, A. (2018) and Nasreen, S., Anwar, S. and Ozturk, I. (2017) ... all use a logistic regression model to evaluate the macro factors affecting the application of new methods. Based on inheritance, the article building the research model is expected as follows:

$$\text{LOGIT [AS =1]} = \alpha_0 + \alpha_1 * \text{DOCU} + \alpha_2 * \text{CHAIN} + \alpha_3 * \text{STRATE} + \alpha_4 * \text{CHARAC} + \alpha_5 * \text{ACCOU} + \varepsilon(\text{M1})$$

Dependent variable: is a dummy variable, takes the value of 1 if the enterprise applies AS and takes the value of 0 if the enterprise does not apply AS.

Independent variables: DOCU, CHAIN, STRATE, CHARAC, ACCOU

Parameters: $\alpha_0, \alpha_1, \alpha_2, \dots, \alpha_n$; Error: ε

The independent variables and the dependent variables:

Table 3 - The independent variables and the dependent variables.

	Legal document system related to AS (DOCU)
1	Timeliness and suitability of the legal document system related to AS (DTIME)
2	Completeness of legal documents related to AS (DFULL)
3	The enforcement of the legal system of legal documents related to AS (DFORCE)
	Characteristics of Supply Chain (CHAIN)
4	Pressure from supplier require businesses to apply sustainable accounting (CHSUPP)
5	Pressure from customers require businesses to apply sustainable accounting (CHCLIE)
6	Competitor pressure require businesses to apply sustainable accounting (CHCOMP)
7	Pressure from employees require businesses to apply sustainable accounting (CHEMPLO)
	Strategy of the business (STRATE)
8	Strategies for effective use of resources require businesses to apply sustainable accounting (SRESOR)
9	Sustainable development strategy requires businesses to apply sustainability accounting (SSUS)
10	Clean production strategy requires businesses to apply sustainable accounting (SCLEA)
11	Ensuring the interests of stakeholders requires businesses to apply sustainable accounting (SSHA)
	Characteristics of the business (CHARAC)
12	Production technology is updated with AS (CHPRO)
13	Managers' competencies ensure the application of sustainable accounting (CHMANA)
14	Information system ensure the application of sustainable accounting (CHINFO)
15	Tools and methods of measuring inputs and outputs to enable sustainable accounting measurement (CHAMEDS)
	Enterprise accounting system (ACCOU)
16	The level of accounting staff of the enterprise is capable of applying sustainable accounting (ACAPA)
17	Accounting information systems ensures sustainable accounting application (AINFO)
18	Application of modern technology ensures sustainable accounting application (ATECH)
	Applying sustainable development accounting in business (AS)

Select a survey sample

The sample size depends on the method of processing the regression model. Hair et al. (2006) assumed that a minimum sample size of 50, preferably 100, and an observed-to-measure ratio (N / p) of 5: 1 means that a measurement variable requires a minimum of 5 observations, preferably 10: 1 or more (Awakita Jiro (2015), El Serafy, S. (2017) recommends an N / p ratio ranging from 2: 1 to 20: 1. The article chooses the surveyed sample approach with the minimum number of 100 and the ratio of N / p ranging from 2: 1 to 20: 1 according to the observed variable to reconcile the above point of view. The number of independent variables is 18, the number of dependent variables is 1 variable. The formal sample size is $n = 198$ is suitable. The article has selected a sample of 198 businesses and collected data from the website www.cophieu68.vn/companylist.php. After collecting data, the author chooses 198 manufacturing enterprises which are classified into two groups: manufacturing enterprises with a market capitalization of less than 3 billion USD and manufacturing enterprises with a market capitalization of more than 3 billion USD. The article uses descriptive statistical methods and regression analysis to analyze the data. The author used the tool is SPSS 22 software.

4.2.2. Research hypotheses

Hypothesis H1: Factors in the system of legal documents related to AS that affect the application of AS in manufacturing enterprises.

Hypothesis H2: Factors in the supply chain of enterprises that affect the application of AS in manufacturing enterprises.

Hypothesis H3: Enterprise's strategy affects the application of AS in manufacturing enterprises.

Hypothesis H4: Firm-specific factors affect the application of AS in manufacturing enterprises.

Hypothesis H5: Factors of an enterprise's accounting system that affect the application of AS in manufacturing enterprises.

5. Research results

5.1. Descriptive statistics:

• General descriptive statistical analysis:

The statistical analysis describes the data of EPS, PE, ROA, ROE of 198 manufacturing enterprises. This is the average data in 3 years 2018, 2019, 2020 of 198 manufacturing enterprises in 6 industries:

Table 4 - Descriptive Statistics

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
PE	198	-87.	73.	8.75	20.06
EPS	198	-29.0	27.6	1.449	4.0774
ROE, ROA, EPS, PE, Beta...	198	-49.%	32.%	3.26%	9.2%

ROE	198	-40%	42%	7.7%	12.0%
Beta	198	-1.27	4.80	.34	.60
Numberof stock	198	1,190,000	3,313,173,359	105,637,804	319,593,495
Market capitalization	198	9	229.059	4623.14	22.446.840
Valid N (listwise)	198				

The results of the group descriptive statistical analysis showed that among: Business size is shown by the market with the average value of 4623.14 billion VND (exchange rate is about 23,000 VND/ 1 USD). In which, the enterprise with the largest scale is 229059 billion VND dong and the business with the lowest asset scale is 9 billion VND. The average ROE of the survey group is 7.7%, ROE ratio for the largest business is 42%, for the smallest business is -40%. The average ROA of the survey group is 3.26%, ROA ratio for the largest business is 32%, for the smallest business is -49%. The survey questionnaires show that 43/198 enterprises have applied AS, accounting for 21.7%.

