

**BINDURA UNIVERSITY OF SCIENCE EDUCATION**



**FACULTY OF COMMERCE**

**DEPARTMENT OF ACCOUNTANCY**

**ENVIRONMENTAL MANAGEMENT ACCOUNTING PRACTICES FOR SMALL-  
SCALE GOLD MILLINGS AND MINES IN MASHONALAND CENTRAL,  
ZIMBABWE.**

**BY**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE AWARD OF A BACHELOR OF ACCOUNTANCY  
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## Abstract

Environmental Management Accounting (EMA) has been at the facet of modern organizations with great environmental effects. The purpose of this research is to explore the existing EMA practices for small-scale gold mills and mines in Mashonaland Central, Zimbabwe and factors affecting the adoption of Environment Management Accounting by small scale mines in Zimbabwe. To determine the current state of EMAP available in small-scale gold millings and mines in Mashonaland central and to gather perceptions about the influences that affect EMA implementation, a quantitative research design was employed, the primary data was obtained using well-structured questionnaires from a population of 38 mills or mine accountants and coded data was inputted in a Statistical Package for Social Science (SPSS) version 20. To determine the significant link between EMAP and Small-scale miner's financial performance, Spearman correlation coefficient was employed. The study reviewed that; PEMA is more commonly practiced than MEMA. It is evidenced that the implementation of EMA practices largely depends on coercive factors, desire to achieve competitive advantages, mimetic factors and normative factors respectively. In addition to that, it was also found that the implementation of EMA in small-scale mines was hindered by financial barriers, management barriers, informational barriers, attitudinal barriers and institutional barriers respectively. The study also reviewed that the financial performance of small-scale miners can improve as a result of implementing environmental related activities or practices. It is recommended that the Government of Zimbabwe should form stringent environmental rules and legislations, in view of the role played by institutional pressures and stakeholders' concerns in EMA implementation. It is also recommended that the sustainability reporting that was mandated to listed companies should not leave small-scale mills and mines and other unlisted companies immune. The government of Zimbabwe should effectively and accurately measure air emissions and devote resources to environmental audits. It is also suggested that the introduction of tax incentives to those who have environmental practices and charge ecological taxes to polluters such as polluter pays principle can increase the application of EMA.

**Key words:** Environmental Management Accounting, Physical Environmental Management Accounting (PEMA), Monetary Environmental Management Accounting (MEMA), small-scale gold mill and mines.

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## **List of abbreviations and acronyms**

GDP- Gross Domestic Product

UNSD-United Nations Department of Sustainable Development

UN- United Nations

GRI-Global Reporting Initiative

EMA- Environmental Management Accounting

EMAP- Environmental Management Accounting Practices

EA- Environmental Accounting

PEMA-Physical Environmental Management Accounting

MEMA-Monetary Environmental Management Accounting

CIMA- Chartered Institute of Management Accountants

FPR- Fidelity Printers and Refineries

EMS- Environmental Management Systems

EIA- Environmental Impact Assessment

# CHAPTER I

## INTRODUCTION

### 1.1 Introduction

The study aims to investigate current EMAPs for small-scale gold millings and mines in Mashonaland central, Zimbabwe. The background of the study, the problem statement, the significance of the study, the research questions, and the research objectives are all described and explained in this chapter. This chapter also presents research assumptions, research delimitations, research limitations and chapter summary.

### 1.2 Background of the study

The current problem of climate change causes the shift in ethics to support green revolution by business entities, governments and environmental activists, as these groups now share the common sense of green movement which was stressed by Reich in 1970. The issues of climate changes are a consequence of past dangerous unsustainable development paths that was feared by Porritt in 1984. This draws attention to reconsider the early proponents of anti-growth activists such as the limits to growth, by Meadows in 1972 or the argument of slow growth if not zero growth by Mesarovic and Pestel in 1975. However, Kahn, Brown and Martel (1976) condemned freezing of economic growth. Environmental management accounting (EMA) sought to solve the problem as a tool that can help businesses to measure and manage their environmental impact. It is being promoted by a number of organizations, including the United Nations Division for Sustainable Development (UN DSD), the United Nations Environment Programme (UNEP), the European Union, and the Tellus Institute (Laine, 2005). EMA was acknowledged in the literature as a way to solve environmental challenges. Among the first organizations to adopt EMA and use it in various industrial organizations to show its benefits are USEPA and Tellus Institute in the USA (USEPA, 1995). These investigations were primarily conducted in the USA and small number in the UK (Bennett, James and Lane, 1996). The promotion of EMA by enterprises in their nations is being done by an increasing number of governments, including those from China, Austria, Germany, Denmark, Netherlands, Australia and Japan (UNSD, 2001). There are a number of

organizations that are working to encourage the adoption of EMA practices in developing countries. Environmental Management Network (EMAN) Africa is among those organizations. This organization is a network of policy makers, practitioners and academics who are working to promote EMA use in Africa (Environmental Management Network, 2023). World Bank also shows its concern by formulating number of programs that are designed to promote EMA adoption in developing countries (The World Bank, 2023). The implementation of EMA in developing countries is a complex issue despite efforts by these organizations and the immense benefits to be gained. With the support of these organizations, EMA has the potential to make a significant contribution to protect environment in developing countries. The discipline of EMA is still at its premature stages of its development with South Africa leading the way, but there is a growing literature on EMA in developing countries (Tanabe, Tanabe and Nomura, 2017; Boiral and Schaltegger, 2012; Filho, Oliveira and Valle, 2014). African countries try to catch up with sustainability reporting evidenced by formulation of regulatory models developed by these jurisdictions such as Kenya, Botswana, Nigeria, South Africa and Guinea (Cambridge, 2019). Nigeria in collaboration with other African counties shared a common commitment through the new Africa Carbon Initiative (ACMI) as solutions to climate change (Mondaq, 2022).

In Zimbabwe, the development of EMA is still in its early stages (Muza, 2018). Nevertheless, there are a number of organizations that are working to encourage the use of EMA in Zimbabwe. For example, Environmental Management Agency (EMAZ), Zimbabwe Business Council for Sustainable Development (ZBCSD) and the Zimbabwe Institute of Environmental Management (ZIEM). The EMA landscape in Zimbabwe is complex and challenging. However, there is a growing recognition of the importance of EMA, and there is a strong commitment to promoting its use (Muza, 2018). With continued support, EMA has the potential to play a significant role in improving the environmental performance of organizations in Zimbabwe. According to the terms of Statutory Instrument 134 of 2019 on Security and Exchange, all listed companies are now mandated to produce a sustainability report (Mondaq, 2022). The prominence of Environment, Social and Governance (ESG) is shown by a movement from the profit-centric.

