



# International Journal of Finance and Accounting

[ijfa.eanso.org](http://ijfa.eanso.org)

Volume 3, Issue 1, 2024

Print ISSN: 2790-9581 | Online ISSN: 2790-959X

Title DOI: <https://doi.org/10.37284/2790-959X>



EAST AFRICAN  
NATURE &  
SCIENCE  
ORGANISATION

Original Article

## Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies

Caleb Magoba<sup>1</sup>, Esther Mutombo<sup>1</sup>, Eliah Zvimba<sup>1</sup>, Prince Sosani<sup>1</sup> & Gift Manhimanzi<sup>1\*</sup>

<sup>1</sup> Zimbabwe Ezekiel Guti University, P. O. Box 350, Bindura, Zimbabwe.

\* Author for Correspondence Email: [gmanhimanzi@staff.zegu.ac.zw](mailto:gmanhimanzi@staff.zegu.ac.zw)

Article DOI: <https://doi.org/10.37284/ijfa.3.1.2248>

Date Published: **ABSTRACT**

28 September 2024

**Keywords:**

Environmental  
Management  
Accounting  
Practices,  
Financial  
Performance,  
Environmental  
Budgeting.

This research was set up to investigate the impact of Environmental Management Accounting Practices on Financial Performance (ROI) for mining firms operating in Bindura. The study objectives were to identify environmental management accounting practices employed by mining firms, establish the roles of environmental management accounting practices and to assess the relationship of environmental management accounting practices on environmental performance (EP) and on return on investment (ROI). Mixed method research strategy which blends characteristics of both quantitative and qualitative research design were used. Data was collected from a sample of 41 participants using questionnaires and interviews as data collection instruments. Descriptive statistics and inferential statistics analysis tools were employed. Data analysis and presentation employed the convenience of SPSS and MS Excel packages. The research concluded that mining companies mainly use environmental budgeting, environmental capital appraisal and environmental performance tools in their mining processes and activities. It also concluded that EMAPs improves environmental performance (EP) and ultimately financial performance. To the primary beneficiaries the research study suggested that mining firms should embrace EMAPs as part of strategic management process so that they maximise from benefits associated with adoption of EMAPs. The research also recommended that the Central government should consider designing fiscal incentive policies to encourage more investment in environmentalism. Lastly, media has been recommended to stimulate public interest in environmentalism for it is anticipated that public interest pressure groups activism will accelerate the speed on adoption of environmental management accounting practice.

### APA CITATION

Magoba, C., Mutombo, E., Zvimba, E., Sosani, P. & Manhimanzi, G. (2024). Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies *International Journal of Finance and Accounting*, 3(1), 53-76. <https://doi.org/10.37284/ijfa.3.1.2248>.

### CHICAGO CITATION

Magoba, Caleb, Esther Mutombo, Eliah Zvimba, Prince Sosani and Gift Manhimanzi. 2024. "Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies". *International Journal of Finance and Accounting* 3 (1), 53-76. <https://doi.org/10.37284/ijfa.3.1.2248>.

### HARVARD CITATION

Magoba, C., Mutombo, E., Zvimba, E., Sosani, P. & Manhimanzi, G. (2024) "Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies" *International Journal of Finance and Accounting*, 3(1), pp. 53-76. doi: 10.37284/ijfa.3.1.2248

**IEEE CITATION**

C. Magoba, E. Mutombo, E. Zvimba, P. Sosani & G. Manhimanzi "Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies", *IJFA*, vol. 3, no. 1, pp. 53-76, Sep. 2024.

**MLA CITATION**

Magoba, Caleb, Esther Mutombo, Eliah Zvimba, Prince Sosani & Gift Manhimanzi. "Impact of Environmental Management Accounting Practices on Mining Entities' Financial Performance: Case of Bindura Mining Companies". *International Journal of Finance and Accounting*, Vol. 3, no. 1, Sep. 2024, pp. 53-76, doi:10.37284/ijfa.3.1.2248

**INTRODUCTION**

The world is under the threat of extinction due to problems emanating from environmental damages. Environmental problems are mainly triggered and exacerbated by irresponsible human activities (Bodansky & Daniel, 2013). Human activities include inter alia the emissions of refuse in water bodies, emissions of Greenhouse Gases (GHG) into the atmosphere which are emitted deliberately or incidentally during production processes. These GHG and other refuse emissions cause a chain of environmental problems and some of these problems are so disastrous that they may lead into human extinction on mother Earth. Some of these environmental challenges are depletion of the ozone layer among many of these problems (Karimi, Dastgir, & Saleh, 2017). Ozone depletion allows the ultra-violet rays which were prevented from reaching humanity by the ozone layer. Ultra-violet rays cause life threatening diseases such as cancers.

On the other hand GHG are blamed of causing problems associated with climate changes such as increased incidences of cyclones, acid rain, prolonged hot seasons, glaciation which may lead to the submergence of other parts of nations and islands as sea water levels rise (Wei-Lun & Yan-Kai, 2019). Nations such as Barbados, Mozambique, are under the threat of climatic induced problems which are related to environmental damages. Zimbabwe is also not spared as it had already experienced environmental induced problems in different forms (Plowes, 2002). In the year 2000, Zimbabwe was ravaged by its first major cyclone, which destroyed homes, farmland and other infrastructure such as dams, roads and bridges (Zimbabwe, 2000). The cyclone also left many people homeless particularly those living in low lying areas. Furthermore, another cyclone related

flooding occurred in the South Eastern districts of Zimbabwe which includes Chimanimani and Chipinge killing people, destroying roads, bridges, buildings and homes (Konrad Adenauer Stiftung, 2020). Many people were killed in this unfortunate event leading into a humanitarian problem. Those who survived the cyclone were left without food and shelter.

In all these environmental problems mining companies are also involved partly as perpetrators and also as potential game changers to these environmental problems. In the process of extracting minerals from the earth surface or underground mining companies are inevitably involved in damaging and contaminating the environment (Chukwudi et al, 2016). They open up mining shafts, creating big holes and craters which are dangerous to humans, animals and also disturbs the sustainable natural ecosystems. Furthermore, the processing of minerals requires dangerous chemicals, such as cyanide, mercury, and many of these chemicals which contaminate water bodies including dams, lakes and even underground water through the processes infiltration and percolation (Chaudhry, 2020). The contamination of water bodies will make it very costly to purify the water and ultimately unclean water will end up being consumed by animals and people without adequately being treated. Aquatic life is also threatened due to refuse released in dams and rivers.

It is unfortunate that most of the companies only comply with these laws to avoid costs associated with environmental damage, without consideration of the potential benefits which may be derived in pursuing green manufacturing (O'Neill, 2017). Many of these companies including mining firms, do not necessarily integrate environmental management accounting practices (EMAP) in their accounting system in

what is generally called green accounting. It is believed that firms which integrate environmental management accounting practices (EMAPs) in its accounting systems stacks competitive advantage over its rivals (Chaudhry, Humaira, Muhammad, & Hussian, 2020). EMAPs are envisaged to be important in exposing environmental costs and revenues. The exposition of environmental costs and revenue will add another dimension of information which will improve decision making particularly in reducing environmental costs and exploitation of opportunities derived from adopting EMAPs.

### Statement of the problem

Profit maximisation is the primary economic objective of any business (USAID, 2019). Environmental costs are perceived to cause unnecessary costs and therefore firms strive to avoid them where possible. They only assume environmental costs and obligation only to the extent of complying with international environmental laws, government laws, regulations and policies. In contrast to this cost averse approach, few researches has shown that adoption of environmental management accounting practices may debundle and expose environmental costs capable of stimulating innovations in efficient environmental friendly technologies which are capable of improving financial performance and reputation of companies (Kaplan Financial Limited, 2019). Furthermore, there is a growing trend by customers to buy goods from environmental friendly firms and as such there is a potential of increasing market reach for firms adopting green accounting. It is behind this backdrop that the researcher seeks to find out that pursuing environmental management accounting practice will lead to increased financial performance of mining companies and innovations in environmental efficient mining technologies.

### Research Hypothesis

The hypothesis is based on the research question 4:

*H<sub>0</sub>: The adoption of management accounting practices does not increase ROI*

*H<sub>1</sub>: The adoption of environmental management accounting practices increases ROI*

## LITERATURE REVIEW

### Theoretical framework

To facilitate conception on the impact of environmental management accounting practices on financial performance it is pertinent for various philosophical views, to be scrutinised. Whilst there are several theories which facilitates in gaining an in-depth understanding of the influence of EMAPs on financial performance, this study finds greatest value in the legitimacy theory, the agency and the contingency theories.

### Legitimacy theory

Firstly, the legitimacy theory provides a view that the interrelationship between an organization and the related social expectations is simply a fact of social life (Ayoib, 2015). The theory simply states that organizations seek to operate within parameters that are acceptable by society since an organisation is a member of the society. Since it is a member of society it is both affected and affect society. This symbiotic relationship between society and its elements are very crucial because they determine the existence of the entity. Retribution by society may be detrimental to the demise of an entity. However, Mobus (2015) argues that different forms of legitimacy pertain to different external audiences. Other legitimacy theory researchers reasoned that non-disclosure of environmental liabilities would attract negative media, and pressure group attention and consequently may affect performance of an entity (Tang & Fiedler, 2005). The essence of this is that an entity should operate within the legitimacy parameters set by the society in which it operates.

