COST ACCOUNTING MODEL IN VALUE CHAIN BASED ON DIGITAL SPACE CONTRIBUTES TO THE MOTIVATION FOR VIETNAMESE ENTERPRISES TO DEVELOP SUSTAINABLY

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Abstract

Enterprises that want to develop sustainable business with high competitiveness need to balance three factors: economic, environmental and socially responsible, towards a green economy - ensuring the long-term development of future generations starting from the sense of environmental protection. The goal of sustainable development also brings certain benefits to the business when it directly contributes to business value. The Value Chain Accounting (VCA) model identifies the environmental costs associated with the value chain starting at the beginning of the value chain (upstream) such as research and development costs, design cost, the cost of providing the inputs of the product manufacturing process, after the finished product will start the downstream phase of the value chain as marketing costs, expenditure distribution fees and costs associated with customer service. Value chain modeling based on breakthrough achievements in the areas of information technology, biotechnology, nanotechnology, etc., is based on the breakthroughs of digital technology.

***Key words**: business, environment, governance, sustainability*

INTRODUCTION

Sustainable development has become a top concern of countries in the world, where enterprises play an active role in realizing the country's sustainable development goals. Sustainable development is a process that develops in a coherent, rational and harmonious way between the three dimensions of development, including: economic development (mainly focused on economic growth), commune development (most important is progress, social equity, poverty reduction and employment) and environmental protection (most importantly, pollution remediation, rehabilitation and rehabilitation). to improve the quality of the environment, to prevent and fight forest fires and deforestation, to rationally exploit and economically use natural resources).

According to many international analysts, the downside of developed economies is global climate change, environmental degradation and the depletion of resources. Since then, economies have suffered from rapid development based on the full exploitation of natural resources, with the

industry releasing dust and toxic substances into the environment. In that context, sustainable development has become a matter of national concern, leading to a green economy - ensuring the long-term development of future generations starting with the sense of environmental protection.

In the general trend of the world, Vietnam has also a sustainable development strategy, focusing on balancing social, economic and environmental factors in order to contribute to the restructuring of the economy. In the future, it is necessary to link the sustainable development goals in the business strategy of the enterprise. Changes in the negative direction of the environment in the process of economic development have been creating worries for many countries and threatening the sustainable growth of the global economy.

Business as an ambassador for social and economic change is also striving to demonstrate its contribution to the achievement of the nation's overall goal. In fact, building a sustainable development goal also brings certain benefits to businesses that directly contribute to business value, such as revenue generation, cost control, risk management and other long-term values. As a result, many businesses have begun incorporating sustainability into their operations as part of a long-term strategic development plan. At the enterprise level, environmental accounting plays a very important role in improving the quality and effectiveness of environmental management. To solve this problem, there is a very effective tool – that is Environmental Management Accounting (EMA). A long time ago, in the world, there were many documents introducing and practicing environmental management accounting issued by organizations and government agencies of many countries in the world (Japan, Germany, USA ...). However, up to now, in Vietnam, in the field of accounting, there are no regulations, circulars, standards that guide the organization, practice management of assets, liabilities, income and environmental costs. The situation in Vietnamese enterprises shows that environmental costs have not been properly reflected or fully reflected, leading to incorrect identification of incomes, costs and selling prices of products and services.

This indirectly affects the competitiveness of the business, and does not support the management to make the right management decision on the basis of measurement, evaluation and recognition of performance achieved in a organizations, which must be set up based on the decentralization and decentralization of authority to managers, parts of an organization in line with their management responsibilities, to provide useful information for the administrator controls the performance of subordinates through personal responsibility for the achievement of the department toward the organization's overall plan and goals.

The accounting system of responsibility is formed, exists and develops in association with decentralization in the organization. Different levels of management are empowered to make decisions and take responsibility in the scope of authority and responsibility that the organization has given them.

LITERATURE REVIEW

Responsibility accounting is a basic content of general management accounting and environmental management accounting in particular, formed from the need for information for financial planning and control production and business. Kellogg (1962) studied accountability in relation to organizational structure, cost accounting, cost control and budgeting.