The environmental objectives of ESG are carbon emission reduction, climate change, water pollution, water scarcity and Greenhouse gas emissions. Currently, the use of mercury has become

the global enemy. In Zimbabwe, the use of mercury in artisanal and small-scale gold miners (ASGM) has been reduced, and where possible, eliminated, according to country's National Action Plan (NAP) (2019). The country has ratified the Minamata Convention on Mercury, and this follows Article 7 of that convention. According to UNEP (2013) in 2010, 95% of anthropogenic mercury emissions come from small and medium miners. In 2018, the Zimbabwe government published its vision of being an upper-middle-income nation by 2030 (Zimbabwe Government, 2018). This ambition is questioned by many analysts, who argue that it is unrealistic given the country's current economic situation. However, if Zimbabwe is to achieve this goal, it will need to make significant progress in addressing environmental issues. The projected increase in Gross Domestic Product (GDP) must be accompanied by many environmental consciousness at the corporate level and national level through environmental laws and regulations due to the global issues of climate changes (Zimbabwe Environmental Management Agency, 2019). However, laws and regulations alone can never guarantee fair practices. A growth in industries should be matched with environmental management accounting otherwise it will be detrimental to the society in form of pollution (Agustia, Sawarjuwono and Dianawati, 2019). Many companies gain a competitive advantage through sustainability reporting as it boosts investor's confidence (Nguyen, 2020). Economic growth accompanied by environmental damages will not benefit as expected.

In the mining sector, small-scale miners produce more output than large-scale mines. For example, in 2019, ASM contributed 17478.74kgs of gold which translates to 63% of the total gold delivered to Fidelity Printers and Refineries (FPR) whilst large mines contributed the remaining 37% (Zimbabwe Miners Federation, 2020). Currently, the \$12 billion expected annual target from the mining sector launched in 2019 has exerted pressure on the environment (Muzo, 2022).

Efforts by Zimbabwe Environmental Law Association (ZELA) in 2022 through the crafting of a model policy to help to eradicate challenges faced by the sector and boost its contribution to the Zimbabwean economy. The government of Zimbabwe put some efforts to protect the environment evidenced through its initiatives such as the idea of launching a plant to manufacture green materials to alleviate the impacts of climate change (Zimbabwe Environmental Management Agency, 2023) and through Environmental Impact Assessment (EIA) by its board Environmental Management Agency directed by Environmental Management Act [Chapter 20:27] of the statutory

instrument 268 of 2018, which was enacted specifically to protect the environment. However, Environmental Management Agency of Zimbabwe (EMAZ) find it difficult to ensure mining firms comply to EIA (Murombo, 2013). This poses a question on whether the mining sector particularly small-scale miners have sustainability mind when they make their internal decision-making.

Small scale miners in Zimbabwe are recognized for their role in producing more output and therefore expected to minimize damage to the environment. Small-scale mines are known for being poverty driven, lack of proper accounting systems and failure to adhere to quality standards such as ISO 14001 (Hilson, 2009). Accounting for environmental and operational costs helps companies to develop and implement general EMS and become a necessity for international trading companies as a result of the expected standard of international compliance ISO 14001, developed by the International Establishment Organization. The Government of Zimbabwe created a problem as it tries to solve another problem of gold smuggling. It put environment at risk through lack of green consumerism of gold by Reserve Bank of Zimbabwe through Fidelity Printers and Refinery, through a **“No Question Asked policy”** (Ncube, Sibanda and Mukasiri, 2019). This is a form of support to the ASM sector, where everyone is selling gold to FPR without asked questions about the way they extracted their gold. Zimbabwe introduced this policy in response to the illicit trade and smuggling of gold to neighboring countries (ZEPARU, 2018).

There are raising concerns that have intensified about the preservation of natural resources (World Resources Institute, 2022). The link between negative environmental effects and human activities. (Natural Resource Defence Council, 2021). Firms communicate with external stakeholders about environmental effects through environmental disclosures in the financial reports (Qian and Burritt, 2010). The environmental reporting held companies publicly accountable for their environmental activities. The maximum benefit is only achieved when small-scale mines account for environmental costs in their decision-making process. Underestimation of environmental costs leads to the overstatement of the living standards if measured using the country’s GDP (Costanza et al., 1997). There is an increased pressure from stakeholders demanding environmental performances of organisations and the degree of the pressure varies from one nation to another (IFAC, 2005).

### **1.3 Statement of problem**

The operations of small-scale mining firms, mainly in Zimbabwe, remain a substantial cause of environmental degradation. Notwithstanding the readiness of EMA as an instrument to accomplish environmental impacts, small-scale mining operations in Zimbabwe have not fully implemented and embraced EMA practices. The problem has been emphasized by ZELA who proclaim that the absence of effective EMA implementation, undesirable environmental impacts from small-scale mining are expected to remain unchecked (Mawowa,2018).

The failure to adopt EMA practices is problematic as it results in environmental degradation, which it turns negatively affect Zimbabwe's Sustainable Development Goals (SDGs). Therefore, small-scale mining companies needs to move from solely profit centric and have to balance it with environmental protection. Hence, the application of EMA practices plays a crucial role in the in fulfilment of sustainable mining practices (Mawowa, 2018). Leaning on the background from the conclusions of Muza and Magadi (2014) that EMA in Zimbabwe mining sector is still in its embryonic stage, there is an overbearing need for regulatory authorities to enforce the application of EMA practices in small-scale mining operations to prevent adverse environmental impacts (Moses, Margaretha and Andrew (2021); Mawowa, 2018). This necessitates the investigation of the current EMA practices in Mashonaland Central small-scale gold millers and miners and how they implement environmental management accounting as well as the factors and barriers that affect its implementation.

### **1.4 Research objectives**

The general objective of this study is to explore the implementation of Environmental Management Accounting in small-scale gold millings and mines in Mashonaland Central, Zimbabwe. The following are the research objectives underlying the study.

- i. To determine the current EMAPs available in small-scale gold millings and mines in Mashonaland Central.
- ii. To explore factors that affect adoption of EMA by small-scale gold millings and mines in Mashonaland Central.
- iii. To determine whether there is significant relationship between EMAPs and financial performance of small-scale gold millings and mines in Mashonaland Central.



iv. To provide recommendations for environmental management accounting practices.

### 1.5 Research Questions

In order to fill the above objectives, the study is intended to answer the subsequent questions:

- i. What are the current Environmental Management Accounting Practices (EMAP) for small-scale gold milling and mines in Mashonaland Central?
- ii. What are the factors that affect the adoption of EMAPs by small-scale gold millings and mines in Mashonaland Central?
- iii. Is there any significant relationship between EMAPs and financial performance of small-scale gold millings and mines in Mashonaland Central?

### 1.6 Significance of the study

#### **To the researcher**

The research will help the investigator to gain a broad understanding of Environmental Management Accounting and this will equip the researcher in environmental management accounting field.

#### **To Bindura Universities**

The study could help Bindura University to better appreciate EMA practices and concepts. This information could be used by the University to improve its own environmental performance and to guide and support other organizations. This could also help Bindura University to improve its reputation as a leader in EMA field. Additionally, the study could entice research partners, faculty and students who are interested in EMA field. The study could to the development of new innovative courses and programs on Environmental Management Accounting. This could help to meet the growing demand for education in this field.