Furthermore, Schippper (as cited in Fontana, D'Amico, Coluccia & Solimene, 2015) argued that companies should satisfy the expectations of the society which is comprised of a set of a wide range of stakeholders and consequently for this reason they need to produce more information. The legitimacy theory also incorporates the philosophy of behaviour transformation because societal norms, values and believes continuously

evolve with time and as a result firms should be prepared to transform in tandem with societal changes. The implication is that as environmental information and requirements continues to change organisations should be able to adopt to these environmental and ethical issues into account (Jerry et al. 2015). Thus the firm is expected to operate within the parameters of the society in order to maintain peace.

### **The Agency theory**

Historical studies have played a remarkable role in management accounting in the recent years which have helped the development of a subordinate area of environmental management accounting. (Holden, Fish, & Smith, 1941) performed an empirical study of incorporated entities and discovered that the fundamental responsibility of management is control. Control serves as a monitoring mechanism which ensures that organisations set objectives are accomplished. Any deviations are analysed through variance analysis and appropriate decisions are taken by the responsible management (Legaspi, 2018). The focus of management accounting by then was on product costs. Product costs were an important input element in the drafting of budgets and the financial control of production processes. Management controls were oriented towards manufacturing and internal administration (Abdel-Kader & Luther, 2008). Management accounting was not proactive but rather reactive when significant variances emerge from the business plan (Ashton, Hopper, & Scapens, 1995)

Then, agency theory makes an important contribution to costing and management accounting as well as to environmental management. It includes explicit recognition of the behaviour of the agent whose actions is a determinant of information generated from the environmental costing and environmental management accounting system in line with the main responsibility of influencing control. (Jensen & Meckling, 1976) stated that the principal duty of the agent (manager) is to maximize the wealth of the principal (firm's owners). Generally, in

practice the principal agent relationship is established in the employment contract. This contractual relationship works well when the agent works to the best interests of the principal (Legaspi J. L., 2018). In general, the interests of business owners are wealth maximisation. Accordingly the agent (manager) must strive to maximise the wealth of the principal and desist from pursuing personal interests such as self-wealth maximisation (Legaspi J. R., 2018). To manage this kind of behaviour the owner may supervise the agents' performance through an accounting information system (Jensen & Meckling, 1976) An accounting information systems generates its information as one of its sources from a sound environmental costing and environmental management information system.

### **The contingency theory**

Furthermore, contingency theory in environmental management accounting describes how appropriate the environmental management accounting information and control system can be designed to match the size of the organization. The contingency theory is based on the premise that the application of any management principle is dependent on the specific situation encountered by management at any given point in time (Smit, Cronje, Brevis, & Vrba, Management Principles: A contemporary edition for Africa, 2013). In other words, there is no one best way in organizing and leading the organization. An entities environmental management accounting system style that is effective in some situations may not be ordinarily successful in others. It therefore, follows that the optimal environmental management accounting system is contingent upon various internal and external constraints (Drury, 2015).

The focus these days is to identify the most developed and efficient EMAPs and other management accounting tools such as: the business process reengineering, environmental activity based costing; environmental budgeting tools, environmental adjusted balanced scorecard; environmental life cycle costing and target costing and environmental strategic management



accounting (Björnenak & Olson, 1999). Over the years, research in costing and management accounting and environmental management continued unabated and focused on how best environmental management accounting systems can be applied on different situations and environments faced by various entities (Legaspi J. L., 2018). Especially research on environmental management accounting change, most relates to practices in developed countries and recently in developing Asian countries. It therefore follows that, there is no single best way to manage. The contingent theory is therefore of great importance in explaining how environmental and management accounting practices (EMAPs) influence the performance of mining entities (Maziriri & Chinomona, 2016). (Otley, 1980) applied contingency theory to management accounting practices and explained that there is no single general standard accounting practice that can be applied to all organisations. Similarly, there is no single environmental management accounting practice (EMAP) which can be applied to mining operations in all situations.

### **Types of Environmental Management Accounting Practices (EMAPs).**

#### **Environmental budgeting (EBT)**

Budgeting is a management accounting tool which is widely used by firms to control performance. It is a proven fact that budgeting improves performance in terms of both financial performance and non-financial performance (USAID, 2019). Environmental Compliance Budgeting is the process that ensures adequate resources are available for implementation of environmental safeguards and that provides transparency to assure the funds remain available for these activities (Legaspi J. L., 2018). That is, the process by which project budgets (from the proposal stage through each annual request for funds) transparently capture costs for environmental compliance requirements, which are an integral part of any project and must be duly paid for. Budgeting for environmental compliance is required by USAID's Operational Policies. However little is known as to whether EBT can

derive the same results on performance particularly for mining firms. Previous research in this area are mainly in western countries and developed nations of Asia (Ahmad, 2017). Even in those nations, researches in EBT are still sparse.

#### **Environmental Costing (ECT)**

Environmental costing is a tool used to trace and analyse costs and revenues attributable to the environment (ACCA Global, 2010; Karimi, Dastgir, & Saleh, 2017). This method is believed to enable entities to control costs and revenues and ultimately improve performance particularly financial performance. Nonetheless, though costing techniques has been a management accounting technique which have been in use for quite a long time little is known of its applicability to environmental management accounting especially in improving the firm performance (Tietenburg & Lynne, 2016). Suggested reasons for sparse use of this technique are attributable to the fact that environmental costs were not analysed separately but bunched in other overheads such as manufacturing and administration overheads.

#### **Environmental capital appraisal techniques (ECAT)**

Environmental capital appraisal techniques (ECATs) involves budgeting for capital outlays to invest in environmental friendly technologies (Drury, 2015). These technologies are responsible for reducing environmental related costs, rehabilitating the environment and for installation of clean production systems. ECATs are to a substantial extend widely used in developed nations and particularly in mining industries, manufacturing industries and other industries which are known of contributing heavily to environmental damage (Drury C. , 2018). In developing nations few entities use ECATs and even the few which use ECATs they use it only because they are forced by regulatory agency, international protocols, and legislature of the respective countries. Outside the regulatory and international protocols ECATs are not embraced by entities and the reasons are not clear as yet.

### **Environmental performance measurement techniques (EPMT)**

Performance need to be measured. Environmental performance measures are regarded as less important because they are viewed to contribute less in terms of the predominant economic firm objective of wealth maximisation (Ahmad, 2017). Furthermore, pursuing environmental performance is blamed for contributing unnecessary and avoidable costs (Debnath, 2019). Consequently, environmental costs should remain concealed for as long as is possible.

### **Environmental product pricing techniques (EPPT)**

There are potential benefits which may be derived by including environmental costs and revenues in pricing decisions. Most of the pricing techniques analyses costs accumulation per unit of a product before adding a mark-up (Alemu, 2020). However, in the absence of environmental costing techniques it follows that it is invariably impossible for EPPT to include environmental costs. This results in lost opportunities of controlling costs and revenues related to the environment.

### **Roles of environmental management accounting practices (EMAPs)**

#### **Manage stakeholder conflicting interests on the environment.**

Environmental management accounting practices plays a wide spectrum of roles to business entities (Czinkotaa, et al, 2020). One of its fundamental role is to minimise pressure from various environmental stakeholders. It is evident throughout all business sectors that pressure is mounting emanating from various pressure groups over the need for firms to recognise the damages they are causing and perpetuating over the environment. EMAPS, assists firms to create and innovate sustainable approaches and strategies of dealing with environmental degradation whilst at the same time meeting their economic objectives of wealth maximisation (ACCA Global, 2010). EMAPs is the nexus between the wealth maximisation objective of

business and green manufacturing. Boston College (2016), posits that the well informed customers prefer products services and products from environmental friendly firms as opposed to just basing their buying decisions on price and other economic factors alone. Neu, Waramé and Pedwel (2018), echoed similar sentiments when they posit that EMAPs plays an imminent role in sprucing up the image of the firm to external stakeholders. Thus environmental management accounting derives mutual benefits between the business sector and society (Neu, Waramé, & Pedwel. , 2018)

#### **EMAPS is the basis for firms' decision making on environmental and financial performance.**

EMA provides both physical flow information and monetary information which can be readily manipulated by organisations' decision makers (O'Neill, 2017). This information will significantly impact on environmental and financial performance of any business. Savage et al (2002), were however quick to note that, EMAPs facilitates internal decision making the adoption of EMAPs is not guarantee to any specific level of financial or environmental performance. However, for organisations that do have the goals of minimising costs in general, environmental costs in particular, or environmental impacts, EMA clearly provides a critical set of information for meeting those goals.

#### **EMAPs exposes opportunities to reduce environmental costs.**

One major role of EMAPs is its capacity to identify environmental costs and expose environmental inefficiencies (Homan, 2016). The exposure of environmental costs and inefficiencies by EMA will assist the firm to reduce environment-related capital investments or environmental operating costs. Ultimately, profit margins will be increased or allow the lowering of product prices (Doorasamy & Garbharran, 2015). Furthermore, reductions in potential environmental obligation will also reduce legal compliance costs and improve access to financing and customer contracts (Ashton, Hopper, & Scapens, 1995). For example, an industrial firm

that is able to recognise the true magnitude and monetary value of the wasted raw materials exiting the facility in the form of pollution and waste may be motivated to identify options for reducing the waste, recovering the raw material, and saving money (Abdel-Kader & Luther, 2008). The reduced volume or changed content of the wastewater stream may allow lower cost wastewater treatment plant upgrades in the future (Baldarelli, Baldo, & Nesheva-Kiosseva, 2017). A local government agency responsible for delivering municipal solid waste management services to the local community can use EMA information determine the combination of services, for instance recycling, landfilling, incineration, that is the most cost-effective and has a minimal environmental impact.

