Construction Waste Management in the Green Accounting Perspective: A Study on Construction Companies in Indonesia

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ABSTRACT

This study describes construction waste management activities and their relevance to financial statement elements from a green accounting perspective. The research used a qualitative approach and was conducted on nine small and medium enterprise construction service companies with K (small) and M (medium) business scales. Data were collected using in-depth interviews with 17 informants and analysed using the Miles and Huberman technique. The results showed that the cost of managing concrete waste was part of the cost of cleaning the project site and had a 2-5% budget of the total. A concrete waste crusher machine will have a positive impact on the company because the results of waste treatment can be used in other construction processes. Reducing, reusing, recycling, and landfilling are all construction waste management activities. These activities have an impact on the cost of economic resources and the economic and environmental benefits for the company. These sacrifices and benefits are relevant to the elements that make up environmental financial statements. These elements include fixed assets (recycled machines and equipment), environmental costs, social costs, and other income, representing economic and environmental phenomena from construction waste management activities and is becoming a concern for green accounting implementation in construction companies in developing countries.

Keywords: construction waste management, financial statement elements, green accounting

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INTRODUCTION

Currently, the construction sector in Indonesia is required to complete projects that meet environmental management requirements and protect the environment, as mandated in Law No. 32 of 2009. It is reinforced by the Regulation of the Minister of Public Works and Public Housing No. 18 of 2021 concerning the Standards for Demolition of Buildings that in Article 15, paragraph 1 states, "building results in waste in the form of waste and materials must be carried out the disposal by the provisions of the legislation regarding waste management. Furthermore, demolition waste includes waste that can be reused and waste that can be recycled."

The increase in construction activities in Indonesia has a negative impact, especially on the increase in the amount of waste generated during construction projects. The economic growth of a country is followed by an increase in construction development, which in turn impacts construction waste problems (Arif et al., 2012; Shahid et al., 2022; Wang et al., 2022). Construction waste is considered dangerous to the environment as it contains hazardous materials (Ali et al., 2019), accounting for 35% of the total generated waste (Huang & Xu, 2011). The increased population causes the need for housing, which ultimately causes increased construction waste generation (Ekanayake & Ofori, 2004); the United Kingdom, the Netherlands, Australia, the United States, Germany, Finland, Japan, and Canada, generated 32%, 28%, 30%, 29%, 19%, 20%, and 27% construction waste respectively (Luangcharoenrat et al., 2019), including Indonesia's contribution of 29 million tons every year (AMF, 2023).

Efforts to build environmentally friendly or green construction projects are constrained, among others, by managing the material waste generated during the construction process so that it does not harm the environment. The management and reuse of construction material waste, if not handled effectively, can cause disturbances at the project site and thus, environmental pollution. Construction waste at the project site has been neglected by contractors owing to limited knowledge, resources, and technology to manage waste (Widhiawati et al., 2019). Furthermore, waste management in construction businesses has not been fully implemented.

Efforts are needed from construction service companies to minimise construction waste, particularly for Indonesian construction companies to implement sustainable construction principles in the execution of infrastructure projects, in an effort to create a sustainable infrastructure that fulfils the requirements of sustainable development (Willar et al., 2020). These efforts are related to improvements in the construction waste management process, but they can be costly. In conventional accounting, cost is the amount of money spent to produce a given product or service. Along with a paradigm shift focusing on sustainable development, there has been a shift in accounting concepts that focus on the environment. Green accounting minimises the weaknesses of conventional accounting that have not accommodated the environmental and social aspects of company activities that affect the accounting process (Gray & Laughlin, 2012; Thornton, 2013; Lako, 2018). Generally, companies consider the use of green accounting to reduce environmental impacts (Montemayor et al., 2019). In line with this, Rossi et al. (2016) argued that communication about a company's environmental impact can be conducted through accounting recognition, supported by independent financial reports. In the green accounting concept, companies must include elements of environmental costs in the financial results of a business (Dhar et al., 2021). In addition to environmental costs, there is also income related to economic benefits from environmental management activities (Kitchen et al., 2019).

According to Rumambi et al. (2019), every company's activity reflects the economic phenomenon of the company's financial transactions, where the elements of financial statements are constructed from existing transactions. The economic phenomenon in question can be in the form of a company's economic sacrifices, such as costs or assets, as well as economic benefits, such as income. Therefore, for the elements of environmental costs and income to be included in the financial statements of construction companies, companies need to identify the sacrifices or economic benefits derived from construction waste management activities.