In relation to organizational structure, Kellogg asserts that the structure of an organization is always decentralized and always changing. In relation to cost control, Kellogg argues that cost accounting must be used as a management tool, to determine the cost source to control costs and to assign responsibility for each cost, but not to mention the factors that affect the use of responsibility accounting.

NJGordon (1963) in a study of the theory of responsible accounting systems referred to decentralized management, the basis of the accounting system of responsibility is economic and organizational theory, the author argues accountability only becomes effective when the enterprise decentralizes management and organization.

According to Nahum Melumad, Dilip Mookherjee, Stefan Reichelstein (1992), one of the important components of responsible accounting is the responsibility center, which centers on the structure of each organization to make decisions and always aim for optimization.

Horngren and Foster (1991) analyzed a formal model for centers of responsibility and compared these centers to arrangements for different organizations, the results suggest that the centers of responsibility can be means to save cost more efficiently.

Meda (2003), meanwhile, has conducted a study of accountability at companies listed on the Jordan stock exchange, who have discovered the practical application of responsible accounting in these businesses, it has a relationship with the budget estimate, which compares the actual achieved results with the estimated results, but does not mention the factors that affect the responsible accounting system.

According to Hansen and Mowen (2005), the responsible accounting system include four contents: assigning responsibilities; building standards and measuring of achievement; evaluating results and distributing the rewards. However, the topic is just to discuss the content of responsible accounting, not to mention the factors that affect accountability.

On the other hand, according to Ismail and King (2007), management accounting is influenced by the qualifications of the accountant, the attention paid to the managerial accounting of the business owner, the cost of organizing one management accounting system, competitive market pressure, information technology application in the corporate management.

According to Rowe, Casey et al. (2008), accountability depends on the magnitude, scope and speed of organizational change. When there is a change in the level, scope and pace of organizational change, the performance of financial management centers may change. In order to achieve the organization's overall goal, an important mechanism is to use responsible accounting to manage responsibility centers, to manage horizontal relationships between responsibility centers including those jobs in committees or multifunctional groups. Okoye et al. (2009) studied the application of responsibility accounting to improve the performance of manufacturing enterprises, the results confirmed that responsibility accounting is an important tool for assessing managerial responsibility, identify the clear relationship between accountability and achievement in the business, not to mention the factors that affect the use of responsibility accounting.

Stephen Brammer and Stephen Pavelin (2008) studied factors influencing the quality of environmental information disclosed by companies. Accordingly, the quality of information is

based on the characteristics of the company and the industry. This is due to the size of the company and the nature of its business, particularly in relation to large companies and companies involved in environmental issues.

Jalaludin et al., (2011) investigates the relationship between institutional pressure and environmental management accounting application in manufacturing firms in Malaysia. Regression analysis is used to test institutional pressure against the environmental management accounting acceptance level. Research shows that some of the effects of institutional pressure on the adoption of environmental management accounting, accountants agree that their work is determined by their education level.

Research results by Mohd Sobre Ismail et al., (2014) shows that Malaysian organizations that are certified by ISO 14001, have implemented environmental management accounting at a high level and most of the environmental management accounting firms are ISO 14001 certified companies. The ISO 14001 certification from Malaysia also reflects a part of their accountability to the relevant stakeholders.

Its implementation into the organization's operations can be beneficial to overcome the problems of traditional accounting management without incorporating the hidden costs of the environment. N. Mokhtar et al., (2016) investigated the relationship between business characteristics and environmental management accounting application, and empirical research in Malaysian listed companies.

In their work, N. Mokhtar et al. (2016) outlines assumptions related to the environmental sensitivity of the industry, the size of the company, the ownership status, the environment management system recognized, the ratio of non-executive directors.

The level of environmental management accounting implementation among companies is relative. However, the relative level of performance shows that accountants' involvement in environmental commitments is still lacking, and the role of accountants in the environmental sector is minimal. Companies seem to focus more on environmental performance rather than measuring and integrating environmental information.

That indicates that companies pay more attention to compliance with environmental regulations rather than incorporating environmental management accounting information into management, control, and reporting. Environmental management accounting information is also useful for reporting on economic, social and environmental indicators in the Global Initiative Report (GRI). One of the reasons why many companies do not have a profit orientation for sustainable operations is that there are concerns about ensuring their legitimacy.