- *Descriptive statistical analysis for two groups of enterprises:*

Group of enterprises that apply AS and groups of businesses that do not apply AS

For groups of enterprises applying AS

Table 5 - Descriptive Statistics for groups of enterprises applying AS

	N	Minimum	Maximum	Mean	Std. Deviation
PE	43	-1.5	62.0	8.247	9.74
EPS	43	-29.0	12.2	1.563	5.79
ROE, ROA, EPS, PE, Beta...	43	-38.0%	32.0%	5.96%	10.6%
ROE	43	-20.0%	42.0%	16.2%	9.1%
Beta	43	-1.27	1.66	.36	.516
Numberof stock	43	1,904,400	3,313,173,359	127,411,990	503,985,585
Market capitalization	43	12	140,815	4742.70	21,410,218
Valid N (listwise)	43				

Table 6 - Descriptive Statistics for groups of enterprises not applying AS

	N	Minimum	Maximum	Mean	Std. Deviation
PE	155	-87.	73.	8.89	22.11
EPS	155	-3.5	27.6	1.423	3.48
ROE, ROA, EPS, PE, Beta...	155	-49.0%	28.0%	2.5%	8.6%
ROE	155	-40.0%	38.0%	5.35%	11.67%
Beta	155	-.93	4.80	.3352	.62689
Numberof stock	155	1,190,000	2,089,955,445	99,597,224	247,421,455
Market capitalization	155	9	229,059	4,645.45	22,793.183
Valid N (listwise)	155				

Tables 5 and 6 show that: The average EPS and market capitalization of enterprises applying AS and not applying AS do not have much difference (1563 thousand VND and 1423 thousand VND), (4742.7 billion VND and 4645.45 billion VND). However, the ratio of ROA and ROE of enterprises applying AS is much higher than that of enterprises not applying AS (5.96% and 2.5%), (16.2% and 5.35%).

5.2. Regression analysis

a. Univariate analysis

Univariate analysis determines the impact of each independent variable on AS application. The paper compares two groups as described above. Kolmogorov-Smirnov test to test whether the data's distribution hypothesis is consistent with the theoretical distribution. With a sample size greater than 50, it is advisable to use this test. The sample has a normal distribution when Sig. > 0.05. The Kolmogorov-Smirnov test is less than

0.05, continues to perform the Mann-Whitney test to compare the average ranking of one variable among the two groups of observations (manufacturing firms applied AS and manufacturing enterprises not applied AS).

Univariate analysis for groups of factors Inspection:

Kolmogorov-Smirnov:

Because the sample size is 198 enterprises (> 50) according to A. Sahu, R. Padhy, Debabrata Das, Amitosh Gautam, (2021), and Huixiang Zeng, Z. Zhou, X. Xiao, 2019) should use the Kolmogorov-Smirnov test to determine the distribution of the sample. All independent variables in the model have the value Sig. = 0 (< 0.05) indicates that the data has no normal distribution. Therefore, the Mann-Whitney non-parametric test is used for the next test step

Table 7 - One-Sample Kolmogorov-Smirnov Test

		PE	EPS	Numberof stock	Beta	Market capitalization
Normal Parameters ^{a,b}	Mean	8.434	1.463	132509169.56	.3276	4724.17
	Std. Deviation	9.9089	5.8899	515871084.953	.51030	21921.667
Most Extreme Differences	Absolute	.240	.304	.414	.181	.415
	Positive	.240	.199	.414	.123	.398
	Negative	-.159	-.304	-.400	-.181	-.415
Test Statistic		.240	.304	.414	.181	.415
Asymp. Sig. (2-tailed)		.000 ^c	.000 ^c	.000 ^c	.002 ^c	.000 ^c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

This test helps to compare the mean values of the variables for 2 groups of firms with and without AS application.

Table 8 - Compare the mean values of the variables for 2 groups of firms with and without AS application.

	PE	EPS	ROA	ROE	Beta	Numberof stock	Market capitalization
Mann-Whitney U	2734.5	1912	1887.5	766	2937	3051	3003
Wilcoxon W	3595.5	13847	13822.50	12701	14872	3912	14938
Z	-1.316	-3.881	-3.962	-7.451	-.692	-.330	-.480
Asymp. Sig. (2-tailed)	.186	.000	.000	.000	.479	.701	.602

The results of Mann-Whitney test for factor groups show that: Factor Type company, EPS, ROA, ROE has a significant difference in applying AS and not applying AS. The remaining factors such as PE, Beta, Number of stock, Market capitalization did not differ significantly for the group of enterprises that applied AS and did not apply AS.