The costs incurred, and the income obtained as a result of the activities in the green accounting context, need to be recognised as part of the expense and income components in the income statement. The cost of a company's economic resources can be recognised as investments (assets) if the cost provides tangible and intangible benefits in the present and future. When

these criteria are not met, the cost is recognised as a periodic expense (Lako, 2019).

Many researchers have analysed construction waste management (Chun-Li et al., 1994; Arif et al., 2012; Bansal & Singh, 2015; Luangcharoenrat et al., 2019; Shahid et al., 2022) and green accounting (Thornton, 2013; Deegan, 2013; Lako, 2018; Sadiku et al., 2021; Gonzalez & Vinces, 2022). Each study was conducted in two different study areas, and none of these specifically discussed construction waste management from a green accounting perspective. This study was conducted to describe construction waste management activities at nine construction companies in North Sulawesi-Indonesia and their relevance to financial statements from a green accounting perspective. Descriptions of construction waste management activities and their relationship with financial statement elements will assist the company in providing information about environmental performance to stakeholders.

This paper is organised in five sections. Section 1 explains the background of this study and has been described above. Section 2 reviews and discusses previous related studies on construction waste management and green accounting. Section 3 presents the research methods used to achieve the study objective. Section 4 describes construction waste management from a green accounting perspective. Section 5 draws conclusions including the limitiations of this study and further research.

LITERATURE REVIEW

Construction Waste Management

Construction waste is generated by construction activities. Waste adds no value to a product and incurs direct and indirect costs (Formoso et al., 1999). Construction waste, according to Yahya and Boussabaine (2004), is unutilised material, an outcome of the construction process. Construction waste is caused by damage, over-ordering, and issues, such as design modifications (De Silva & Vitana, 2008; Peng & Tan, 1998). Besides design, other sources of construction waste include paperwork, labour, construction planning and techniques, material handling, and procurement

(Luangcharoenrat et al., 2019). According to Gavilan and Bernold (1994) and Craven et al. (1994), the main causes of waste include, among other things, errors in contract documents, design changes, ordering errors, accidents, lack of control over the project site, lack of waste management, damages during transportation, and material cutting. Materials, excavations, demolition debris, project site clean-up, and rehabilitation waste are the primary sources of construction waste. According to Kofoworola and Gheewala (2008), construction and demolition waste is created during building construction, restoration, and destruction.

The construction sector has become a major contributor to the negative influence on the environment because of the large quantity of waste created by building activities, such as rehabilitation and demolition. Consequently, construction organisations must conduct comprehensive construction waste management to mitigate the harmful effects of building operations. Presently, construction waste management in Indonesia is minimal. This is because of an existing assumption that construction waste occurs as useless waste and can be ignored. There are no handling actions to reduce the volume of the material used (Widhiawati et al., 2019). Construction waste must be reduced, reused, and recycled before being disposed of at the final disposal site. According to the Minister of Public Works and Public Housing of Indonesia No. 18 of 2021, Article 51 states that the management of waste from demolition includes reused, recycled, and disposable materials.

Hierarchically, according to Chun-Li et al. (1994), construction waste management includes the following actions:

1. Reducing. The company should try to use materials efficiently and minimise the use of materials that will generate waste, so it directly has an impact on reducing the generated waste.

2. Reusing. During the construction process, the company should attempt to reuse materials that can still be utilized as much as possible.

3. Recycling. The company should attempt to reuse the remaining materials by processing them into reusable goods.

4. Landfilling. This stage is the last option for construction companies to dispose of waste at the final disposal site. Landfilling is performed when other alternatives cannot be performed.

In the sustainability context, construction activities impact society economically, environmentally, and socially (Taroun, 2014). The social impact of construction projects has certain consequences on human social life; construction projects impact life and work processes, may overcome various societal problems, and should meet community needs (Vanclay, 2006; Wang et al., 2016). Construction project development can lead to both positive and negative social impacts such as land acquisition and disposal, resettlement of nearby residents, and resource depletion (Tilt et al., 2009; Li et al., 2014). Thus, for construction activities to successfully contribute to sustainability, one requirement is to have waste management strategies and practices (Djokoto et al., 2014).