### Strategic reasons

Companies no longer adopt the green industry concept not only to minimise or avoid costs associated with non-compliance but also as a strategic choice which leads to wealth maximisation. The greening of industries has become a core determinant of economic competitiveness and sustainable growth for example Dupont (O'Neill, 2017). Input resources represent a crucial production cost for companies in the production of goods or the provision of services (UNIDO, 2019). Consequently, firms which adopts green manufacturing and service provision by improving efficiency stacks a strategic competitive advantage over rivals. The greening of industries also plays a role in poverty alleviation, through promoting energy security, health and safety, jobs, and reducing costs through increased productivity (Iheduru & Chukwuma, 2019). Furthermore, the current generation of consumers is well informed particularly with the developments of digital technology. They are well informed of the importance for firms to adopt environmental friendly business practices. It is therefore not surprising for consumers and customers' particularly first world customers are more sensitive to buying products for pro-environment entities (Ki-Hoon L et al, 2017; Jeonbaeva, 2015).

### Limiting factors on the adoption of environmental management accounting practices (EMAPs)

Karimi et al. (2017) analysed factors affecting the adoption of EMA to provide a conceptual model, from the financial managers and assistants point of view, who are in the oil refining and petrochemical companies. The result indicated that the limiting factors to the adoption EMAPs is the inherent resistance to change, absence of EMAPs standards framework, and clear methods of collecting and allocating environmental costs (Karimi, Dastgir, & Saleh, 2017).

The study also revealed that organisations competitive environment and the culture of the community in interacting with environmental are some of the factors which determines the use of EMAPs (Karimi et al 2017). Le et al (2020) accounted the lethargy for the adoption of EMAPs by firms to weak environmental legislation and enforcement structures. The behaviour of firms on the adoption of EMAPs is also delayed if in a particular country there are few and less vocal pressure groups such as environmental pressure groups, shareholders, employees, investors and lenders (Li, Dang, & Le, 2020). In other nations these pressure groups have transformed the organisational culture, the management systems as well as the accounting systems of various organisations (ILO, 2018). The change in the accounting systems in which EMA is a branch was accounted for form the various environmental management pressure groups.

Another, inhibiting factor on EMA uptake is the nature of the firm and managers perspective on environmental costs and benefits (Burritt, 2015). Phan et al (2017), contented that managers who are more informed about EMA are flexible to adopting an EMA information system and appreciate its usefulness. They are willing to consider the costs and benefits associated with environmental accounting. Similarly, Phan et al (2017) noted that management support on EMA information systems has a great positive bearing on the implementation of EMAPs. Buttressing the importance of management support for EMA

Roger (2015) reiterated that managers in heavy manufacturing companies are more flexible to change and generally ready to adopt EMA particularly because of strict regulatory, economic, environmental and international pressures (Phan, Baird, & Su, 2017). However, the readiness of managers to embrace EMA depends on how soon concerns about regulatory inconsistency at local levels and low environmental awareness among employees can be resolved (UNICEF, 2019).

Hamzah et al. (2018), identified several inhibiting factors to the adoption of EMAPs in local government authorities. The included inter alia, the strength of social cultural factors, regulatory pressures from environment authorities, environmental expectations of the community, situational needs of particular companies, and complexity of waste operations (Burritt, 2015). The strategies of the different local authorities also have a bearing on the adoption of the EMAPs.

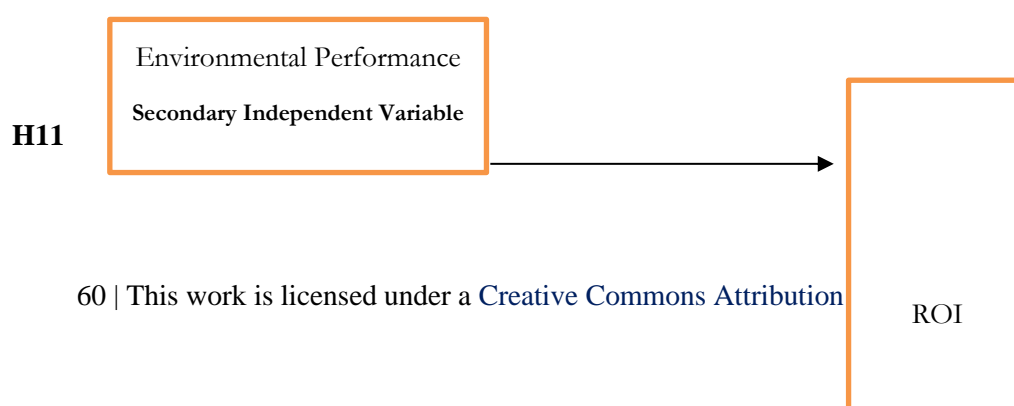
### Financial performance measures

#### Concept of return.

The concept of return is a derivative of performance measurement (Drury, 2015). Performance measurement is important in every type of business because decisions related to finance and operations are based on performance. There are various ways of measuring performance but in general performance is measured using non-financial measures and financial measurement tools (Legaspi, 2018). Return on investment is a financial measure, hence the focus is to explain financial measures and the reason why the research opted for Return on investment (ROI) measure.

### Conceptual framework

**Figure 1 : Conceptual Model 1**



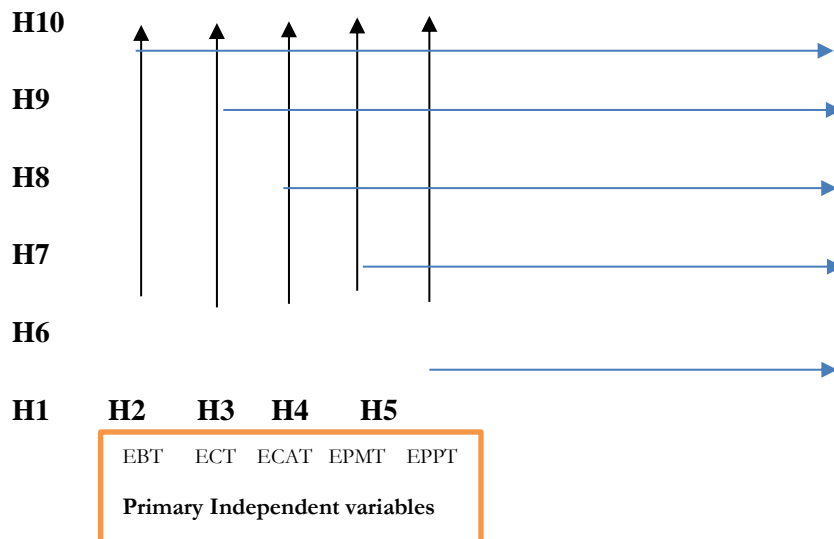
### Financial performance measures

Financial measures are the bedrock of measuring any business performance though non-financial measures like the balanced score card are equally important. Financial measures have been used by various types of business for strategic business intents. Financial measures provide the fundamental and objectives information which is very crucial for strategic decision making. Non-financial measures in most of the circumstances complement financial measures. Accordingly this research will only analyse and evaluate the impact of environmental management accounting practices on financial performance (Harrison Jr, Horngren, Thomas, & Suwardy, 2014). Financial measurements, measures what transpired in the past and mainly their focus is a short span. Financial measures are specifically important in liquidity, profitability, efficiency and the capital structure (Lubbe, Modack, & Watson, 2017).

### Return on Investment (ROI)

ROA shows the profit return attributable to owners of the business (Huang & Hou, 2019). It shows how the assets of an entity are efficiently utilised in generation of the investment returns. The ROI is computed by taking into consideration of calculating profit which are revenue and expenses as well as the assets (resources) which enabled that profit or loss to be experienced (Qi, Peng, & Xiong, 2020). Therefore, to increase return assets must be utilised optimally and at the same time revenue should increase and expenses managed to acceptable levels. It is this ratio which was used as the basis of this research because it takes major elements of return into consideration. These elements are revenue, operating expenses and the resources controlled by the entity (Wang & Kesan, 2020).





Source: Researcher 2020

### Independent variables

The independent variables are the environmental management practices (EMAPs). These EMAPs are environmental budgeting techniques (EBT), environmental costing techniques (ECT), environmental capital appraisal techniques (ECAT), environmental performance management techniques (EPMT) and environmental product pricing techniques (EPPT). Their simultaneous influence on both environmental performance and return on investment (ROI) is going to be tested. Environmental performance is a dependent variable to the primary independent variables. At the same time, it also acts as an independent secondary variable.

### Dependent variable

There are two dependent variables which are environmental performance (EP) and the return on investment (ROI). EP is a secondary independent variable which is also a result of the primary independent variables. The ultimate dependent variable is the return on investment. The association of the primary independent variables and the secondary independent variable of EP on ROI was also tested.