Test correlation between variables

Thus, we have finished the descriptive statistics section, now we move to the quantitative research section from the results obtained in the survey forms with 6 groups of independent variables and the dependent variable is AS.

Table 9 – Correlations

		AS	DOCU	CHAIN	STRATE	CHARAC	ACCOU
AS	Pearson Correlation	1	0.565	.101	.692**	.361**	0.100
	Sig. (2-tailed)		.835	.001	.007	.000	.002
	N	198	198	198	198	198	198
DOCU	Pearson Correlation	-.015	1	.030	-.014	.024	-.228**
	Sig. (2-tailed)	.835		.677	.842	.738	.001
	N	198	198	198	198	198	198

1	(Constant)	.427	1.117		.387	.042	1.771	2.635
	CHAIN	.768	.063	.773	1.394	.016	.037	.213
	CHARAC	.944	.178	.876	5.313	.000	.593	1.294
	ACCOU	.374	.156	.289	1.179	.0240	.492	.124
a. Dependent Variable: AS								

The Logistic regression function of the model is estimated in the form:

$$\ln(p/(1-p)) = 0,427 + 0,944 * CHARAC + 0,768 * CHAIN + 0,374 * ACCOU$$

6. Conclusion

For descriptive statistics, the group of manufacturing firms that apply AS is those with a much larger ROE and ROA. The factors Type company, EPS, ROA, ROE differ significantly in the application of AS and not to apply AS. For testing results and regression analysis: CHAIN, CHARAC, ACCOU have values of Sig. <0.05 proves this variable has a linear correlation with the variable AS. The variables DOCU, STRATE have the value Sig. > 0.05 so there is no correlation with AS. Results of multivariate regression analysis show: Business characteristics have the most influence on the application of AS. Enterprises have technology processes suitable for identifying and measuring material flows; the capacity of good managers, with clean production policies and orientations, protecting the environment; a clear and separate information system for each stage and part of the business; Especially businesses with good material input and output measurement capabilities will be suitable for the application of AS. Next, the supply chain variable (CHAIN) has a significant influence on the application of AS, in particular: which businesses are affected and pressured by suppliers, customers, competitors, and employees. AS must be applied and there will be a higher possibility of AS adoption. The third factor is the corporate accounting system (ACCOU): Which enterprise has a well-qualified accounting team, a complete and clear accounting information system, applying technology in current accounting, the application of AS will likely be higher.

Accounting for sustainable development is an emerging aspect of accounting science that will greatly affect audiences shortly. Applying the basic elements of accounting for sustainable development will show the role of the environment in the economy as well as analyze macroeconomic questions more easily with the help of AS measures.

The reality is that the environmental costs of the business are very high, but they are all accounted for in the accounts as a general expense and are not tracked separately on a separate account. Some companies have included environmental costs in the cost of products and services, but the method of allocating usage costs is not appropriate. In the absence of a proper attribution method, business managers will not receive reliable information regarding the true costs and real profits of maintaining or changing products or processes. Furthermore, this also effectively prevents a business's productivity tracking as well as the right to price products and activities that are critical to maintaining a business's competitiveness. AS still faces some problems such as lack of information support, lack of professional personnel, lack of international accounting models. In recent years, efforts for the development of environmental information systems have led to the creation of environmental management systems that deal with complex environmental data processing problems. New trends in the development process suggest more proactive environmental strategies by recognizing and reducing environmental costs and moving towards improving corporate profits.

Currently, in the practice of business, accounting, finance, and management control departments are less involved in sustainability management than all other corporate functions (Windolph et al., 2014). The methods of measuring and managing information on sustainability should be promoted and adopted by a range of departments such as production, R&D, marketing, etc. Therefore, the Board of Directors needs to set appropriate strategic goals for accounting innovation for sustainability. This will be accompanied by the creation of an interagency task force with an important budget and across different business functions and stakeholders. Therefore, future research and testing are needed on new approaches to developing completely new innovative ideas on sustainability accounting.

In Viet Nam, to implement a sustainable accounting model, accounting can range from adjusting existing cost models to an accounting system for more integrated environmental management accounting. Businesses need to practice linking physical and monetary information, like material cost accounting. In addition to identifying and classifying costs effectively, accountants can ensure a sustainable performance association with organizational goals and help integrate sustainability goals and measure performance with the overall Internal control and management system. Accounting is also ideally positioned to combine sustainable performance with measures and KPIs into a performance management system strategy.

However, any innovation will start with ideas and some experimentation in research before it spills over into a broader group of organizations. Specific guidance is needed from international accounting organizations, international associations of accountants, and standardization organizations (e.g. ISO, 2011; with ISO 14051). Therefore, it is necessary to develop accounting standards that address ways of measuring sustainability

indicators. So whether one classifies the world as modern or postmodern, or whether we see change possible at a global or local level; issues of human rights, human dignity, and the human condition must be of primary concern. Regardless of background or interdisciplinary background, we must constantly assert that accountants must be more socially responsible. In our view, without interdisciplinary collaboration, efforts to improve accounting are meaningless.

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