#### **To the small-scale and artisanal mining industry and the Government of Zimbabwe.**

The researcher attempts to investigate the current Environmental Management Accounting Practices undertaken by small-scale gold miners in Mashonaland Central, Zimbabwe and develop recommendations that will benefit the entire small-scale and artisanal industry. The researcher's results, conclusions and recommendations will assist accountants and management, allowing them to strengthen their management practices or strategic decision- making process.

The study serves as a fertile ground for future studies that benefit the mining industry, and Accountants by offering a wealth knowledge and information that lead to a better environmental approach. EMA methodology results in more accurate identification of environmental costs (Gale, 2006b), the proper tracing of environmental costs helps the government to make rational decisions than relying on environmental legislation (Li, 2004) and therefore the Zimbabwean government will benefit from the research recommendations.

### **1.70 Assumption(s)**

The following assumptions are made for the study:

1.71 The development of legal documents guiding and regulating small-scale gold mines or millers on the procedures of establishing EMA practices will increase EMA adoption.

1.72 The researcher assumed that the environmental costs, benefits and impacts of small-scale miners can be measured in either monetary or physical units.

### **1.8 Research delimitations**

In order to control the study, the researcher created some boundaries before any attempt to investigate or undertake the research and these comprise geographical, theoretical and data period delimitations as explained below:

#### **1.8.1 Delimitation concerning geographical area**

To achieve research objectives, the study was carried out in Mashonaland Central province. While there are other small-scale miners around Zimbabwe, those outside Mashonaland Central province do not take part in the study. Only small-scale gold miners with elution processing takes part in the study. However, the research findings would not be negatively affected as small-scale gold miners are homogeneous throughout the Zimbabwe.

#### **1.8.2 Delimitation concerning literature**

The reviewed literature was related to EA, EMA, sustainability reporting and accounting, ecological-efficiency, social and corporate environmental reporting, corporate social responsibility and environmental costs.

#### **1.8.3 Data Period Delimitation**

The data was collected within a certain time frame and since the global environment is not static the results may be affected by time.

## **1.9 Research Limitations**

1.9.1 The data was collected from one province in Zimbabwe, that is, Mashonaland Central and so the research findings might not be generalized to other provinces in Zimbabwe. Small-scale gold mines are scattered throughout Zimbabwe but the research information was gathered from those based in Mashonaland Central only. Small-scale gold mills and mines in Mashonaland Central are assumed to represent all small-scale mills and mines in Zimbabwe. Since it is impracticable to gather data from all small-scale mines, only small-scale gold mines with milling process are included as a representative. This may be insignificant to represent all small-scale mines throughout the country since it is difficult to find significant relationships from the data. Although quite a lot of results were made via this study, there is a likelihood that the results may differ among small-scale gold mills and mines around Zimbabwe.

1.9.2 The study is considered as a cross-sectional as all the data used in this study were gathered at one point in time rather than over a long time. This means findings shows the circumstance at a specific point of time. Another constraint of the study is the method of data collection, which took place at a single point in time, as it is typical in cross-sectional research. Since EMA is a long-term strategic accounting approach that requires time to develop and produce outcomes in terms of improving organizational performance, a longitudinal study conducted over a longer period could reveal the cause-and-effect links between the variables of interest that were not captured in the cross-sectional study. This type of research may also yield more precise findings.

1.9.3 The study is limited to the factors that are already in the previous studies, it's important to consider that there may be additional factors influencing small-scale gold mines decisions about adopting Environmental Management Accounting practices. Additionally, the study relied on subjective measures to evaluate financial performance in small-scale gold mines or mills. Future research should use objective and numerical indicators to ensure more accurate measurement of this variable.

1.9.4 There is no generally agreed international accounting standard, rules or regulations that can be used to quantify organizational performance due to EMA implementation.

1.9.5 There was insufficient information on the data obtained from Ministry of Mines offices which shows active and inactive small-scale mining operators in Mashonaland Central, this reduces the response rate as some of the targeted miners indicated that they ceased operations.

### **1.10 Definition of key terms**

#### **Environmental Management Accounting**

EMA is the implementation of environment-related systems and accounting practices to achieve both environment as well as economic performance and it incorporates auditing and reporting in many companies. According to IFAC (2005) EMA includes different components such as environmental management strategic planning, life cycle costing, benefits assessment as well as full cost accounting.

United Nations (2001) defined EMA as the process of identifying, collecting, analyzing environmental information to make internal strategic decisions.

#### **Environmental costs**

There is no scope in the international standards that deals with environmental costs in terms of recognition, measurement, presentation and disclosure (Jasch, 2003). Despite lack of a standard taxonomy, there are many efforts to explore what should be included in environmental costs. Environmental costs include costs of research and development activity, costs for wastes and costs of controlling emissions, costs of managing and preventing environmental damages, costs for the unused materials in the production process and less tangible costs (IFAC, 2005).

#### **Physical Environmental Management Accounting (PEMA)**

PEMA emphasizes in physical units of EMA, for example, kgs of materials (Burritt et al.2002).

#### **Monetary Environment Management Accounting (MEMA)**

MEMA focuses in monetary units of EMA. For example, waste treatment costs (Burritt et al.2002).

#### **Social costs**

These are cost to the third parties for which there is no compensation to the affected parties.

### 1.11 Chapter Summary

This chapter highlighted the background of the study and it pinpointed the significance of the study towards academics in the practicality of EMA. The chapter also described the aims of the research, research objectives. It also outlines the limitations, delimitations as well as assumptions underline the research.

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This section presents contextual material on a number of key notions in the areas that this research extends. It will focus on the EMA, EA related aspects in different industries around the world. The chapter also extends to theories and their results on the application of EMA by different scholars in different industries.

#### **2.20 Background of EMA.**

EMA is a branch of management accounting, so information is used for internal decision-making (UNSD, 2001); which helps companies in cost saving opportunities, pricing decisions, in improving environmental performances and it also helps in the avoidance of future costs that are related investments (Ferreira, Moulang and Hendro, 2010; Qian and Burritt, 2009; Deegan, 2003). EMAP helps in tracking, tracing and treating environmental costs, savings and earnings that resulted through environment-related activities (Burritt, Hahn and Schaltegger, 2002). EMA generates, analyzes and uses both monetary and physical environmental related costs to improve the organization's financial and environmental performances (Chang, 2007).

#### **2.3.0 Theoretical Literature Review**

##### **2.3.1 Uncertainty theory**

This theory attempts to describe the association between internal and external organizational factors and management accounting systems. These management systems were designed to match both internal and external environment, therefore in the era of sustainability firms adopt EMAPs due to these factors (Al-Mawali and Am, 2016).