### Empirical evidence

A study conducted by Hasniza and Malcolm (2013) in Turkey revealed a strong positive

impact of EMAPs on company's performance using the balanced scorecard framework from data gathered from 197 manufacturing firms. Hutahayan (2020) indicated that EMAPs promotes innovation and also revealed that innovation does not need substantial changes to processes. Sometimes it may only require little changes to the current arrangements (Chaudhry, Humaira, Muhammad, & Hussian, 2020). For example, little adjustments on processing, waste reduction and minimisation of costs. Adopting environmental innovation on strategy may result in internal processes improvement. Hasniza and Malcolm (2013) reiterated that if entities introduced new environmental management practices in their processes they gain competitive advantages over their rivals (Hutahayan, 2020). Firms with superior competitive advantage are highly innovative and generally it is complex to imitate their competitive advantage. As a result, these firms enjoy long run benefits by adopting EMAPs (Gomez-Conde et al., 2019; Reed, 2012; Saeidi et al., 2018).

A limited number of studies refutes the presence of a positive association between environmental process innovations to company financial performance. A typical analogy is an investigation conducted by Njanja (2013) which established that environmental process innovation has a substantial negative influence on a firm's performance. In another research, environmental

innovation on process was blamed for stifling growth of a firm (Mahfud, 2015). This acute difference could have been caused by factors which were not taken into consideration by the researchers.

Most of the investigations linking environmental management accounting and financial performance were carried out in advanced nations with highly structured and advanced manufacturing sector (Njanja, 2013). Such results cannot be generalised in mining industries of Zimbabwe who are still using old technology in a sector which is still developing. Hence, there is an important need to find out the relationship between EMAPs and firms' performance in emerging economies (Bassey E B et al, 2013). Additionally, there is apparent contradictions between earlier researches where other studies concluded that there is positive relationship between EMAPs and firm performance while other studies regards EMAPs as a negative predictor on financial performance. The disharmony of these earlier researches on the influence of EMAPs on financial performance requires further empirical research on this relationship.

***H1: EMAPs has a positive significant effect on financial performance.***

Furthermore, Minoja et al. (2010) demonstrated that the development of that demands creative efforts have a positive viable edge. In the literature on the environment, the study by Chang (2011) revealed that there is a positive association between manufacturing of green products and the entity's ecological ethics and a viable edge (Amir et al., 2020). Although, several studies were dedicated to investigation on the influence of innovation on firm performance relatively few researches were devoted to investigate the relationship of innovation on EMA. Hutahayan (2020) noticed that the influence of innovation on EMA and ultimately on financial performance was rarely evaluated by earlier studies. It therefore

follows that a research lacuna still regarding the intermediary role played by innovation on EMA and financial performance. As a result, the current study seeks to considerably close this gap by placing EMAPs on the mediatory role between environmental innovation and firms' performance.

### **The research gap**

Regardless of a considerable research in the area of environmental accounting and disclosure, few researches have been dedicated to EMAPs and performance of mining companies. Further, there is a clear lack of consistency on the influence of EMAPs on environmental performance and ultimately on financial performance. Some research studies have established that environmental process innovation has a substantial negative influence on a firm's performance. In contrast, some earlier studies have concluded that EMAPs have positive influence on financial performance. It is these contrasting views which justifies the need for further research. In addition, most of the researches were done in developed economies of the western economies and the medium economies of the Asian countries. Few were conducted in Sub-Saharan Africa which share similar economic conditions. Even if the economic systems shares a lot in common environmental issues are mainly determined by the political environment, legal frameworks and international treaties. It therefore follows that this current research is still relevant if this gap is to be filled.

### **RESEARCH METHODOLOGY**

This research is underpinned and informed by the honeycomb research methodology (Wilson, 2014) figure 2. The honeycomb research methodology was particularly chosen because it recognises the human mind thought realities which may not necessarily follow linearity as depicted by most of the available research methodologies

**Figure 2. Honeycomb of research method 1**

## 1. Research Philosophy



-Pragmatism

## 6. Data analysis

-Descriptive statistics  
Approach

-Inferential statistics

-Narrative analysis



## 2. Research

-Adductive

## 5. Data collection

-Questionnaires

-Interviews

-Secondary data



## 3. Research Strategy

-Multi-strategy



## 4. Research Design

-Survey (Cross-sectional design)

**Source:** Jonathan 2013

In most of the circumstances, the researcher's philosophy influences the choice of the research approach to be used. As a result, in light of the pragmatism philosophy chosen the most ideal approach adopted is the abduction approach. of the theory- building new theory or existing theory modification (Mitchell & Mitchell, 2018). In line with the Honeycomb research methodology the choice of the research is linearly a product of the predecessor research approach chosen which in this study is the abductive approach. The researcher will opt for the survey design.

A sample size is a sub-set of all elements to be included in a research study (Gupta, 2011). The

sample size will be determined by using a formula. The researcher applied the Yaro Yamani formula shown below. The use of the Yaro Yamani formula is justified because in its development it took into consideration the size of the population to be represented, accuracy of the outcome, cost variability of the target population and also subjectivity in determining the sample size (Maziriri & Mapuranga, 2017). The Yaro Yamani formula is the most ideal framework because it produces a sample size which more representative of the population from which the study participants have been drawn from.

Yaro Yamani formula.

$$n = \frac{N}{1+N(e)^2}$$

Where n: sample size

N: population from which the sample will be drawn.

e: error margin or sampling of error (level of precision which is usually 5%)

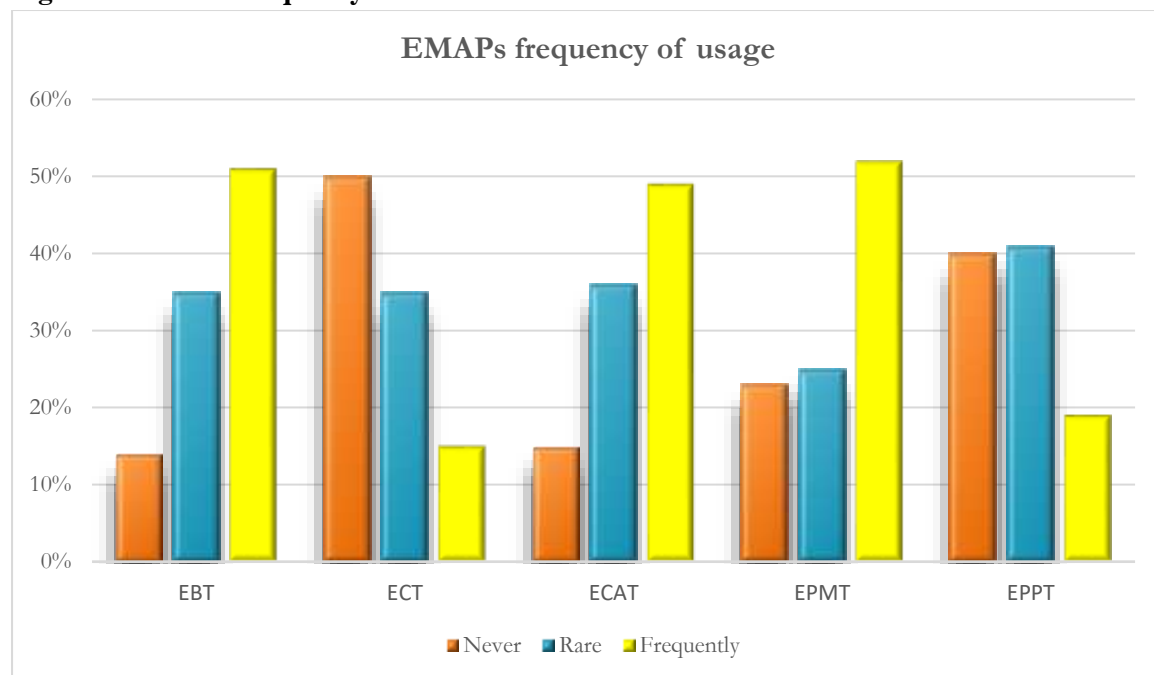
So Sample size

$$n = \frac{61}{1+61(0.05)^2} = 52.928 = 52 \text{ persons}$$

## RESULTS AND DISCUSSION

### Frequency of use EMAPs

**Figure 3: EMAPs frequency 1**



**Source:** Research Survey Data 2022

Figure 4: shows the frequency of usage of environmental management accounting practices (EMAPs). The EMAPs used identified are:

- Environmental budgeting techniques (EBTs),
- Environmental costing techniques (ECT),
- Environmental capital appraisal techniques (ECATs),

- Environmental performance measurement techniques (EPMTs) and
- Environmental product pricing techniques (EPPTs).