This may explain why most listed companies in Malaysia tend to insist on meeting regulatory requirements as it will help them find legitimacy to ensure the existence of the company, and to continue business. In addition to legal costs, loss of community trust is a negative result that can be a significant threat to the company's existence. Lack of guidance and knowledge related to environmental management accounting can prevent companies from knowing about environmental information and the existence of management accounting systems.

According to the International Financial Accountants Committee’s (IFAC) international Guide on environmental management accounting (2005), the EMA is responsible for managing

economic and environmental performance through the development and implementation of an accounting system and hands-on practice relevant to environmental issues. While corporate environmental accounting can generally include reporting and auditing in some companies, the EMA typically only deals with life cycle costs, full cost accounting, benefit assessments and strategic planning for environmental management. According to Bennett et al., (2002, p.1), EMA can be defined as the generation, analysis and use of financial and non-financial information to optimize the company's environmental and economic performance and to achieve be business sustainable.

The experience of countries around the world in Environmental Management Accounting

Environmental accounting in the United States came into being in the period 1969-1979, with the passage of the 26th enactment of the Environment Act by the US Congress, which underpins the development of EMA. To encourage and promote entrepreneurship awareness of the types of environmental costs and the application of these costs in business decisions, the General Accounting Office, the Environmental Protection Agency (EPA) has researched projects on environmental accounting.

United Nations Division for Sustainable Development UNDSD, The International Federation of Accountants (IFAC) and many other countries have relied on EPA's environmental accounting model, the basis for the process of preparing documents on environmental accounting. Environmental accounting is carried out under both environmental financial accounting and management accounting.

Due to rising cost pressures and information requirements of the Securities and Exchange Commission, environmental finance accounting has been implemented. EMA is designed for the decision-making process of the manager. American EMAs are born from the pressure of the public and the movement to protect the environment. This pressure requires businesses to be mindful of the environmental issues that affect the US government's environmental policies.

This policy requires businesses to compensate for environmental damage, to reduce waste, to clean waste, etc. This increases the cost, affects the potential debt ..., thereby affecting the price of shares, the interests of shareholders.

The EMA is built on the basis of a complete and consistent legal system that primarily relies on laws such as the National Environmental Policy Act, the Environmental Cleanup Act, the Sarbanes Law-Oxley (This law affects the recording and reporting of environmental information in corporate financial statements.) Also because of such a tight and complete legal system, the EMA in the United States have a basis for such development.

The EMA application focuses primarily on the environmental cost of the decision-making process of the manager, focusing on providing environmental information at the request of the US Securities and Exchange Commission. The environmental information of US companies is presented in the Global Initiative Report (GRI). US companies increasingly focus on environmental reporting because they primarily want to meet the needs of shareholders and the community and, most importantly, to meet the requirements of the law.

Environmental accounting in Germany in 1980 was started by the Federal Statistical Office of the Federal Republic of Germany but focused on environmental cost accounting and energy flow at the national level. In 1995, Germany studied and implemented the Input - Output Table - reflecting the flow of material and energy circulated within the economic system and between the economic system and natural resources in relation to human activity.

In 1996, the German Ministry of the Environment published guidelines on environmental accounting primarily focused on serving corporate governance purposes. Germany is a developed country, so it also faces environmental problems like many other countries. Environmental issues have put enormous pressure on increasing environmental protection costs, requiring disclosure of environmental information to stakeholders, etc. These things have forced businesses in Germany seeks EMA as a viable tool to solve these problems.

Germany is a pioneer in the study and application of material cost accounting. In addition, the establishment and development of the EMA in Germany is also due to the need for a comprehensive and consistent legal system, such as the Waste and Recycling Law, the Environmental Debt Law, the Product Debt Law…

Japan first applied environmental accounting in 1999, with made the birth of environmental accounting here. In March 1999 the Environment Committee issued guidelines for measurement and reporting of environmental costs. Then, the Ministry of Environment of Japan has continuously supplemented, revised the specific guidance on the implementation of environmental accounting in enterprises through 2002, 2003, 2005, ... EMA in Japan was born and developed on the basis of complete legal system and synchronous, with special attention of the Government agencies.