##### **2.3.2 Deep ecology theory**

The development of this theory was back-dated to 1973 and was the brainchild of Naess to explain the improvement in the living standards of humans and the environmental quality by reducing

environmental pollution. This theory explains the need for moral and ethical obligations of firms in measuring environmental costs, resource use and management, water and energy (Devall and Sessions, 1985). This theory helps to explain the benefits of measuring and reducing emissions and wastes. This concept aids in the identification of environmental cost information to support the needs or interest of stakeholders when companies disclose its environmental performances. The question on the use of business' ethical behaviors in reducing negative societal and environmental effects leads to the development of the Deep ecology theory (Barrow; 1999, Drengson and Inoue; 1995).

### **2.3.3 Stakeholder Theory**

The stakeholder theory of EMA advocates that organizations adopt environmental accounting practices in response to the demands and expectations of their various stakeholders. By managing environmental performance and accounting for environmental impacts, organizations can prove their commitments to sustainability and social responsibility, which can boost their stakeholder relations and reputations.

The sustainability mind of stakeholders through demanding transparency of information related to sustainability practices (Meutia, Ramadhani and Adman, 2019). Shareholder value is not only the core aim of companies, but to create value to all stakeholders (Harymawan et. al., 2019). The competitive landscape requires firms to climb sustainability ladder to gain a sustainable competitive advantage through green strategy (Agustia et. al., 2019). This makes stakeholders more vital in the lessening of environmental impacts (Ramadhany; Fadlilah; Hidayatul; Mustika; Diana; and Nabella, 2021). Current studies have observed the association among EMA practices and stakeholder pressure in several industries, including service, manufacturing sectors. For instance, a study by Baxendale and Sinnett (2020) found that stakeholder pressure was a crucial motivator of EMA practices the UK manufacturing industry. Another study by Islam and Deegan (2020) found that stakeholder engagement and pressure played a substantial part in determining the development and application of EMA practices in Australian mining industry.

### **2.3.4 Legitimacy Theory**

This theory helps to analyze the relationship between organizations and the environment (Mousa and Gehan, 2015). The theory assumes that actions of firms should be aligned with beliefs, values

and norms (Suchman, 1995). The legitimacy theory is the eye-opener to firms to implement social, environmental and economic disclosures as part of corporate responsibility (Mousa and Gehan, 2015); these three dimensions helps companies to gain legitimacy (Berthelot and Robert, 2011). This theory can be reflected by green innovation as companies are encouraged to pay attention to the environment by taking strategic steps to adopt EMA (Husnaini and Tjahjadi, 2021).

#### **2.3.4.0 Institutional theories**

The perspective of the institutional theory is basically grounded on economic and social theoretical views (DiMaggio and Powell, 1983). Numerous authors have proposed institutional theories to elucidate why companies implement EMA information. These theories have been reinforced by empirical evidence, which submits that they are at least somewhat factual. The three major institutional theories that have been proposed are coercive theories, mimetic cognitive theories, and normative theories. The institutional theory was suggested to be used to identify and explain the motivations to the adoption and implementation of EMA (Gunarathne and Lee, 2014).

#### **2.3.4.1 Coercive institutional theory**

The coercive institutional theory EMA contends that organizations implement environmental accounting practices as a response to regulatory and legal pressures. These pressures may come from governmental bodies, industry associations or other actors with the authority to enforce compliance. In this theory, firms are forced to adopt EMA systems. This can be referred as Coercive Isomorphism and it provides pressure to obey rules and regulations, inferential sets and schemes (Qian and Burritt, 2009). In Zimbabwe the coercive forces come from Environmental Management Agency of Zimbabwe (EMAZ) through Environmental Management Act chapter 20:27, Ministry of Mines through Mines and Minerals Act chapter 20:05 of 1961 or Ministry of Environment Water and Climate (Muza, 2018). Non-compliance attracts penalties and fines or even closure of companies therefore, firms will usually comply due to these adverse consequences of non-compliance. Shareholders, local communities, environmental pressure groups and the desire to protect the corporate image also leads to the implementation of EMA. Overall, the coercive institutional theory highlights the importance of regulatory and legal frameworks in driving environmental accounting practices.



Current studies have revealed that coercive pressures can be influential stimuli for environmental accounting practices include the study by Trinks et al. (2020) found that regulatory pressures were a significant influence in driving American firms to adopt carbon accounting practices. Another study by Turner et al. (2018) found that coercive pressures from industry associations motivated Australian firms to disclose their environmental impacts.

#### **2.3.4.2 Cognitive institutional theory.**

The cognitive institutional theory of EMA posits that organizations implement environmental accounting practices as an outcome of joint beliefs, values, and assumptions within their industry or society. This approach highlights the part of cognitive progressions, such as sensemaking and interpretation, in determining organizational decision-making concerning the implementation of environmental accounting practices. This concept is allied to the values appreciated within a certain profession. Pressure from companies and stakeholders that demand environmental reports to be produced before accepting any contracts with that company (Qian ,2009). Companies will be motivated to adopt to EMA systems because they want to trade with others.

A current study by Giannarakis et al. (2020) observed the role of cognitive institutional pressures on the implementation of EMA in the hospitality industry. The authors found that shared beliefs and values and perceived reputation benefits, played a substantial role in inducing organizational decisions to adopt environmental accounting practices.

#### **2.3.4.3 Mimetic institutional theory**

Mimetic institutional theory EMA suggests that organizations implement environmental accounting practices in attempt to imitate their competitors and gain legitimacy in their field. This can lead to a standardization of environmental practices, even if they are not effective or efficient in achieving their intended goals. Mimetic behavior is the way companies do things (Qian ,2009). Recent literature on this theory includes a study by Abedzadeh, et al. (2020) which observed how companies in the apparel industry mimic their competitors in applying sustainable practices. Another study by Maroun, et al. (2021) explored the role of institutional pressures in determining the adoption of environmental accounting practices in the energy sector.

#### **2.3.4.4 Normative institutional theory.**

This theory explains the use and importance of societal values and norms in the business environment (Jamil et al, 2015). Businesses use these values and norms to gain the base for survival and failure to utilize that opportunity negatively affects the company. The normative institutional theory plays a crucial role as a motivational factor for EMAPs adoption in various firms.

#### **2.3.5 Contingency Theory**

This theory was explained in 1960 by Burns and Stalker. This theory explains that the structure of an organization depends on uncertainty of the environment. Technological and environmental factors affect organizational structures of companies. This theory was demonstrated as useful in explaining EMAPs (Bouma and Van de Veen; 2002). This underutilized theory is more important in EMA development (Christ & Burritt ,2013).