The most frequently used EMAPs are environmental performance measurement tools (52%), environmental budgeting tools (51%) and environmental capital appraisal tools (49%). The



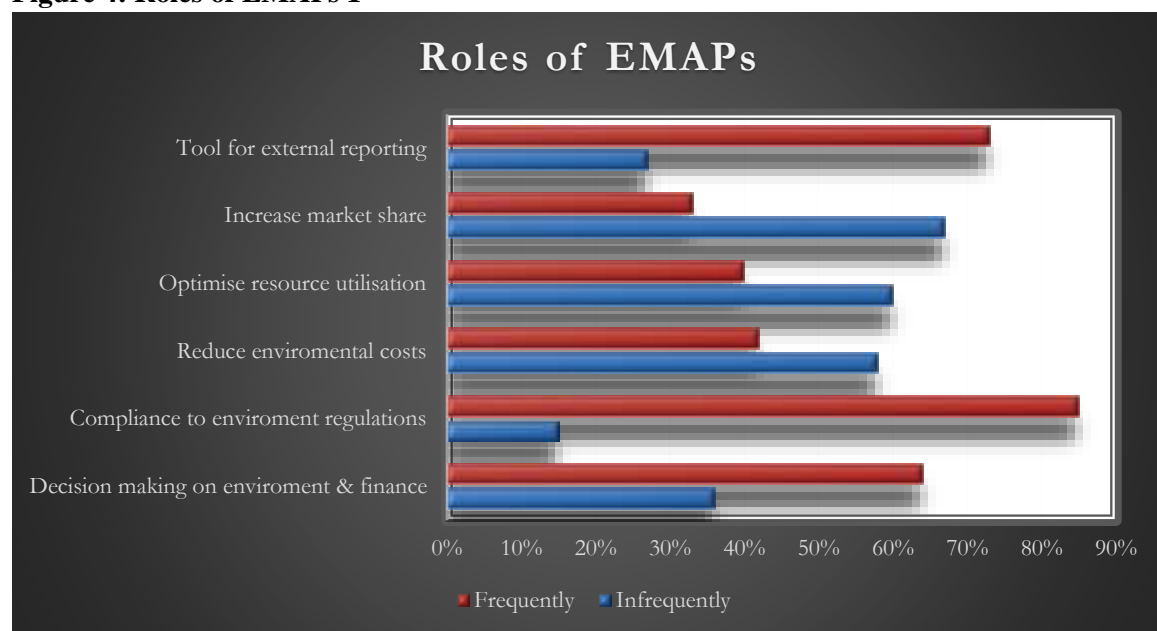
results show that three mostly used EMAPs are mainly related to capital expenditure acquisition and maintenance. To a considerable extent it shows that mining firms are acquiring resources which enables them to be compliant with environmental laws. This results are consistent with the findings of Olubukola et al. (2021), who reiterated that entities particularly mining companies invest in environmental equipment in order to comply with environmental laws and pressures from environmental stakeholders. Environmental laws are strong particularly when it comes to their application to mining companies. Henceforth, the frequency of use of EPMT, EBT and EPAT could be attributable to compliance to environmental regulations.

In contrast the infrequent usage of environmental costing techniques (85%), environmental product

pricing techniques (81%) may be accounted to lack of direct relation with costs reduction or enhancing financial performance. The results are consistent with the findings of Savage et al (2002), who argued that adoption of EMAPs is not guarantee to any specific level of financial or environmental performance. However, Hutahayan (2020), strongly objected when he argued that EMAPs promotes innovation and improves financial performance significantly. Furthermore, Hutahayan (2020), revealed that innovation does not need substantial changes to processes. Slight changes to processes leads to significant costs savings and improved financial performance.

#### Roles of EMAPs.

**Figure 4: Roles of EMAPs 1**



**Source:** Research survey data 2022

From the data obtained (Figure 4) results indicate that mining companies infrequently use EMAPs to increase market share (67%). Only 33% indicated that they use EMAPs to improve the image of their mining companies and ultimately the market share. Thus data findings showed significantly lower levels of the usage of EMAPs for reputational purposes and this denotes that mining companies are perhaps oblivious of the

potential indirect benefits to be reaped when EMAPs is embedded in strategic making process. Correspondingly, EMAPs are infrequently used for optimisation of resource utilisation (60%), and for cost reduction (58%). Only a few respondents indicated that mining companies use EMAPs to optimise resource utilisation (40%) and for cost reduction purposes (42%). The majority of the respondents were of the view that EMAPs were

not primarily adopted for the purposes of increasing market share, cost reduction or optimisation of resource utilisation. If ever these roles were met, this could be accounted to incidental achievement.

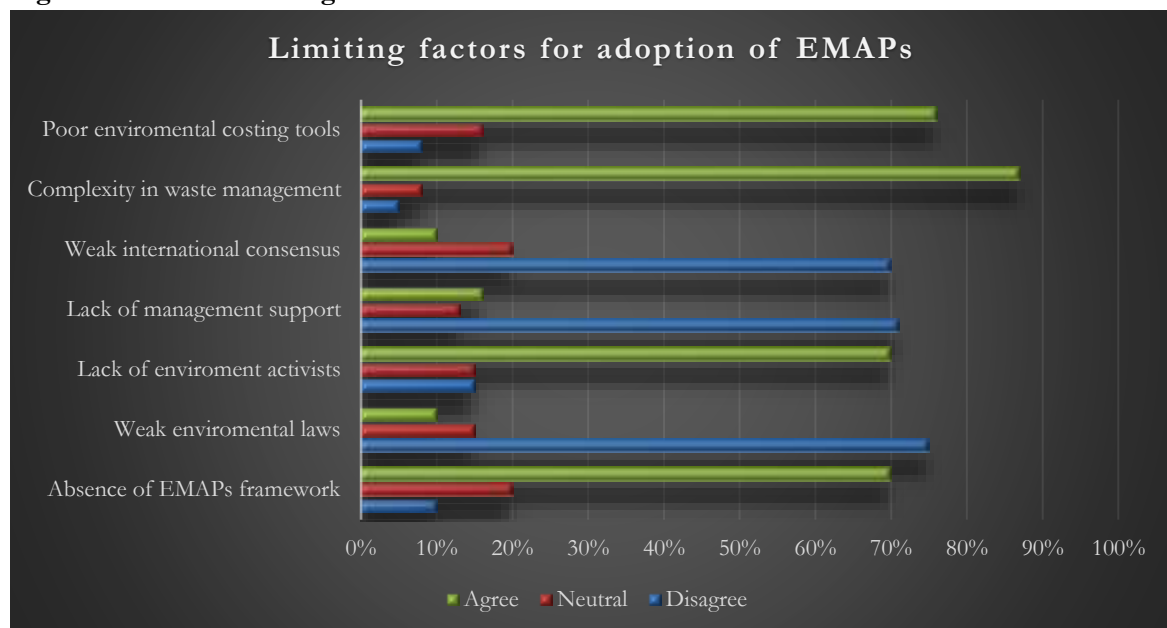
The findings agree with the results from key informants interviewed who also indicated that most of the mining companies engage in environmental management on to comply with environmental laws particularly as enforced by EMA. Achievement of any other results inconsistent with this primary purpose is only incidental and not a planned result. This is however inconsistent with the results of Lea et al. (2020), who established that adoption of EMAPs particularly environmental costing techniques leads to the exposure of environmental costs and inefficiencies will assist the firm to reduce environment-related capital investments or environmental operating costs. Ultimately, profit margins will be increased or allow the lowering of product prices (Lea et al., 2020).

Contrastingly, most respondents significantly indicated that EMAPs are frequently used for the purposes of external reporting (73%), compliance to environmental regulations (85%), and for

decision making related to environmentalism and finance (64%). Thus data findings substantially show high levels of respondents agreeing that the fundamental roles of engaging in environmental is for compliance purposes with environmental laws. The results are consistent with key informants interviewed who indicated that in Zimbabwe environmental and safety laws are very strict to mining companies perhaps because of the nature of mining business which is relatively dangerous in comparison to other business sectors. Key informants also reiterated that even the roles of environmental decision making and the role of external reporting are only supporting roles which are ancillary to meeting the compliance requirements. The results were also consistent with the findings of Chaudhry et al. (2020), who concluded that most of the adopters of environmental management accounting practices implements them only as a tool to comply with the environmental regulatory requirements of the countries in which they operate. Similarly, EMAPs are also undertaken as a direct capitulation to environmental pressures from environmentalism pressure groups.

### Limiting factors

**Figure 5: EMAPs limiting factors 1**



Source: Research survey data 2020

Figure 7 are the results of the responses to question soliciting the limiting factors on the adoption of environmental management accounting practices. The respondents accounted the significant low adoption of EMAPs as stemming from poor environmental costing tools (76%), complexity in waste management (87%), lack or absence of environmental activists (70%) and absence of EMAPs standards framework (70%). In the words of one key informant interviewed, stated that “the relatively low uptake of environmental management accounting practices is fundamentally accounted for in terms of poor environmental costing techniques, the absence of a universal environmental management accounting standards framework which will guide organisation who are keen to adopt EMAPs. A framework similar to the international financial reporting standards would suffice.” Echoing the same sentiments another key informant has this to say, “Low adoption are a result of absence of environmental accounting costing techniques. This is further compounded by lack of knowledge particularly from the cost and management workers of mining firms since most of their training did not cover the area of environmental accounting.”

In line with the current research findings and comments of the key informants, prior studies have also found out that the poor adoption of EMAPs is a result of a skills gap in issues related to environmental cost and management accounting techniques (Karim et al 2017, Lea et al 2020). Furthermore, Lea et al (2020), postulates that the uptake of EMAPs is delayed by the absence of vocal environmental pressure groups such as shareholders, employees, investors and lenders. Similarly, Olubokula et al (2021), concluded that the limiting factors on the adoption of EMAPs among mining firms is attributable to the complexity of EMA and the absence of shared consensus on strategic course of action to address environmental problems. These elements to a larger extend are the reasons which best explains the relatively low uptake of EMAPs among mining entities operating in Bindura.

Surprisingly the findings of this current study refuted the deep held beliefs that weak adoption of EMAPs as indicated by the disagreement percentage, are caused by lack of international consensus on environmentalism strategy (70%), lack of management support (71%) and weak environmental laws (75%). The findings are inconsistent with the results obtained by Lea et al (2020), who accounted the lethargy on the adoption of EMAPs by firms to weak environmental legislation and enforcement. Correspondingly, Olubokula et al (2021), posit that the absence of shared strategic consensus on how to address the environmental problems and lack of top executive support are the fundamental reasons for failure to adopt environmental management accounting practices (EMAPs).