Thanks to this condition, the EMA in Japan has the opportunity to develop sustainably. The Ministry of Environment focuses on disclosing environmental information to serve outside parties, while the Ministry of Commerce and Industry emphasizes EMAs at the enterprise. The Ministry of Industry and Trade has studied the inclusion of environmental costs in product costs and the improvement of cost methodologies to apply for cost management to the design and development of the products concerned environment.

Japan is not the leading country in the EMA, but it is applied a very good EMA. Because of the very good performance of the EMA, it has provided a wealth of environmental information for both internal and external objects. One of the aspects of EMA that Japan has done so well is the material flow accounting.

Environmental accounting in Korea, because of the concern of the government and shareholders for the benefit of environmental activities, has made the business in Korea to research and develop environmental accounting since 1990. In 2000, Korea's Ministry of Environment coordinated with the World Bank to implement the project "Environmental accounting systems and environmental performance indicators".

In 2003, the Ministry of Environment of Korea drafted the "Environmental Accounting Guideline (draft)". In 2004, the Ministry of Environment of Korea announced guidelines for environmental accounting to guide the measurement and reporting of environmental costs including environmental benefits. EMA in Korea is built and developed on the basis of complete legal system,

with the cooperation of agencies such as Ministry of Environment, National Bank, Korea Accounting Institute, World Bank, leading Korean enterprises...

Environment Ministry publishes environmental accounting guides. The National Bank and the Korea Accounting Institute play an important role in the development of environmental accounting within the country. World Bank provides financial support to Korea to introduce and develop EMA. EMA in Korea focuses on measuring environmental costs. But most businesses only manage environmental costs related to pollution treatment but not including costs of replacing fuel, recycling, pollution prevention...

Then plan to assess the environmental benefits associated with the activities and disclose environmental accounting information through environmental reports. South Korean firms account for the allocation of environmental activity based costs. Environmental accounting methods in the country based on the flow of materials and energy.

The usefulness of EMA is based on the set of enterprise sustainability indicators

Criteria for assessing sustainable development are stable economic growth; to make good progress and social justice; rational exploitation, economical use of natural resources, protection and improvement of living environment quality.

Therefore, the Vietnam Business Council for Sustainable Development, Vietnam Chamber of Commerce and Industry (VCCI) announced the Corporate Sustainability Index (CSI) was developed as a measure of value. It is based on the criteria of sustainable development in the economic, environmental and social fields, as a tool for recording targets, measuring and managing changes to make the business is more sustainable.

CSI includes criteria that are relevant to the political and social context in the country as well as international practices. The positive impact on the economy, the environment and the community of a sustainable business development strategy is essential to be replicated and joined hands for a better Vietnam. The Corporate Sustainability Indicator includes two categories:

Part 1: Overview of enterprises, including 2 parts: Part 1: General information about enterprises. Part 2: Summary of business results of enterprises in recent 3 years.

Item 2: Situation of implementing sustainable development in enterprises, including 2 parts. Part 1: General criteria (14 criteria, from criterion 1 to criterion 14). Part 2: Specific criteria for each sector of sustainable development of enterprises (137 criteria, from criterion 15 to criterion 151) include:

Section A: Economy (20 criteria), in which: (I) Sustainable production (from criterion 15-20); (II) sustainable consumption (from criterion 21-24); (III) Ensure customer and consumer satisfaction (from criterion 25-34).