According to statistics gathered by the European Union Environment General Directorate, the construction and demolition process generates construction material waste. The amount of construction waste created annually is expected to exceed 180 million tons (Zalaya et al., 2019). This construction waste has a detrimental influence on the community and the environment surrounding the building projects; however, if it can be handled through a waste treatment procedure, the negative impact can be turned into a beneficial impact from both economic and social perspectives.

To have a beneficial influence on the community, companies should conduct recycling operations to reuse the residual material (e.g. solid concrete waste) through a recycling process using machines. Recycling concrete into coarse aggregates is one option for the deconstruction process (building and demolition). Malešev et al. (2010) defined coarse aggregate as recycled concrete aggregate derived from the treatment of building and demolition debris. A portable concrete crusher was used to complete the recycling process. According to Bansal and Singh (2015), this machine breaks concrete into coarse/fine aggregates, which may subsequently be recycled immediately.

Green Accounting

Green accounting is the activity of collecting, analysing, estimating, and preparing reports on both environmental and financial data to reduce environmental impacts and costs (Cohen & Robbins, 2011). All events, objects, impacts, and financial, community, and environmental transactions directly or indirectly related to corporate entities are considered in green accounting (Lako, 2019). In this concept, companies in their accounting records focus not only on financial transactions originating from business activities, but also on transactions related to environmental activities. The implication is that financial statements are prepared not only in the context of financial reporting but also in environmental reporting.

Therefore, according to Lako (2019), among the elements of financial statements, the asset section includes assets acquired as part of environmental investment activities. In the liability group, obligations arise from environmental activities. The company is responsible for the economic losses experienced by the community and the state from company operations that cause environmental damage or pollution of water, air, or soil. The equity accounts are related to voluntary CSR activities. These activities are based on sincere intentions and spiritual business values from their shareholders. The new accounts can emerge as CSER (Corporate Social and Environmental Responsibilities) donation accounts. It arises because management, at the request of the owner or shareholders, treats a number of CSER programs and sacrifices the entity's economic resources to implement CSER as a charity. These activities as a charity or love for fellow (people) who are poor, weak, disabled, and excluded. The CSER donation accounts is presented in the statement of the green financial position, below the current period profit / loss account. Moreover, companies need to calculate and include costs that affect the environment and society, both in the form of prevention costs and those incurred as a result of the company's operational activities, such as waste treatment costs, recycling costs, environmental audit fees, pollution costs, pollution control costs, environmental damage costs, and disclosure of environmental social information costs. The cost structure in preparing the profit and loss performance report includes production, operational, social, environmental, and other costs. The sacrifice of the company's economic resources (costs) to carry out environmental responsibilities is recognised as a sacrifice of investment (assets) if the sacrifice is considered to provide

tangible and intangible benefits that are reasonably certain in the present and future. If these criteria are not met, the sacrifice should be treated as a periodic expense in an entity's income statement.

Furthermore, regarding preparing environmental reports, environmental assets are understood as goods and investments to preserve and protect the environment and reduce the environmental damage that may occur. Some of these assets are inventories of materials used in the production process to minimise pollution, such as property, installations, and equipment used for this purpose (Aznar & Estruch, (2015) as cited in Gonzalez and Vinces, (2022). This obligation relates to the recognition of environmental costs associated with the acquisition of assets to avoid environmental impacts, as well as to future events or payments caused by the current situation that damages the environment (Gonzalez & Vinces, 2022). Revenue in the environmental context relates to the economic benefits obtained by companies from managing their environment, such as the sale of recycled waste, energy and material savings, and savings from the use of non-polluting or less-polluting materials (Kitchen et al., 2019). Expenses are recognised as a decrease in a company's economic resources, resulting from measuring environmental costs to avoid, repair, and reduced environmental damage (Gonzalez & Vinces, 2022). Thus, the profits or benefits obtained by the company include income and assets (Hens et al., 2018).

In general, financial statements comprise assets, liabilities, equity, revenue, and expenses (Institute of Indonesia Chartered Accountants, 2018). Financial statements are created from financial statement elements, according to the Statement of Financial Accounting Concepts (SFAC) number 6. These aspects describe the entity's economic phenomena derived from the business scope as well as transactions resulting from the entity's activity (Rumambi et al., 2019). This phenomenon is represented by the company's sacrifice of economic resources or economic advantages. In the following sections, green accounting is discussed to support Indonesian policymakers and the construction industry in formulating effective policies for construction waste management to improve the financial performance of construction companies through extensive implementation of green construction.