However, these findings were consistent with the comments of two key informants who illustrated that “the belief that the rate of environmentalism uptake is influenced by weak environmental regulations and lack of international consensus does not hold in Zimbabwe. The reasons for that is that Zimbabwe has strong environmental laws and strict enforcement structures when it relates to mining entities. Secondly, the country leadership including the presidium and parliamentarians embrace environmentalism and every effort is put in place to promote environmentalism at workplaces.” Thus to a larger extend factors which limits the adoption of EMAPs are peculiar to the conditions obtaining in a particular country.

### **Perceptions on the influence of EMAPs on Environmental Performance**

Question 8 was asked to solicit the perception of the EMAPs on environmental performance. A follow up question 9 was asked to evaluate the perception of respondents on the direct influence of EMAPs including environmental performance on return on investment (ROI). The EMAPs tested were developed into sub-hypothesis derived from the main alternate hypothesis:

*H<sub>1</sub>: The adoption of environmental management accounting practices increases ROI*

Consequently, the following sub hypothesis were formulated assessing association on Environmental Performance (EP) and assessing association to return on investment (ROI) as follows:

Association to EP:

*H<sub>1</sub>: EBT positively influence EP*

*H<sub>2</sub>: ECT positively influence EP*

*H<sub>3</sub>: ECAT positively influence EP*

*H<sub>4</sub>: EPMT positively influence EP*

*H<sub>5</sub>: EPPT positively influence EP*

Association to ROI

*H<sub>6</sub>: EPPT positively influence ROI*

*H<sub>7</sub>: EPMT positively influence ROI*

*H<sub>8</sub>: ECAT positively influence ROI*

*H<sub>9</sub>: ECT positively influence ROI*

*H<sub>10</sub>: EBT positively influence ROI*

*H<sub>11</sub>: EP positively influence ROI*

In soliciting the responses, a five point Likert scale was used with weight of 1 = Decreased significantly and 5 = Increased significantly. The researcher used the Spearman Rank Order Correlation coefficient. The Spearman coefficient is applicable on two related ordinal data. Therefore, the results of the frequency of perceptions were converted to ranking which corresponds to Likert scale ranking. The interpretation of the Spearman ranges from -1 to 1 which means a measure between -1 and 0 depicts negative correlation and a coefficient measure between 0 and 1 depicts positive correlation. Thus, if there is no correlation the results should refute the hypothesis or confirm the hypothesis if there is a positive correlation of the variables.

#### Hypothesis testing using Spearman Rank Correlation coefficient.

$$\text{Formula: } R_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

$R_s$  = Spearman rank correlation coefficient

$n$  = number of paired ranks

$d$  = difference in ranks

**Table 1: Spearman coefficient-EP 1**

Environmental management accounting tool (EMAP)	$\sum d^2$	$\frac{6\sum d^2}{n(n^2-1)}$	$R_s$ $1 - \frac{6\sum d^2}{n(n^2-1)}$
H <sub>1</sub> : Environmental budgeting tools (EBT)	9.8	0.49	0.51
H <sub>2</sub> : Environmental costing tools (ECT)	7.0	0.35	0.65
H <sub>3</sub> : Environmental capital appraisal tools (ECAT)	4.0	0.20	0.80
H <sub>4</sub> : Environmental performance measurement tools (EPMT)	9.60	0.48	0.52
H <sub>5</sub> : Environmental product pricing tools (EPPT)	18.6	0.93	0.07
$n(n^2-1) = 5(5^2-1) = 120$			

**Source:** Research Survey Data 2020

The results Table 1 reveal a significant positive correlation of all the EMAPs on environmental performance. The implication is that the application of EMAPs positively influences environmental performance of mining companies. The results indicate that ECATs (0.80). ECTs (0.65), EPMT (0.52), EBT (0.51) and EPPT (0.07). The results show that the participants perceive that all the management accounting practices implemented improves environmental performance. However, a weak correlation was

recorded on EPPT (0.07). The results were similar to the findings of K-Hoon et al. (2017), who in their studies found out that the uptake of environmental accounting practices determine the level of environmental performance. This is also supported by, Gomez-Conde et al. (2019) and Saeidi et al. (2018) carried out a research to determine the influence of environmental management accounting on environmental performance and found out that environmental management accounting improves environmental



performance. They also emphasised that the greening of industries has become a core determinant of economic competitiveness and sustainable growth. Firms with superior competitive advantage are highly innovative and generally it is complex to imitate their competitive advantage (Ricome, Louhichi, & Gomez-y-Paloma, 2020).

### Perceptions on the influence of EMAPs on Return on Investment (ROI)

$$\text{Formula: } R_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

$R_s$  = Spearman rank correlation coefficient

$n$  = number of paired ranks

$d$  = difference in ranks

**Table 2 Spearman Coefficient-ROI 1**

Environmental management accounting tool (EMAP)	$\sum d^2$	$\frac{6\sum d^2}{n(n^2-1)}$	$R_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$
H <sub>6</sub> : Environmental product pricing tools (EPPT)	11.2	0.32	0.68
H <sub>7</sub> : Environmental performance measurement tools (EPMT)	18.9	0.54	0.46
H <sub>8</sub> : Environmental capital appraisal tools (ECAT)	23.1	0.66	0.34
H <sub>9</sub> : Environmental costing tools (ECT)	9.10	0.26	0.74
H <sub>10</sub> : Environmental budgeting tools (EBT)	12.95	0.37	0.63
H <sub>11</sub> : Environmental performance (EP)	16.80	0.48	0.52
$n(n^2-1) = 6(6^2-1) = 210$			

**Source:** Research Survey Data 2020

The results of Table 2 shows that all the six EMAPs are positively correlated to return on investment (ROI) with the strength ranging from lowest of 0.34 for ECATs to a maximum 0.74 for ECTs environmental management accounting practices. The implication is that for all the EMAPs under study there is a positive influence on financial performance. Thus environmental management practices influence financial performance significantly. Consequently, hypothesis:

*H<sub>0</sub>: The adoption of management accounting practices does not increase ROI is refuted and the alternative*

*hypothesis:*

*H<sub>1</sub>: The adoption of environmental management accounting practices increases ROI*

is accepted. Hypothesis H1 to H11 represents H1 and are all positively correlated to returns on investment (tax incentives influence profitability significantly).

The hypothesis test results show both consistencies and inconsistencies with previous studies. In the literature on the environment, the

study by Chang (2011) revealed that there is a positive association between manufacturing of green products and the entity's ecological ethics and a viable edge (Amir et al., 2020). Similarly, Hutahayan (2020) and Olubokula (2021) in their researches established that EMAPs adoption promotes innovation and wealth maximisation emphasising particularly firms which adopts environmental life cycle costing. Olubokula et al. (2021), posit that environmental management accounting practices are the nexus between the wealth maximisation objective of business and green manufacturing. The current research outcome also corroborates earlier researches. However, in one of the studies conducted by Mahfud (2015), concluded that environmental innovation on process was blamed for stifling growth of a firm. Nonetheless, this acute difference could have been caused by factors which were not taken into consideration by the researcher.

### Summary of findings

The major findings classified according to the research questions were as follows:

### Which environmental management accounting practices (EMAPs) frequently used by mining firms in Bindura?

The most frequently used environmental management accounting practices by mining firms in Bindura are Environmental budgeting techniques, environmental performance measurement techniques, and environmental capital appraisal techniques. The reason for frequently using these techniques could be perhaps attributable to the fact that these EMAPs are linked to investments in environmentalism which is greatly expected by law particularly for mining firms.

### What are the roles of EMAPs to mining firms in Bindura?

The research found out that environmental management accounting practices (EMAPs) are mainly used by mining firms for compliance purposes to environmental regulations and for external reporting requirements especially for listed firms who are compelled to disclose environmental and sustainability issues in addition to the traditional financial statements. The other important role of EMAPs found is that EMAPs are used to support decision making on environmentalism and its associated financial decisions. Surprisingly, contrary to the deeply held views environmentalism is not pursued for purposes of increasing market share, for optimisation of resource utilisation or reducing environmental costs. If ever, these roles are met, they would have been achieved incidentally and not as a planned attempt to achieve them.

### What factors limits the adoption of EMAPs by mining firms in Bindura?

Furthermore, the research survey found out that the major limitations to the adoption of environmental management accounting practices (EMAPs) according to their strength of inhibition are:

- **The complexity in waste management for mining firms.**

Waste management in mining firms is very complex because there are many different types of

waste involved in mining companies which affects primarily the safety of the employees and indirectly the environment. Another complexity is in the form of managing different types of waste which include emissions of emitting greenhouse gases, disposal liquid refuse and solid refuse. Furthermore, they are required to rehabilitate the land on abandoned mines so that they avoid endangering biodiversity. Waste management require a lot of resources and consequently management may be forced to hide some of these need areas.