Part B: Environment (32 criteria, from criterion 35 to criterion 66), in which: (I) Compliance with Vietnamese law on environmental protection (from criterion 35-36); (II) Pollution prevention, disaster recovery, environmental improvement (criterion 37-45); (III) resource saving, response to climate change (from criterion 46-47); (IV) protection of forest resources, protection of biodiversity (from criterion 48-50); (V) protection of land resources (from criterion 51-54); (VI) protection of water resources (from criterion 55-57); (VII) Protection of air, dust, noise, vibration (from criterion

58-59); (VIII) Protection of mineral resources (from criterion 60-62); (IX) Protection of marine environmental resources (criterion 63-66). Section C: Society, Labor and Human Rights (85 criteria, from criterion 67 to criterion 151), in which, (I) Social relation (from criterion 67-69); (II) Prevention of Corruption and Monopoly of Business (from criterion 70-75); (III) employment (from criterion 76-87); (IV) worker training (from criterion 88-93); (V) internal rules (from criteria 94-98); (VI) Working time and rest (from criterion 99-102); (VII) Salary, bonus and allowance (from criterion 103-109); (VIII) Insurance regimes (from criterion 110-113); (IX) occupational safety and health (from criterion 114-123); (X) Health care and welfare for employees (from criterion 124-139); (XI) Democracy at Work and Collective Bargaining (from criterion 140-151).

However, in addition to the Corporate Sustainability Index, EMAs need to be used, as EMA overcomes the limitations of traditional accounting management. In traditional accounting, environmental costs such as waste disposal costs, environmental precautions and costs are defined as the environmental costs of an enterprise.

These expenses actually arise in the production and business process, are directly collected for the expenses incurred and then allocated to each subject according to an enterprise-defined criterion such as materials costs, labor costs... Moreover, the traditional cost model of environmental costing provides unclear environmental cost information, does not specify the impact of each activity on the environment, causing the image decisions about the environment.

With the production cost object only interested in the cost of manufacture, traditional models have not shown the relationship between the various departments and has not explained the source of cost increases, costs account for a large proportion of total environmental costs. Traditional management accounting mostly focuses on cost analysis at the manufacturing stage, without costing the product life cycles.

EMA overcome the limitations of traditional accounting management. EMA helps to accurately, costly, and discovers opportunities for increased profitability for businesses. Environmental management accounting will overcome the lack of information for environmental management decision making, the environmental costs that are hidden in general expenses, or the misstatement of general costs. , resulting in inefficient use, waste of raw materials, energy. An analysis of environmental costs helps companies accurately determine the cost of production and sales of products to build a competitive price strategy. It also helps businesses find opportunities to increase profits by saving costs, gaining additional revenue from recycling operations, using materials discarded from the process to serve the other operation…

EMA helps improve the competitiveness of the business. EMA helps provide more accurate, comprehensive information to measure performance, thereby improving the image, enhancing the brand value of the business. It also helps businesses reduce or avoid costs such as fines, liabilities, contingency costs, risk costs ... EMA helps bring benefits to society.

Thanks to the information from the EMA, businesses can contribute to the benefits of the community and society by minimizing environmental costs and impacts on the environment through specific solutions such as: To build a clean management system, to recover post-mining ...

Accounting model used in environmental management accounting

Actual cost accounting model, accounting collection of environmental costs according to actual costs incurred as the basis for the cost calculation of products. Actual environmental costs may be the cost of preventing, stopping, or treating costs caused by environmental impacts from the operation of the business. As such, information on product costs under this model is only available after the production process ends. However, this model has limited the provided information for the cost of production is still slow. The cost of production is concerned only with the cost of production, not the relationship between the different parts. Allocate costs only by a single criterion, leading to inappropriateness and inaccuracy to the subject's costs. Environmental cost information is not specific to each subject, causing limited awareness of the source, impact of activities on the environment, not to affect the environmental management decisions.

The Activity Based Costing accounting model is intended to overcome the disadvantage of the actual cost accounting model in the set and especially the allocation of general costs. The environmental cost model is determined on the basis of activities that have an impact on the environment and indirect environmental costs associated with the operation of the business are allocated to the products, service based on the activity that product creates. Thus, the environmental costs of activities must first be determined and then allocated to products based on the production of each of those activities. The basis of this model is simply: the resources that create activity, the activities that create the product. The objective of the model is to collect environmental costs and calculate the exact cost of the product. This model overcomes the disadvantage of the actual cost accounting model. However, this model has certain limitations such as creating large, complex workloads.

Life Cycle Costing accounting model, using techniques to estimate and determine the use of raw materials, energy and environmental impact over time. In practice, this method is very difficult to implement because it is difficult to identify the different stages of the product life cycle, and it is difficult to ascertain its waste and quantitative information.