METHODOLOGY

This study used qualitative research methods. The research was conducted on nine construction service small and medium enterprises (SMEs) with business scales of K (small) and M (medium). Companies were selected using purposive sampling. Purposive sampling is a technique that is widely used in qualitative research. This technique is used to identify and select information-rich cases for the most effective use of limited resources (Patton, 2002). Researchers need to identify and select individuals or groups of individuals who have special knowledge about or experience with the phenomenon of interest (Cresswell & Plano Clark, 2011).

The purposive sampling method emphasizes selecting samples and research informants based on the questions the researcher wants to answer (Tongco, 2007), or when the information needed comes from specific target groups who are conform to the data collection criteria (Sekaran & Bougie, 2009). Research by Brussell (2004) with a research problem regarding information on medicinal plants, determines locals knowledgeable in medicinal plant usage as a basis for determining the sample. In this research, the fundamental question was related to construction waste management. Information about construction waste management was obtained from various scales of construction companies so these companies became research samples. Based on this sample, the determination of research informants referred to the criteria of those who understood construction waste management and were involved in the construction process.

This research aimed to describe construction waste management activities and their relevance to financial statement elements from a green accounting perspective. To achieve this goal, this study used a sample of several construction service companies in Indonesia. Based on the Regulation of the Minister of Public Works and Public Housing No. 18 of 2021, every construction company needs to manage construction waste. Therefore, all construction companies in Indonesia can be selected as samples in this study. Furthermore, Construction Services Law No. 2 of 2017 regulates the qualifications of construction services companies. Companies belonging to the K and M scale in Indonesia have the same characteristics, standards, and criteria, so SA and SUJM companies represent K-scale companies, also CBMg, CBMn, RK, AKA, Cr, STM, and Dy companies represent M-scale companies.

Data from the nine construction companies were collected through in-depth interviews with 17 project managers and company owners. Interviews are used when researchers need more in-depth information (Sugiyono, 2016). In-depth interviewing involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program, or situation (Boyce & Neale, 2006). It is useful to get more detailed information about a person's thoughts and behaviours or want to explore new issues in depth.

In this case, the information that needed to be explored in depth was related to construction waste management. Therefore, the informants were selected with the criteria that they understood construction waste management and its activities and were directly involved in the company's operational activities. The selected informants at the RK, AKA, and Cr companies were project managers because the company owners were not directly involved in daily project activities, and all activities were managed by the project manager. This is different from the SA and SUJM companies, where apart from the project manager, the owner was also directly involved in project management. On the other hand, in CBMg, CBMn, STM, and Dy companies, all management of the company was handled by the owner. The informants' data is shown in Table 1.

Table 1: Interview Informants Data

Scale of company	Name of company	Informants		
K (small)	SA	Owner & project manager	2	R1, R2
	SUJM	Owner & project manager	2	R3, R4
M (medium)	CBMg	Owner	1	R5
	CBMn	Owner	1	R6
	RK	Project manager	3	R7, R8, R9
	AKA	Project manager	3	R10, R11, R12
	Cr	Project manager	3	R13, R14, R15
	STM	Owner	1	R16
	Dy	Owner	1	R17
Total	9		17	

Source: Self-developed by researchers

Research data collection in the construction industry must use appropriate research methods (Abowitz & Toole, 2010). Data collection was carried out through interviews and literature studies. Data collected

from informants included business scope, type of construction waste, factors that cause construction waste, construction waste management activity, also budgeted and spent funds of waste. Literature studies were carried out on the concepts of construction waste management and green accounting.

Data analysis was carried out through the stages of data reduction, data display, and conclusion (Miles et al., 2014). The collected data were reduced and grouped based on the informants' answers to the key questions about the scope of the construction business, types of construction waste, factors that cause construction waste, construction waste management activities, and budgeted and spent funds. After that, researchers analysed the data.