- The second compelling reason for non-adoption of environmental management accounting practices is **the absence of comprehensive environmental costing techniques**. This is critical because environmental management accounting is an emerging area of study. As a result, there are no costing techniques dedicated to environmental management accounting. Henceforth, environmental management accounting borrows techniques from a sister area of costing and management accounting systems which at times becomes difficult to adopt such tools without some adjustments.
- The third significant finding of the research study inhibiting the adoption of EMAPs among mining firms in Bindura is the absence of an environmental management accounting (EMA) standard framework which is supposed to work as a guideline to assist those who intend to implement environmental management accounting practices. For instance, the framework can come in the form of accounting standards as issued by the International Financial Reporting Standards Board (IFRSB).
- The forth limiting factor on the adoption of EMAPs in Zimbabwe and in particular mining is the subdued environmental activism. The lack of pressure groups which are very vocal is the reason for the lethargic implementation of environmentalism protocols in Zimbabwe. This is regardless of the fact that we are already experiencing the

dangers of the endangered environment such as cyclonic climate changes, the cholera outbreaks of 2009, contamination of water bodies, and rehabilitated mining pits and dump to mention just a few.

- Another surprising finding is that weak environmental laws, lack of management support and weak international consensus on environmental strategy are not in any way an impediment when it comes to Bindura mining firms.

### **To what extent are EMAPs positively correlated to financial performance?**

It was found that environmental management accounting is strongly positively correlated to environmental performance (EP) except for environmental product pricing technique (EPPT) which have a weaker correlation coefficient ( $r$ ) of 0.07. Similarly, EMAPs are strongly positively associated to financial performance (ROI). The strength of the correlations was measured by the Spearman Rank correlation coefficient.

### **CONCLUSIONS**

From the findings discussed above the following conclusions were made:

- The level of education of those charged with decision making for mining firms in Bindura commensurate with the requirements of the implementation of environmentalism. The conclusion was drawn from the finding that, all sections involved in environmentalism were represented and their level of education commensurate with the minimum requirements expected in environmentalism issues.
- Environmental management accounting practices (EMAPs) are widely and frequently used by mining firms in Bindura. The conclusion was drawn after finding that EBT, EPMT, and ECAT were commonly and significantly used by mining firms in Bindura. The implication is that mining firms in Bindura have embraced environmental management accounting practices. However,

the low use of environmental costing techniques and environmental product pricing techniques need to be addressed because they are important in improving financial performance.

- **Environmental management accounting practices are pursued to meet regulatory requirements, for external reporting and for decision making related to environmentalism.** The conclusion was drawn from the fact that most respondents (85%) agreed that they practice environmentalism to meet the requirements of the national laws on safety and environment which are very strict in terms of their enforcement in mining firms. Additionally, the enforcing authorities such as Environmental Management Regulatory Authority of Zimbabwe (EMRAZ) has very strict monitoring and reporting requirements which are expected to be met regularly. Failure to meet the regulatory requirements of EMRAZ is often met with punitive action such as withdrawal of mining licence.
- Secondly, meeting external reporting is another compelling reason for adoption especially for mining companies because most of the mining firms are listed firms. They are expected to meet the listing requirements of the Zimbabwe Stock Exchange (ZSE) which expects mining firms to include a sustainability report in addition to the traditional financial reports published.
- Lastly and complementary to meeting regulatory requirements, the research study concluded that EMAPs were adopted by mining firms to facilitating decisions related to environmentalism and financing to support environmental investments. This conclusion was drawn after most of the respondents (64%) attributed the adoption of EMAPs to facilitating environment decision making.
- This research also concluded that environmental laws are strong in Zimbabwe and particularly for mining firms. The

conclusion was derived from the fact that respondents indicated that regulatory requirements were not an inhibiting factor. Furthermore, even when there is weak international consensus on the environmental strategy, lack of management support and weak environmental laws. Those factors do not deter mining firms to implement environmental management accounting practices perhaps because the government of Zimbabwe is positive and supports environmentalism.

- Environmentalism is not pursued for purposes of improving financial performance of mining firms. It is surprising that factors which are very crucial to enhance financial performance polled very lowly in terms of influencing financial performance. For example, environmental costing techniques (42%), resource optimisation (40%) and increasing market share (33%) and yet these are factors which are significantly influential in meeting financial performance. It therefore follows that if ever financial performance measures are met, they are achieved incidentally not out of planned activity to reduce costs, increase market share or optimisation of resource utilisation.
- Influence of EMAPs on environmental performance and financial performance
- The research study concluded that the adoption of EMAPs determine the magnitude of environmental performance (EP). The outcome was confirmed by the finding that all EMAPs were strongly positively correlated to EP except for EPPT which have a weaker correlation coefficient of 0.07.
- The researcher also concluded that EMAPs have a great bearing on financial performance as measured by return on investment. The adoption of EMAPs is expected to increase return on investment (ROI). All the EMAPs hypothetically tested were strongly positively correlated to return on investment according to the perceptions of the respondents.

## Recommendations

### • Training of environmental management accounting practices (EMAPs).

Knowledge of environmental management accounting practices is crucial for mining companies to be in a position to implement EMAPs successfully and in particular environmental costing techniques and environmental product pricing techniques. Currently, the training was mainly towards training costing and management accounting practices. The environmental management accounting can be spearheaded by universities and colleges who should include environmental management accounting in their training programmes. Also accounting training institutions in Zimbabwe can also initiate training environmental management accounting in their curriculum. However, this to be effective, public-private partnership (PPP) are crucial to speed the training and adoption of such policies. The private sector particularly the mining companies would provide the much needed financial resources and the government will participate by developing policies which are environmentally friendly through legislature.

### • Developing an environmental management accounting standards framework specific for Zimbabwe.

Related to training of EMAPs is the development of a comprehensive environmental management accounting framework which will act as a guideline for those who are compelled to adopt environmental management practices. The development should be inclusive of all sectors affected by environmentalism such as mining sector, services sectors, manufacturing sectors, chemical production sectors and leather tannery sectors among others. However, the development of the framework can be initiated by the Public Accounting and Auditing Board of Zimbabwe (PAAB) through its affiliate member organisations by triggering debate on environmental management accounting practices. In developing the environmental management



accounting framework international protocols on environmentalism and the expectations of international laws and local laws should be taken into consideration.

- **Design fiscal incentive policies to buttress the strong mining environmental laws and safety laws and regulations.**

The environmental laws as they relate to mining firms are fairly strong and even the enforcing mechanisms mainly through EMRAZ is considerably efficient. However, the government can expand the number of companies who will voluntarily adopt environmental management accounting practices by incentivising environmentalism. Government through the fiscal policy budget statement and statutory instruments may consider granting generous tax incentives for investing in environmental friendly technology and capital expenditure. The tax incentives can come in the form duty free for environmental capital expenditure, tax holidays as well as availing affordable credit facilities through the financial institutions specifically for financing investment in environmentalism projects. That the government will go a long way in expanding the adoption of environmental management accounting practices.

- **Mining firms should seriously consider including environmental management accounting practices in formulation of their organisational strategy.**

The mining sector should not only concentrate on practicing EMAPs for the purpose of compliance to regulatory requirements only. They should also seriously consider EMAPs as part of the company strategy formulation activity to improve organisational performance in all its perspectives which include inter alia financial performance and non-financial perspectives. That way they will realise the importance of the often ignored environmental costing techniques and environmental product pricing techniques. These EMAPs are closely linked to financial performance.

- **Conscientising the public on the benefits of practicing environmentalism.**

Humanity is always the victim of environmental degradation which to a greater extent are perpetuated by firms particularly those firms which emit greenhouse gases (GHG) and of course mining firms included. As a result, the public should be on the forefront in ensuring that firms engage in sustainable environmental management accounting practices by engaging in environmental activism. Environmentalism can be promoted among the public through media organisations. Deliberate and well researched environmental information can be published through media houses. The government can also assist through media reforms to incentivising environmental media information broadcasting. When the public is well acquainted with information pertaining to environmentalism, that is, when they perceive the dangers posed by firms who contaminate the environment, that way, environmental activism groups will ultimately emerge. Non-governmental organisation can also fill the void left for vociferous activism.

## REFERENCES

- Abdel-Kader, M., & Luther, R. (2008). The impact of firm characteristics on management accounting practices: A UK-based empirical analysis. *The British Accounting Review*, 40(1), 2-27.
- ACCA Global. (2010, June). Environmental management ACCA P5. *Student accountant issue 15/2010*.
- Ahmad, K. (2017). The Implementation of Management Accounting Practices and its Relationship with Performance in Small and Medium Enterprises. *International Review of Management and Marketing*, 2017, 7(1), 342-353.
- Alemu, A. A. (2020). The Effect of Internal Control on Organization Performance in Reference to Moha Soft Drinks Company, Ethiopia: A Case Study in Hwassa Pepsi Cola Factory. *International Journal of Research in*