#### **2.3.6 Signal Theory**

The theory was constructed on the premise that organizations can use their environmental practices to send signals to stakeholders about their commitment to environmental protection and sustainability. Signals can be communicated through numerous means, such as certifications, environmental reports and strategic partnerships. The theory suggests that these signals can influence the perceptions and behaviors of stakeholders, leading to positive outcomes such as amplified customer loyalty and regulatory support. As elucidated by Burchell and Collier (2006), signal theory proposes that organizations use environmental practices to send signals that prove their legitimacy and aptitude in environmental management. The signals are interpreted by stakeholders constructed on their previous observations and expectations about the organization, leading to positive or adverse appraisals. In this way, signals act as a form of representational management, allowing organizations to communicate their intentions and values to external audiences. Such as, the use of eco-labels on products can positively stimulate customer behavior leading to increased sales (Loureiro and Dillenburg, 2017). This theory assumes that internal stakeholders have more information than external parties, so information in management reports contains information to predict the future (Dewi and Rahmianingsih, 2020). EMA practices by

companies will be considered as a management tool of environmental costs (Haymawan et. al., 2019).

In conclusion, signal theory of EMA highlights the standing of symbolic management determining stakeholder perceptions and behavior towards environmental issues. By leveraging environmental practices as a signal to commitment to sustainability, organizations can build credibility, reputation and trust with important stakeholder groups.

### **2.3.7 Resource based theory**

The theory proposes that organizations may adopt environmental accounting practices as a means to maximize resource efficiency and minimize environmental costs, leading to improved financial performance. This is based on the idea that environmental issues can also be seen as a source of opportunities for organizations to improve their resource utilization.

The fundamental proposition of resource-based theory is that firms are not homogenous in owned, controlled strategic resources due to imperfections in resource-market and immobility of resources (Barney, 1991) and the inabilities of firms in altering accumulated resource stocks over time (Carroll, 1993). The accomplishment of EMA is directly influenced by the availability of the bundle of intangible and tangible resources and capabilities (Ray, 2004). The most valuable resource to drive EMA are competent workers in the discharge of affluent in environmentally friendly ways.

### **2.40 Reasons why firms adopt EMAPs**

There are many studies in different countries aiming the factors that hinder or influence the firms to adopt EMAPs. In order to identify all factors that motivate the adoption or the implementation of EMAPs, different theories as mentioned above can be employed. These theories are put forward by different authors in trying to enlighten the focal motives behind the implementation of and the adoption of EMA information (Burrirt and Chen, 2015).

### **2.5 Drivers and Challenges of implementation of EMA**

Prior studies in the field mentioned challenges that hinders EMA adoption. Implementation of EMA is legged behind due to absence of initial organizational incentives as companies view

information disclosure as risky (Ferenhofet; Vignochi; Selig; Lezana and Campos; 2014). Information type used by accountants makes it difficult if not impossible for them to accurately track and trace environmental costs. Delmas & Toffel (2003) builds a model to link institutional pressures to organizational features to explain environmental management adoption. The associated barriers to the implementation of EMA include lack of priority to environmental costs (Chang, 2007; Jamil et al.,2015). Their studies grouped these barriers into five major categories namely financial barriers, attitudinal barriers, institutional barriers, information barriers and management barriers. Kostka et al., (2011) grouped these barriers into four categories: informational, financial, cultural and organizational barriers. IFAC (2005) expressed the notion that companies are not primarily adopting EMA for strategic reasons but were forced by external factors and these includes: regulatory pressures, disclosure pressures, supply chain pressures, financial pressures and environmental tax or cap and trade pressure. The lack of EMA implementation was blamed on insufficient environmental awareness, ineffective and reluctant regulatory bodies, absence of stakeholder pressures and financial difficulties faced by firms (Burritt, 2004).

## **2.6 Prior Empirical Studies on Environmental Management Accounting**

Many authors used different case studies in different sectors and studied how EMAP are related to companies' financial performance and environmental performance. In trying to determine a connection that exists between EMA and environmental performance, Larojan and Thevaraban (2014) successfully found that variables are positively correlated. Findings of the article titled "Environmental management tools" by Doorasamy in 2015, showed that, management tend to underestimate environmental costs and that there is a divergence between environmental costs in the financial statements and that actually incurred by the firms in paper and pulp manufacturers in South Africa. Costs were still allocated using the traditional cost accounting systems rather than environmental management systems. Quantitative methods were used to analyze information. From the descriptive research of Muza (2018) that tries to assess the relevance of EMA to Zimbabwean extractive industries' sustainability, by employing an open-ended questionnaire, the researcher concluded that EMA is more significant in the promotion of sustainable growth in extractive sector in Zimbabwe. The author also points out that the fruits of EMA practices are not yet fully realized in Zimbabwe. Despite the advantages of EMA implementation in Zimbabwe, firms are still reluctant to implement it because of associated costs and absence of knowledge. In

addition to that, an examination directed on the barriers of EMA in Chinese SMEs in 2022 by Javed, Yusheng, Iqbal, Fareed and Shahzad reviewed that SMEs are motivated by the flexible financing options available in China and also forced by strict legislation to adopt EMA. They also found that, the availability of environmental reporting systems as well as auditing mechanisms motivates utilization of EMA. From the analysis of the factors that influences the adoption of EMA in Australian water supply industry, Ferdous, Adams and Boyce (2019) found that EMA adoption is fueled by government regulation and expectations of the community regarding environmental performance and disclosure. They found that these organizations are reflexively isomorphic as they try to align commercial logic to sustainability.

A study by Noah (2017) on the accounting for the environment, measuring the accountability of Nigerian cement industry a case of two companies selected as firms, revealed that there is heavy pollution of the environment but companies were exerted pressure by various agents to reduce environmental pollution this means that external institutional factors greatly influenced the corporate environmental accountability in Nigeria.

In line with that, Jamil (2018) studied the factors that affect the adoption of environmental management accounting practices in SMEs in manufacturing industries in Malaysia. Descriptive results from mailed surveys, reviewed that the most dominant barriers to the adoption of EMA are financial barriers, followed by informational barriers, then attitudinal barriers, institutional and lastly management barriers.

Mohamed (2018), extended the study of EMA by studying environmental management accounting and environmental performance the context of Malaysia SMEs. The study investigated the relationship between EMA and environmental and to explain the current EMAPs in SMEs. The research findings reviewed that SMEs in Malaysian manufacturing sector account for the environment more in physical units as compared to monetary terms, although the adoption level is not satisfactory, those with EMAP improves its environmental performance.

Wachira and Wang'ombe (2019) also aimed to understand environmental management techniques applied in Kenya manufacturing firms. Results obtained from a mixed method of semi-structured interviews and surveys applied to Kenyan companies, reviewed that the availability of

environmental regulations and financial performance can be directly linked to environmental management accounting practices levels applied. According to the study, EMAPs are principally applied as compliance to regulatory requirements.

Smith and Dikgwatlhe (2013) assessed the awareness of environmental management accounting in the mining industries in South African. The authors employed a quantitative approach to collect data, they opted for a modified questionnaire to find the results of their study. They found that financial practitioners and environmental practitioners are highly aware of EMA.