The Material Flow Accounting model, which identifies the environmental costs associated with the use of materials in the production process, without considering the costs incurred beforehand production and post-production costs. Therefore, to determine the full environmental costs, need to combine with other accounting methods. On the other hand, this approach is only suitable for companies with a high proportion of material costs in total operating costs. For small companies, limited resources, this would be very costly because they do not identify the harmful effects of the environment under controlled environmental costs.

The Value Chain Accounting model identifies the environmental costs associated with the value chain starting at the beginning of the value chain called upstream such as research and development costs, design cost, the cost of providing the inputs of the product manufacturing process, after the finished product will start the downstream phase of the value chain as marketing costs, distribution costs and costs associated with customer service. Value chain modeling based on breakthrough achievements in the areas of information technology, biotechnology, nanotechnology, etc., is based on the breakthroughs of digital technology. It can be said that this is the breakthrough of digital technology in the past few years, following the results of the digital revolution took place

decades since the computer. The advent of computers has led to the digital revolution, especially when personal computers and the internet appear. Computers work only with numbers "0" and "1", and represent entities with numbers "0" and "1", which can be interpreted as the 'digital version' of the entity. The "digital version" of entities allows us to connect them together on computer systems or connect them to the internet, and create digital spaces that correspond to our real world.

These systems connect their entities and 'digital versions' are called cyber-physical systems. This is a fundamental concept of industrial revolution 4.0, which reflects the relationship of production to that of the entities world, but the computation is done on the digital space and the result is returned using for production in the world of entities. This is a fundamental change in the way people produce, and production is driven and decision-driven from the digital space. Therefore, the costing model of value chain in combination with the digital version will help to calculate and allocate environmental costs starting from the research and development phase, focusing on the ideas of Eco-friendly products, from the research results with the support of digital space, products and services will be designed, with product samples, services will be designed to calculate the inputs , this is a product phase designed to match the technical specifications, drawing details, assemblies, etc., will be formulated, implemented in digital space, with technical specifications and design. With the help of the "digital version", it will be possible to calculate the environmental costs incurred in relation to the products and services produced and to control the impact of products and services on the environment, the balance between the cost and benefit of the project (Total Cost Assessment TCA). USEPA (1995, p. 9-22) provides guidance on the methodology for evaluating the cost-benefit related to the environment of an investment project. This method helps managers select one of the environmental protection investment projects or compare the environmental impacts of different investment projects as a basis for selection of harmful investment projects to the environment is the lowest. After selecting the most environmentally damaging projects with the identified environmental costs, the relevant inputs for production and supply will be introduced to consumers through the marketing and introduction of products and services after the sale.

From the center to identify the activity center, each center may have one or more different activities. Collection of environmental costs incurred during the period for the department and inductive to the operations center. Thus, businesses must accurately calculate the actual consumption of activities that create different products. Then, allocate costs for each type of activity at the appropriate cost level. Based on the level of participation of each activity in the production process, businesses allocate environmental costs in the process of operation into production costs.

CONCLUSION

In order to help businesses grow sustainably, enterprises must first be decentralized in the organization. Different levels of management are empowered to make decisions and take responsibility in the scope of authority and responsibility that the organization gives them.

After that, businesses should use EMA, because EMA helps to correct, calculate costs, find opportunities to increase profits for businesses, overcome the lack of information for environmental management decision making, point out the environmental costs hidden in general expenses or misallocate general expenses, leading to inefficient use, waste of raw materials and energy. An

analysis of environmental costs helps companies accurately determine the cost of production and sales of products to build a competitive price strategy. It also helps businesses find opportunities to increase profits by saving costs, gaining additional revenue from recycling operations, using materials discarded from the process to serve the operation of others.

EMA helps to improve the competitiveness of enterprises on the basis of organizing the costing model in the value chain, reflecting the relationship of production conducted in the world of entities but the process of calculation is done in digital space and this calculation result is returned for production in the world of entities. This is a fundamental change in the way people produce, and production is driven and decision-driven from the digital space.

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