The data analysis process was carried out in two stages. First, the researcher summarized the collected data to identify construction waste management activities. In this process, researchers interpreted the data by using the concept of construction waste management from Chun-Li et al. (1994). Next, the researcher described the relationship between construction waste management activities and the economic sacrifices and benefits of waste management. In this process, researchers also interpreted data using the green accounting concept Lako (2019) as well as SFAC concept No. 6. Second, the results of the first stage are classified into the elements of financial statements. This classification is also referred to as the green accounting concept of Lako (2019), Gonzalez and Vinces (2022), and Kitchen et al. (2019). The results of this analysis are displayed on two themes. First, identification of construction waste management activities and their relevance to economic sacrifices and benefits. Second, the classification of economic sacrifices and benefits of construction waste management according to the elements of the financial statement. After displaying the data, conclusions were drawn regarding construction waste management from a green accounting perspective.

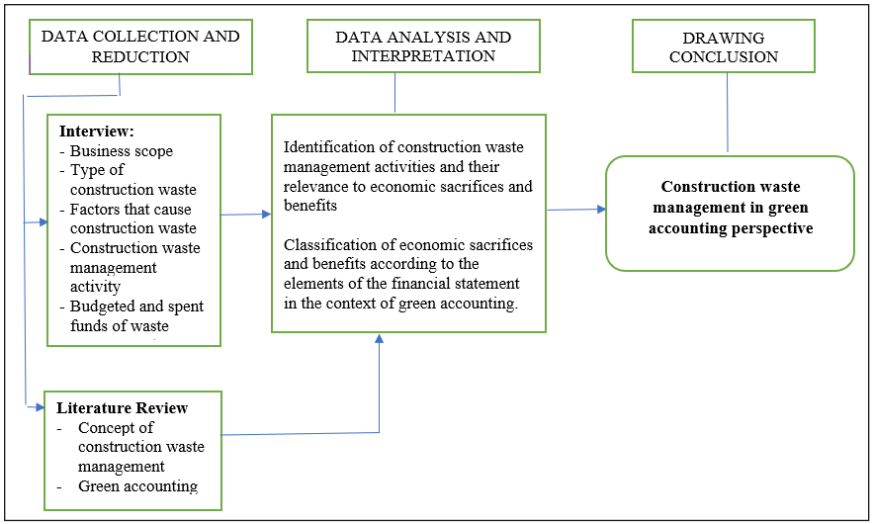

Figure 1: Research Method
Source: Self-developed by the researchers

RESULTS AND DISCUSSION

Based on the data collected from in-depth interviews with project managers and company owners, and after data reduction, we found information about the scope of the construction business, types of construction waste, factors that cause construction waste, construction waste management activities, and budgeted and spent funds, as presented below.

1. The scope of the construction business

   Some of the information obtained from the informants is as follows:

   "The company's scope of business is on the K- and M- scales. They are categorised based on the contract value per year. Construction projects include both government and private projects. The construction project includes the construction, renovation, and demolition of buildings."

   (R1-R17)

2. The types of construction waste

The information obtained from the informants is as follows:

"Construction waste is solid waste such as residual/damaged zinc, wood, iron, bricks, concrete, or installations."

(R1-R17)

3. The factors that cause construction waste

Some of the information obtained from the informants is as follows:

"The cause of construction waste is, for example, building demolition, renovation or new building construction work, wasted material, excavation work, lack of quality costs, lack of waste management, long distances for transporting the waste, differences between the volume of materials purchased and the materials needed and the non-environmentally friendly behaviour of project workers."

(R1-R17)

4. The construction waste management activity

The information obtained from the informants is as follows:

"We can deal with installation waste by disposing of it. Waste zinc, wood, iron, and bricks can be resold. The sale proceeds increase the company's income from a respective project."

(R2, R3, R8, R14)

"If the waste is left over from a government project and that is still useful, then the company will return it to the project and an auction is usually carried out by the relevant agency. In this context, the company recorded no revenue. If it can no longer be utilised, it will be destroyed, and a report will be produced. Likewise, this elimination action is free of charge to the corporation because it is carried out by a government entity that handles the budget."

(R1, R4, R5, R6, R8, R13, R16, R17)

"Solid concrete trash is often disposed of at a specific site as a shelter or utilised by the community as a landfill at their location, with individuals providing a particular amount of compensation for the solid concrete garbage. Such compensation is an extra source of cash for firms. If no reprocessing is performed, solid waste concrete might be used as a stockpiled material by the local community to create paths or parks. When garbage may be used by the community and donated without remuneration, this can be viewed as a company's social responsibility activities."