A study by Nyahuna and Doorasamy (2021) applies Environmental Management Accounting in South African SMEs. From an in-depth interview to managers of SMEs in Gauteng province, the authors found that SMEs in SA are more aware of PEMA than MEMA and they are more motivated to implement it when there are no costs attached because they view it as costly. So, in terms of PEMA and MEMA, they prefer PEMA. The study concluded that SMEs prefer EMAPs that are costless.

Ahmad & Omar (2019) also conducted the study on the implementation of Environmental Management Accounting practices in Indonesian manufacturing firms and found that Indonesian manufacturing firms practice PEMA more than MEMA because PEMA is easier to implement and requires fewer financial resources compared to MEMA.

Jamil, Mohamed, Muhammad and Ali (2015) also extended EMA studies to small and medium manufacturing firms. The study employed the Institutional theory, the results indicated that firms are aware of EMA because they have environmental budget allocations and they are involved in PEMA practices. The authors found that the dominant force for the practice of EMA was coercion. Coercion was in form of Government regulations, shareholders, environmental laws as well as Government pollution standard. Other factors include attitudinal barriers, information barriers, management barriers and institutional barriers.

Cuthbert Muza and Itumeleng Magadi (2014) tried to explore the benefits of application of EMA in Zimbabwe mining sector. Authors found that there are advantages for the “green companies” by applying environmental policies. EMA implementation in Zimbabwe is still at its infancy and they recommended that Zimbabwean government should design a suitable EMA framework.

The study also found sufficient evidence on the proper tracking and reporting of environmental costs.

Another study in Zimbabwe to develop Greener Goldmining conceptual framework through Environmental Management Accounting Practices by Moses, Margaretha and Andrew (2021). The authors adopted Saunders research onion and pointed out that government regulations drive organizations to adopt EMA and authors also argued that the absence of EMA framework for adoption and implementation results in ecological degradation. The mining companies in Zimbabwe adopts EMAPs due to regulatory forces and they also concluded that there is very little integration of EMA practices in Zimbabwe.

Van der Poll (2022) explored the drivers and barriers of EMA adoption in developing and developed countries to achieve sustainable development. The study found that the existence of strong institutions in developed countries exerted more isomorphic pressure to organizations to adopt EMA as compared to weaker institutions in some developing countries. Moreover, normative forces, mimetic factors and contingent factors also play a greater pivotal role in developed countries than developing countries.

Resistance to change is another barrier to the implementation of EMA. Many organizations may be resistant to change due to the fear of increased costs, reduced profits, and disruption of existing systems (Khan & Harnmeijer, 2018). Therefore, there is a need for effective change management strategies to overcome this barrier. The lack of resources is another significant internal barrier to the implementation of EMA. Organizations may not have the financial and human resources required to implement EMA, and managers may prioritize other activities over EMA (Mishra et al., 2020). Therefore, there is a need for allocation of sufficient resources to support the implementation of EMA. The lack of regulatory support is a significant external barrier to the implementation of EMA. Many organizations may not implement EMA due to the absence of legal requirements or incentives (Khan & Harnmeijer, 2018). Therefore, there is a need for governments to provide regulatory support through policies and incentives to promote the adoption of EMA. The lack of stakeholder pressure is another external barrier to the implementation of EMA. Organizations may not implement EMA if stakeholders do not demand it (Mishra et al., 2020). Therefore, there is a need for stakeholders to increase their demand for EMA and its benefits.

### **2.61 Influences of EMA on financial performance and environmental performance**

The application of EMA had proved superior towards the improvement of both financial and environmental performance as noted from quantitative research by Deb and Rahman (2022) in Bangladesh, results reviewed a significantly positive relationship of EMA and environmental performance and financial performance. The research also reviewed the impact of stakeholders and institutional pressure to the manufacturing firms enhances the implementation of EMA. Fuadah, Kalsum and Arisman (2021), also seek to determine the influences of EMA and corporate environmental performance of companies with ISO 14001 certifications in Indonesia, and the results from Partial Least Squares Regression analysis proved a positive relationship between environmental strategies and EMA, and also of EMA and environmental performance of companies. In the same view, Mayndarto and Murwaningsari (2021), tries to find the role of EMAPs and firm's environmental strategies on environmental and financial performances using managerial commitment as a moderating variable in Indonesia. Research results reviewed a significant positive linear relationship between EMA and environmental performance and financial or economic performance. AlKhajeh and Khalid (2018) EMA is directly corelated with SMEs financial performance in South Africa. Additional study by Love and Roper (2015) studied the empirical evidence on the connection between management accounting practices and small and performance of SMEs. The study found that management accounting practices are positively corelated with performance, but that the strength of this connection differs depending on the specific practices used and the setting in which they are implemented.

However, there are some studies that failed to see the relationship and they found no substantial connection between EMAPs and financial performance. Those studies include a study of Aras and Ozgen (2016), their study found no substantial relationship between the use of EMA practices and environmental performance in Turkish manufacturing firms. Cordery and Dobler (2018), studied how sustainability is affected by management accounting practices. The study found there is no clear connection among management accounting practices and sustainability performance. Another study is the study by Rezaei and Nikzad (2017) in Iranian manufacturing firms, the authors concluded that there is no significant relationship between EMA practices and performance. Some studies have found a positive relationship, while others have found no relationship or even a negative relationship.



**The factors that the Environmental Management Accounting in Kenya manufacturing companies Ngeti (2019).**

The study aimed to identify the difficulties connected with EMA implementation and how they are correlated with adoption level. A survey was conducted using a questionnaire to gather information about the adoption rate and challenges encountered. Data were analyzed using narrative analysis and descriptive statistics. Multiple regression analysis was also used to examine the relationship between EMA and challenges. The findings revealed that the manufacturing industry's EMA adoption rate was small. Some companies are implementing all EMA practices, whilst others are only the necessary practices. The difficulties identified with the EMA implementation include the absence of guidance and expertise, low awareness of environmental concerns, inadequate communication between departments, and ineffective regulatory approaches. Listed companies in Kenya are not under pressure to adopt EMA, which could be attributed to the inadequate regulatory approaches identified in the study. The study recommended that the responsible environmental and capital market authorities and other regulating bodies to work hand on hand with UNDS and UNEP to craft clear and comprehensive regulations and guiding principles for manufacturing firms to account for the environment. Additionally, little environmental cognizance and absence of expertise in EMA were also identified as significant barriers. Finally, it also recommended that the government should take the lead in sensitizing the public to the importance of a green economy by 2030.

**Factors that hinder EMAP in developing nations, Elhossade, Zoubi and Zagoub (2022)**, case study of Libyan manufacturing industry, the researchers found a low level of implementation of EMA due to institutional barriers, management barriers, followed by informational barriers, then financial barriers and attitudinal barriers. They also noted that strict enforced environmental laws and regulations from Libyan government and stakeholders facilitates the implementation of EMA.