- Business Studies and Management Volume 7, Issue 3, 10-19.*
- Ashton, D., Hopper, T., & Scapens, R. (1995). *The Changing Nature of Issues in Management Accounting*. Hertfordshire.: Prentice Hall.
- Baldarelli, M.-G., Baldo, M. D., & Nesheva-Kiosseva, N. (2017). *Environmental Accounting and Reporting - Theory and Practice*. Cham, Switzerland: Springer.
- Bassey E B et al. (2013). The Impact of Environmental Accounting and Reporting on Organizational Performance of Selected Oil and Gas Companies in Niger Delta Region of Nigeria. *Research Journal of Finance and Accounting ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online) Vol.4, No.3.*
- Bennett, M., & James, P. (2017). *The green bottom line: environmental accounting for management: current practices and future trends Jesudason*. London, U.K: Routledge.
- Birnie, Patricia, Allan, E., Boyle, & Redgwell, C. (2009). *International Law and the Environment, 3rd Edition*. Oxford : Oxford University Press.
- Björnenak, T., & Olson, O. (1999). Unbundling management accounting innovations. *Management Accounting Research, 10*, 325-338.
- Bodansky, & Daniel. (2013). "International Environmental law." *The Handbook of Global Climate and Environment Policy*. London: John Wiley & Sons.
- Boston College. (2016). The enrst and young excellence current-use fund for accounting and management. *Boston College*.
- Burrit, R., & Saka, C. (2006). Enviromental Management Accounting Applications and Eco-Efficiency: Case Studies from Japan. *Journal of Cleaner Production, 1262-1275*.
- Burritt, R. L. (2015). The potential for environmental management accounting development in China. *Journal of Accounting & Organizational Change, 11(3)*, 406-428.
- Chaudhry, N. I., Humaira , A., Muhammad , A., & Hussian, R. I. (2020). Environmental Innovation and Financial Performance: Mediating Role of Environmental Management Accounting and Firm's Environmental Strategy. *Pakistan Journal of Commerce and Social Sciences 14 (3)*, 715-737.
- Chukwudi et al, E. J. (2016). The effects of environmental accounting on a developing nation: nigerian experience. *European Journal of Accounting, Auditing and Finance Research Vol.4, No.1*, 17-27.
- Czinkotaa, M., Kaufmannb, H. R., Basilec, G., & Ferric, M. A. (2020). An innovative social-business model. The Italian case. *Journal of Business Research, 20(119)*, 377-387.
- Debnath, S. (2019). *Enviromenta Accounting, Sustainabilty and Accounting*. New Delhi: Sage Publications India Pvt (ltd).
- Doorasamy, M., & Garbharran, H. (2015). Assessing the use of environmental management accounting as a toolto calculate environmental costs and their impact on a company's environmental performance. *International Journal of Management Research and Business Strategy* .
- Drury, C. (2015). *Management and cost accounting. 9th Edition*. United Kingdom: Cengage Learning.
- Drury, C. (2018). *Management and Cost Accounting-10th Ed*. Cengage Learning EMEA: Hampshire UK.
- George, R. A., Siti-Nabiha, A. K., Jalaludin, D., & Abdalla., Y. A. (2016). Barriers to and enabler of sustainability integration in the performance management system of oil and gas company. *Journal of clean production, Vol. 136*, 197-212.
- Hansson, J., & Eriksson, H. (2002). The impact of total quality management on financial

- performance. *Measuring Business Excellence*, 6(4), 44-54.
- Holden, P. E., Fish, L. S., & Smith, H. L. (1941). *Top Management Organization and Control*. Carlifonia: Stanford University Press.
- Homan, S. H. (2016). Environmental accounting roles in improving the environmental performance and financial performance of the company. *South East Asia Journal of Contemporary Business, Economics and Law*, Vol. 11, Issue 1 (Dec.), ISSN 2289-1560.
- Hutahayan, B. (2020). The mediating role of human capital and management accounting information system in the relationship between innovation strategy and internal process performance and the impact on corporate financial performance. *Benchmarking: An International Journal*, 27(4), 1289-1318.
- Iheduru, N., & Chukwuma, R. I. (2019). Effect of Environmental and Social Cost on Performance of Manufacturing Companies in Nigeria. *International Journal of Accounting & Finance Review*; Vol. 4, No. 2, SSN 2576-1285.
- ILO. (2018). Enabling environment for sustainable enterprises in Zimbabwe . *International Labour Office (ILO)*.
- Jeenbaeva, I. (2015). *Green Enterprise Workers' Participation in Social Change induced by Climate Discourses: Institutionalization of the global policy clubs' green discourses at the local level*. Trento: University of Trento Italy.
- Jensen, M., & Meckling, J. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs, and Ownership Structure. *Journal of Financial Economics*, 1,, 305-360.
- Kaplan Financial Limited. (2019). *ACCA Advanced Financial Management (AFM)-Study Text*. Wokingham Berkshire, UK: Kaplan Financial Limited.
- Karimi, Z., Dastgir, M., & Saleh, M. A. (2017). Analysis of Factors Affecting the Adoption and Use of Environmental Management Accounting to Provide a Conceptual Model. *International Journal of Economics and Financial Issues*, 7(3), 555-560.
- Kariuki, S. N., & Kamau, C. G. (2016). Organizational contingencies influencing the adoption of strategic management accounting practices among manufacturing firms in Kenya. *International Journal of Advanced Research in Management and Social Sciences*, 5(4), 167-182.
- Khalid, F. M., Lord, B. R., & Dixon, K. (2018). Environmental management accounting implementation in environmentally sensitive industries in malaysia. *UC Research Repository*.
- Ki-Hoon L,. (2017). The value relevance of enviromental audits: Evidence from Japan. *Business enviroment & the strategy (John Wiley & Sons, Inc)*, Vol 26, Issue 5, 609-625.
- Konrad A.S,(2020). The role of the media in environmental discourses in Zimbabwe. *Konrad Adenauer Stiftung Zimbabwe*.
- Legaspi, J. L. (2018). Evaluating Management Accounting Tools in SMEs: Issues and Evidence,. *2018 International Symposium on Business and Management* (pp. 679-701). Osaka, Japan: 2018 International Symposium on Business and Management.
- Legaspi, J. R. (2018). Management Accounting Practices of the Phillipines Small and Medium-Sized Enterprises. *European Journal of Business, Economics and Accountancy*: 6(3), 71-91.
- Li, T. M., Dang, L. A., & Le, T. H. (2020). Factors affecting the environmental management accounting implementation and the quality of environmental information for making decisions of fishery processing enterprises in Vietnam. *Accounting*, 6(2020), 401-412.

- Lubbe, I., Modack, G., & Watson, A. (2017). *Financial ACCOUNTING IFRS Principles-4th Ed.* Cape Town: Oxford University Press Southern Africa.
- Mahfud. (2015). The impact of social and environmental information on managers' decisions: Experimental evidence from Indonesia. *Asian Review of Accounting*, 23(2), 156-169.
- Maziriri, E. T., & Chinomona, E. (2016). Modelling the influence of relationship marketing, Green marketing and Innovative marketing on the business performance of the Small, Medium and Micro Enterprises (SMMES). *Journal of Economics and Behavioral Studies*, 8(3), 127-139.
- Maziriri, E., & Mapuranga, M. (2017). The Impact of Management Accounting Practices (Maps) on the Business Performance of Small and Medium Enterprises within the Gauteng Province of South Africa. *Journal of Accounting and Management JAM* Vol. 7, no. 2, 12-25.
- Neu, D., Wame, H., & Pedwell, K. (2018). Managing public impressions: environmental accountings in annual reports. *Accounting organisations and society*, 23(3).
- Olalekan, I. O., & Jumoke, O. O. (2017). *Identifying Barriers to Environmental Management Accounting Practices: A Comparative Study of Nigeria and South Africa*. Business And Management Review, 9(1), 168-179.
- O'Neill, K. (2017). *The Environment and International Relations-2nd Edition*. New York, USA: Cambridge University Press.
- Onyinyichi AB et al. (2017). *The Effect of Environmental Cost on Financial Performance of Nigerian Brewery*. European Journal of Business and Management ISSN 2222-1905 (Paper) ISSN 2222-2839 (Online) Vol.9, No.17.
- Otekunrin, O. A., Samu, T., Sifile, O., & Matowanyika, K. (2021). *Making Environmental Accounting Work: Case of the Zimbabwe Mining Industry*. Universal Journal of Accounting and Finance 9(4), 722-734.
- Otley, D. (1980). *The contingency theory of management accounting research: achievement and prognosis*. Accounting, Organisations and Society, 5(4), 413-428.
- Phan, T. N., Baird, K., & Su, S. (2017). *The use and effectiveness of environmental management accounting*. Australasian Journal of Environmental Management, 24(2), 1-20.
- Plowes, R. (2002). *Tree damage by cyclone eline in the bunga forest, Zimbabwe*. National Herbarium & Botanic Garden Kirkia, 2002, Vol. 18, No. 1 (2002), 63-71.
- Schaltegger, S., & Burritt, R. (2017). *Contemporary environmental accounting: issues, concepts and practice*. London: Routledge.
- Smit, P. J., Cronje, G. J., Brevis, T., & Vrba, M. (2013). *Management Principles: A contemporary for Africa*. Cape Town: Juta and Company Ltd.
- Tietenburg, T., & Lynne, L. (2016). *Environmental and Natural Resource Economics*. New York: Taylor & Francis.
- UNICEF (2019). *Caribbean Children Facing the Climate Crisis*. UNICEF Climate, Environment and Energy (CEE).
- UNIDO (2019). *Green Industry: Policies for supporting Green Industry*, Vienna. UNIDO.
- United Nations (2019). *System of Environmental Economic Accounting*. United Nations.
- USAID (2019). *Aligning Budgets for Implementing Environmental Compliance Safeguards in USAID Development Food Assistance Programs: A Toolkit*. USAID.

Wei-Lun, F., & Yan-Kai, H. (2019). *The Study on the Relationship between the Environmental and Financial Performances of Corporates Which Have Adopted the System of Environmental Accounting in Taiwan*. E3S Web of Conferences 81, 01012 (2019). China: EDP Sciences.

Wilson, J. (2014). *Essentials of Business Research. A Guide to Doing Your Research Project -Second Edition*. London, United Kingdom: SAGE Publications Ltd.