(R9, R12, R15)

"Building demolition and rehabilitation operations create solid concrete waste. Waste management includes transportation, disposal, and reuse. The solid waste of concrete generated during the demolition process is considerable; therefore, when it is disposed, it must be crushed into smaller shapes. To crush solid waste concrete with various equipment, it can be easily transported to the disposal location. Equipment such as hammers, excavators, concrete crushers, and concrete chisels is needed. Furthermore, the organisation needs workers to perform these diverse duties as well as cars to transport garbage to landfills."

(R1, R3, R5, R6, R7, R11, R13, R16, R17)

"In the context of waste management, companies need to consider the positive impact of the waste. Solid waste concrete can be recycled. Another reason for the need for recycling is the unavailability of land for solid concrete waste disposal or the very long distance to the disposal site, which adds up costs. The recycled waste can produce coarse and fine aggregates. Processed products can be reused during construction. Therefore, a company requires a machine that can be used in the recycling process. By conducting recycling activities, the solid concrete waste does not need to be disposed of, so it will not pollute the environment."

(R1, R7-R15)

"The costs related to the waste management process include equipment rental costs or the purchase of excavators, costs for purchasing recycling machines, costs for purchasing equipment such as hammers or concrete chisels, labour costs, vehicle rental costs, vehicle fuel costs, and rental costs land for disposal. In addition, waste management activities also generate income such as income from the sale of waste and income from the use of recycled material waste."

(R1-R17)

5. The budgeted and spent funds

The information obtained from the informants is as follows:

"The cost of waste management is between 2-5% of the entire budget/contract value and is known as the cost of clearing the project land, which includes demolition and transportation charges."

(R1-R17)

According to the data above, we present the identification of construction waste management activities and their relevance to economic sacrifices and benefits. Subsequently, we classify them according to the elements of the financial statements in the context of green accounting.

The Identification of Construction Waste Management and The Relevance to Economic Sacrifices and Benefits

Construction waste management consists of four stages: reducing, reusing, recycling, and landfilling (Chun-Li et al., 1994). Companies concerned with construction waste management carry out these four stages. In the accounting context, every activity has a close relationship with economic sacrifices and benefits. The activities carried out by the company were identified and grouped into 4 stages of construction waste management. This is presented in Table 2 below.

Table 2: Identification of Construction Waste Management Activities and Their Relevance to Economic Sacrifices and Benefits

Construction Waste Management Activities	Activity Description	Economic Sacrifices and Benefits of Waste Management
Reducing	Efficient use of construction materials and minimizing the use of materials that will generate waste such as minimizing wasted material and minimizing the difference between the volume of materials purchased and the materials needed	Purchase materials effectively
Reusing	Reuse of construction materials such as: Wood, iron, and bricks (internal company) Concrete as backfill material (external company)	Material purchase savings Obtaining compensation for stockpiling materials Corporate Social Responsibility (CSR) implementation
Recycling	Utilization of existing material (solid concrete waste) through a recycling process using machines	Purchase/Investment of solid waste concrete recycling machine Expenditures related to recycling
Landfilling	Disposal of construction waste to landfill that includes the following activities: - Demolition (if solid waste concrete is in large form) -Transport and disposal	Expenses for demolition Expenses for transportation Expenses for disposal The compensation received from waste as a stockpile

Source: Analysis results from informants' data

Classification of Economic Sacrifices and Benefits of Construction Waste Management According to Financial Statement Elements

To realise the company's responsibility for environmental conservation and to prevent environmental pollution, construction service companies need to minimise construction waste. Efforts to minimise such waste is shown in Table 2. In the accounting context, the identification of activities, sacrifices, and economic benefits of construction waste management will assist companies in providing information about their environmental performance to stakeholders.

The company conveys information on environmental performance through its financial statements. For construction service companies' financial statements to contain information related to their environmental performance, the elements that comprise the financial statements must represent the phenomena/ transactions/activities of construction waste management. According to SFAC number 6, the elements of financial

statements are the building blocks for constructing a financial statement (FASB, 2008).

The elements of financial statements are the representations of resources and claims to those resources and reflect the impact of transactions or activities of the entity so that the existing phenomena must be represented appropriately in the form of accounting information. The description of these elements represents the economic phenomena of business entities obtained from the scope of businesses and transactions (Rumambi et al., 2019). Therefore, the relevance between activities and the economic sacrifices and benefits of construction waste management activities needs to be represented and classified as the financial statements elements so companies can provide information about their environmental performance. The classification is suggested in Table 3.