**Application of EMAPs by manufacturing firms in South Africa by Govender (2016)**

The results of a well-structured questionnaire indicated that South African manufacturing firms practice EMA. It also showed an insignificant difference between the way firms are aware of both PEMA and MEMA. The organization recognizes environmental related costs directly to a product and therefore improves decision making. The motivation to adopt environmental management

practices was only as a compliance to the regulations rather than go beyond compliance, whilst others do.

**Karimi, Dastgir & Saleh (2017) in Iran, developed a conceptual model through the analysis of the factors that hinders EMA adoption and use.**

From their descriptive survey, authors found that managers struggle to collect, allocate environmental costs, absence of accounting standards on environmental accounting, managers are also resistant to cope with change and competitive environmental and cultural society in dealing with ecological issues affect EMA adoption.

**The factors affecting the adoption of EMA in pulp and paper manufacturing enterprises in Veitnam. Nguyen (2022).**

The examined the factors that affect manufacturing firms in Veitnam pulp and paper industries in implementing EMA practices. The primary data applied in the study were gathered using questionnaire surveyed to 290 respondents in the cities and provinces of Veitnam and secondary data was obtained from seminars, conferences and scientific articles. The results were analyzed using exploratory factor analysis, linear regression analysis and Cronbach's alpha analysis using SPSS 20 software. The study was grounded on isomorphic institutional theory and the legitimacy theory. The study results were based on the proposed research model of six hypotheses of the factors that affect EMA adoption. The study reviewed that coercive pressure have the greatest effects whilst lack of awareness of EMA application has insignificant effect on EMA adoption. It also reviewed that normative, accountants' qualifications, perceptions of management and environmental strategy were also identified as factors affecting EMA implementation. The author recommended on the development of legal documents guiding and regulating firms on the procedure of establishing EMA practices. In addition to that, the study also recommended on the perfection of regulations on disclosure of EMA and other related environmental regulations, spreading and publicizing environmental protection on the media. The avenue given by that study was to increase factors and the sample size.

**The role played by EMA in the promotion of sustainable development in Iraq. Chichan, Mohammed and Alabdullah (2021).**

The objective of the research was to investigate whether Iraqi industrial companies possess knowledge about EMA and to observe the importance of EMA in providing information that could impact decision-making regarding environmental preservation and sustainable development. A questionnaire was administered to a randomly selected Iraqi industrial firms to gather data. The study also focused on the economic and social aspects of sustainable development. The data was analyzed with statistical software SPSS version 20 and the results suggested that Iraqi industrial firms have an understanding of the principles of EMA and its potential contributions towards sustainable development. The study recommends that Iraqi industrial firms should implement EMA to reduce undesirable environmental impacts caused by their business operations.

**Exploratory study on the factors that influence EMA practices in Malaysian manufacturing industry. By Ong, Noordin, Kassim and Jaidi. (2020)**

The purpose of the study was to investigate factors influencing EMA implementation in the manufacturing industry in Malaysia. Data was gathered was by a semi-structured interviews with three local environmental authorities and two companies. The results indicate that EMA is primarily driven by customer demand for environmental management and compliance with Malaysian environmental regulations. While environmental management practices have not been officially mandated by headquarters, there are indications that they do exert some influence. These findings shed light on the challenges faced in promoting EMA implementation in Malaysia and offer suggestions for raising awareness and encouraging adoption of EMA in organisations.

**The effect of Environmental Management Accounting practices and reporting on organizational performance of South-West Nigerian universities. Olaoye (2018).**

This study investigated how EMA practices and reporting affected the economic performance of South-West Nigerian universities. The study aimed to examine the current accounting practices and identify ways to expand EMA sustainability within those universities. The research utilized a descriptive survey research design and structured questionnaire, employed stratified random and purposive sampling techniques. The study revealed that the current EMA practices was low in university under study, with various factors such as low priority, resistance to change, deficiency of institutional pressures, and non-existence of environmental accountability contributed to the slow adoption of EMA. The study concludes that management accounting's role in enhancing environmental performance was yet recognized, impeding the implementation of EMA. The study

suggested that universities should integrate PEMA and MEMA information systems for innovation, weigh environmental performance of key managers, offer better inducements to manage environmental costs, and adopt strategic planning for enhanced efficiency.

**The factors that affect EMA implementation in manufacturing firms in Danang city, Vietnam. Duong and Nguyen (2022).**

The research surveyed 321 chief accountant and managers from 200 manufacturing companies located in Danang city, Vietnam to identify the factors that affect EMA implementation and determine their influence on EMA implementation. The study adopted a mixed research method to find and measure the influencing aspects of EMA practices. The results revealed five critical factors that impact EMA implementation: enterprise characteristics, technology level, performance pressure, the qualifications of accounting staff, and awareness from management.

**The use of environmental management accounting as a perspective for the sustainability of Sri Lankan hotel by Gunawardena and Dissanayake (2021)**

The authors explored the significance of EMA as a means to determine and analyze environmental costs within a company, and understand how these costs impact the company's overall environmental performance. The emphasis of the study is to highlight the importance of EMA in helping companies manage environmental costs more effectively, and thus improve both environmental and financial performance. Through data analysis and case studies, the authors demonstrated how EMA can enable a better understanding of accurate environmental impacts of a hotel under study, and help to identify potential areas of improvement. The paper concludes by emphasizing the need for more attention to be paid to EMA within the business community, in order to foster more sustainable environmental practices and better performance outcomes for companies.

**The relationship of EMA, management commitment and environmental strategy with economic and environmental performance of SMEs in Indonesia Christine, Yadiati, Afiah and Fitrijanti (2019).**

In contemporary times, carbon emissions and other pollutants contribute significantly to the problem of overshoot. Against that backdrop, the authors' study explored the linkage between accounting, management and the environment in achieving firm performance. Specifically, the

study examined the interdependence among EMA, environmental strategies, and the commitment of management in improving financial performance of firms. Acknowledging the alarms raised in the existing literature regarding the financial implications of environmental management in organizations, authors also aimed to investigate the influence of these variables on environmental and economic performance of SMEs in Indonesia. The research employed an innovative approach of partial least square structural equation modelling and collected data from 317 participants from various SMEs. The findings from the study indicated that environmental strategies have a significantly positive effect on both economic performance and environmental performance. The study also demonstrated that EMA has a positive significant influence on both economic and environmental performance. Finally, the research findings confirmed that management commitment significantly and positively affects both economic and Environmental performance.

**A study on how EMA application and operational strategies on waste management cost (WMC) in RSIA Siti Hawa. Sofia, Ardiany, Adawiyah and Yulia (2022).**

The study aimed the examination of the impacts EMA adoption and operational strategies on the waste management at RSIA, both individually and in combination. The research methodology comprises field and literature research for gathering data, and multiple linear regression for data analysis. The study results demonstrated that EMA has a partial impact on waste management costs, Similarly, operational strategies have a partial impact on waste management costs. Furthermore, EMA application and operational strategies together have a significant impact on waste management costs.