Table 3: Classification of Economic Sacrifices and Benefits of Construction Waste Management According to Financial Statement Elements

Construction Waste Management	Economic Sacrifices and Benefits of Waste Management	Financial Statement Elements	Description of Financial Statement Elements
Reduce	Purchase materials effectively	Expense	Material purchase
Reuse	Material purchase savings	Income	Other income
	Obtaining compensation for stockpiling materials	Income	Other income
	CSR Implementation	Expense	CSR expense (manpower wage and transportation)
Recycle	Purchase/Investment of solid waste concrete recycling machine	Assets	Fix Assets (machine)/ machine investment for the environment
	Expenditures related to recycling	Assets	Fixed assets (equipment) Equipment rental expense
		Expense	Demolition expense Transport expense Labour wage
Landfilling	Expense for demolition	Assets Expense	Fixed assets (equipment) Labour wage
	Expense for transportation	Expense	Transport expense
	Expenditure for disposal	Expense	Vehicle rental expense Labour wage Land rental expense
	The compensation received from waste as a stockpile	Income	Other income

Source: Analysis results from informants' data

The classification of financial statements elements is only in the form of assets, income, and expenses without liabilities and equity. Based on data collection results, we did not find any liability to the community due to losses arising from construction waste management activities. This is also supported by the absence of regulations related to this matter. Likewise with the equity element. The informant explained that when stockpiled material may be used by the community and donated without remuneration, they interpreted it as a company's social responsibility activity. According to Lako (2019), an equity account can emerge if intentions and spiritual business values from their shareholders are concretized through existing donation programs and budgets. Stockpiled material as a waste construction result is provided to the local community, and does not have an impact on the equity account because there are no intentions and spiritual business values from the owner which are explicitly stated in the program and specifically in the budgeting by the management although this is interpreted as the implementation of CSR and can be grouped as CSR costs. When the waste (stockpiled material) is brought to the community, the company must pay transportation costs and workers' wages. Therefore, the discussion in Section 4 only focuses on the economic sacrifices and economic benefits of construction waste management that are related to the assets, expenses, and income as the elements of financial statements.

Construction Waste Management in the Green Accounting Perspective

The construction industry is the main producer of construction waste, which can cause significant environmental damage. Reducing the amount of construction waste requires heavy equipment (excavators) and garbage dump trucks, and needs to be managed more effectively, efficiently, and productively. It is necessary to realise the role of micro, small, and medium enterprises in providing construction services to maintain and preserve the environment, not only in the form of CSR activities, but also in tangible evidence of implementing environmentally friendly construction behaviour. SMEs that provide construction services are expected to be agile and adaptive in the face of competition in the construction service industry, which currently prioritises the application of environmentally friendly and green construction. However, studies by Willar et al. (2020) have shown that Indonesian contractors still experience problems in minimising construction waste production during construction.

Every construction activity impacts the community, that is, it has economic, environmental and social impacts (Taroun, 2014). Based on Table 2, it can be seen that the economic impact of construction companies is the compensation from the stockpiled material. However, solid concrete waste management activities have a social impact on the community in the form of a company's CSR implementation. The implementation of CSR to provide stockpile materials to communities can overcome community problems. Construction projects address various societal problems and meet community needs (Vanclay, 2006; Wang et al., 2016). To overcome the negative impact of construction waste, companies need to manage the waste to avoid polluting the environment.

Construction waste management includes several stages, reducing, reusing, recycling, and landfilling (Chun-Li et al., 1994). Based on the identification results in Table 2 and the classification in Table 3, the elements of the construction company's financial statements are closely related to waste management activities.

To carry out the reducing stage, companies must purchase materials effectively. It is intended so that the company can minimise the materials used to produce waste, minimise wasted material, and prevent the difference between the volume of materials purchased and the materials needed. Material purchase is an expense because of the cost of economic resources expended by the company.

A company can implement reusing activities internally or externally. Internally, the company can save on material purchases by reusing construction materials, such as wood, iron, and bricks, or using construction waste concrete as a stockpile material at the project site. Construction waste concrete can be used by the community as a stockpile material. The company can obtain compensation from the community for the stockpiled materials. Furthermore, if the company does not want compensation from the community, the provision of stockpile materials can be a form of CSR implementation. In the implementation of CSR, transportation and labour costs become CSR expenses.

The company conducts recycling activities to reuse the remaining material (solid concrete waste) through a recycling process with a machine,

so it becomes a coarse aggregate. Coarse aggregate is a recycled concrete aggregate used in construction waste treatment (Malešev et al., 2010). This machine crushes concrete into coarse and fine aggregates (Bansal & Singh, 2015). Therefore, companies can purchase or invest in machines that recycle solid waste concrete. The machine produces coarse aggregates that can be reused in the construction process. Besides purchasing the machine, there are other expenses for the company, such as equipment rental, demolition costs, transportation costs, and labour costs.

Construction waste disposal is the last alternative to construction waste management. The company carries out landfilling activities to dispose of construction waste. Disposal activities include demolition if solid concrete waste is in a large form, transportation, and disposal. The expenditures related to these activities include the purchase of equipment, labour wages, transportation costs, vehicle rental costs, and land rental costs for disposal. In addition to various expenses, the company can also receive compensation for the use of construction waste as a stockpile material. Compensation can be recognised by the company as another income source.

The effective purchase of materials reduces waste treatment activities, the cost of implementing CSR in reuse activities, and expenditures in recycling and landfilling activities because the company sacrifices economic resources. This is in line with the concept of periodic expenses from Lako (2019), which states that cost only provides benefits for the current period. The recognition and measurement of costs that affect the environment and society, both in the form of prevention costs and those incurred from construction waste management activities, are the company's economic sacrifice as a form of responsibility to the environment. The decrease in a company's economic resources to avoid, repair, and reduce environmental damage is also an expense for the company (Gonzalez & Vinces, 2022).

The purchase of recycling machines and equipment used in the recycling process is a sacrifice of the company's economic resources and it is a fixed asset for the company with long-term benefits. Investment costs meet the criteria as assets if they can provide tangible and intangible benefits that are quite certain in the present and future (Lako, 2019). In the environmental context, an asset can be understood as goods and investments used to preserve and protect the environment and reduce environmental damage (Aznar & Estruch, 2015 in Gonzalez & Vinces, 2022).

Savings on material purchases and the result of compensation from the community for reuse and landfill activities are other sources of income for the company. Other income is obtained from outside the company's main activity. In an environmental context, accounts are related to the economic benefits of managing the environment (Kitchen et al., 2019). Assets, expenses, and revenues arising from reducing, reusing, recycling, and landfilling activities represent accounting information in an environmental context. These elements are not only used by companies to form financial statements of business activities, but also relate to environmental activities. Therefore, the financial statements of construction service companies include financial and environmental reports. From a broader perspective, financial and environmental reporting are part of green accounting (Lako, 2018).

CONCLUSION

Companies have an inseparable relationship with the environment with a reciprocal impact. From a green accounting perspective, construction service companies report not only the financial aspects of their business activities, but also the environmental aspects of waste construction management activities. Reducing, reusing, recycling, and landfilling activities reflect a decrease in economic resources, as well as the economic and environmental benefits of managing construction waste. Therefore, assets, expenses, and revenues are elements that form the financial statements of construction companies. More specifically, these elements are described as fixed assets (such as recycling machines and equipment), environmental costs (such as material purchases, labour costs, transportation costs, vehicle rental costs, equipment rental costs, demolition costs, and land rental costs for disposal), social costs (such as the cost of CSR implementation), and other income (such as savings on material purchases and obtaining compensation). The existence of these elements becomes a source of information about the environmental performance of construction companies, which is also a reference to help construction companies implement green construction.

At a practical level, this study also found that the company's budgeted costs for managing construction waste are 2-5% of the total budget. The waste management process at the recycling stage can use a construction

waste processing machine to process concrete waste into fine aggregates. This aggregate could be reused during construction.

In addition, the results of this study inspire other K- and M-scale construction business actors to implement environmentally friendly measures and incorporate green accounting elements as part of their financial reporting to show their concern for sustainable development. The limitation of this study is the use of K- and M-scale construction companies that conduct more projects from the government as the samples of this study, where for further research private construction projects can be targetted for samples of the study. It is possible that a study performed on construction service companies with larger private projects that use environmentally friendly materials might provide a new discourse on construction waste management so that it can enrich the existing green accounting concept. This study also opens a space for further research on the preparation of construction companies' financial statements from a green accounting perspective.

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