**Institutional drivers to the implementation of EMA in Australian public sector water organizations. Ferdous, Adams and Boyce (2019).**

The primary aim of the study was to determine the factors that influence EMA implementation using institutional theory perspectives. The study includes case analysis of three Australian water supply companies, basing primary data on interviews and secondary data available in companies' internal documents and annual reports. The study found two primary drivers that leads to EMA implementation namely, the availability of the government regulations and expectations from the community with respect of environmental performances and disclosures. The study was based on the application of reflexive isomorphism and institutional theory to identify drivers to the implementation of EMA.

**Seneviratne and Kalpani (2020), study on the drivers of EMAPs and waste management practices in Sri Lanka.**

The core purpose of the study was to investigate the correlation between EMA practices and waste management practices and how the study organization prompted to adopt waste management practices. The study adopted the case study technique was employed to assess the relevance of EMA in waste management in a large manufacturing firm. The data was collected using observations, interviews and also from archival documents. Findings revealed that the company improved its environmental and waste management practices influenced by key stakeholders. These influences were classified into coercive, mimetic, and normative isomorphisms.

**Susanto and Meiryani (2019), tries to find the antecedents of EMA and environmental performance in SMEs in Indonesia.**

To extent the study of EMA, the study focused on the barriers and factors that motivates SMEs in Indonesia to adopt EMA practices. The adoption of EMA was low because of ineffective environmental laws, low awareness of environmental issues and absent of stakeholder pressures. EMA in SMEs in Indonesia is still low as there is no use of management practices associated with environmental issues. The study also exposes that expected financial benefits are the major internal motive for the implementation of EMA. Authors also discovered that SMEs apply EMA because of regulatory pressures.

**Experimental research to determine the factors that affect Veitnam Manufacturing Enterprises' EMA application by Huy, Trang and Huyen (2022).**

The primary aim of the study was the determination of the factors that affect the application of EMA by Veitnam Manufacturing Enterprises. Researchers used quantitative approach and analyses the data using regression analysis. The authors identified four key aspects that have substantial impact on EMA application in Veitnam manufacturing firms. EMA application is influenced by the normative pressure, coercive pressure, awareness in terms of the usefulness and of the difficulty when applying EMA.

**The implication of EMA techniques on sustainable competitive advantage. Allawi, Mijbil and Hamzah (2020)**

The research aimed to establish the association and potential impact between environmental management accounting practices and advancement of sustainable competitive advantage. The study aimed to explore advantages of EMA techniques in cost reduction and saving time, increasing quality, promoting environmental sustainability, encouraging innovation and energy conservation, fostering safety, and decreasing waste in production, thereby achieving a sustainable competitive edge. The researchers administered a questionnaire to 350 account managers and production staff of industrial firms in Iraq. The findings revealed that environmental management accounting techniques are crucial in developing aspects of sustainable competitive advantage within the organization. Therefore, the study recommended that companies adopt these practices as a means of maintaining their competitiveness and achieving sustainability.

**The analysis of the factors that motivates or drives the implementation of EMAPs using the new institutional sociology perspective on Apparel Manufacturing in Sri Lanka by Nethsarani and Samudrage (2021).**

The objective of the research was identification of the reasons why a manufacturing firm in Sri Lanka apparel industry adopt EMA. The study used a single case study approach of the top manufacturing firm and primary data was collected by distributing semi-structured questionnaires and interviews. The results from the study indicated that the used EMAPs were environmental cost accounting and environmental induced revenue and capital expenditure. The study was based on the institutional theoretical perspective and it found that the most significant factor was coercive isomorphism and the least being the normative isomorphism. The coercive force that mostly influence the implementation and the adoption of EMAPs being government regulations. The results also indicated that PEMA is more practiced than MEMA.

**Conceptual framework**

EMA comes in different dimensions which were extracted from previous developed frameworks such as Burritt et al. (2002) developed a framework on EMA implementation modalities. Below is the framework summarizing the areas the researcher considered in the formulation of the conceptual framework.

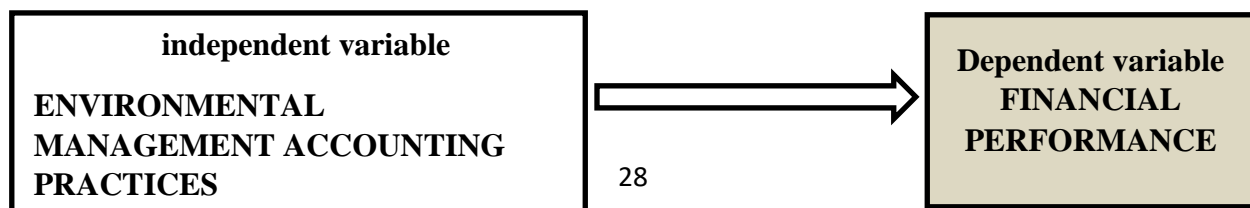


Figure 2.1 Conceptual framework

#### **2.40 Gap Analysis**

To the researcher's knowledge, there are limited researches directed in the Zimbabwean context and in the small-scale mines. Therefore, it necessitates furtherance of EMA researches in Zimbabwe and the researcher pursued to undertake this research. Most of the reviewed literature were undertaken in different contexts other than small-scale mining sectors and are undertaken in developed countries.

#### **2.41 Chapter summary**

From the above discussion of the theoretical and empirical evidence, most of their studies have looked into the advantages that accrue when companies adopt EMAP. Most of their existing researches have been done in developed countries and in large corporations. On the contrary, industries such as Artisanal and small-scale have not been researched in Zimbabwe to assess EMA application. The study therefore intends to seal literature gap by investigating the application of EMA to small-scale miners, which seem to be applied in developed industries. The topic which is going to follow is chapter three which centers on the research methodology.



## CHAPTER III

### RESEARCH METHODOLOGY

#### **3.1 Introduction**

After a critical establishment of the pertinent literature on EMAPs, EA as well as other related studies carried out in different contexts including in Zimbabwe. This chapter will highlight the research methodology used to collect data, research design, a step-by-step plan of action to systematically carry out the research to produce the intended results and the validity and reliability of the instruments used.

#### **3.2 Research design**

After considering the research problem and the existing literature, the next step is to design a model to provide the answers of the questions underlying this study. The researcher stresses to explore the current EMAPs for small-scale gold mines and mills in Mashonaland central, Zimbabwe and ways small-scale gold mines implement EMA in Mashonaland central, Zimbabwe. To gain understanding of the above aims, descriptive research was employed. Descriptive survey helps in addressing features of specific population at fixed point of time or varying time (Gill and Johnson, 2002). The case study is used to empirically examine the current phenomenon in a real-life setting, when there are blurred boundaries between context and phenomenon and when there is a use of single source of evidence, according to Yin (2003b). There are different ways in which case study may be presented and the types depends on purpose and the role underlying the theory. The case study can take the form of explanatory, exploratory, descriptive, experimental and illustrative (Otley and Berry, 1994). To determine the current state of EMAP available in small-scale gold millings and mines in Mashonaland central, and to gather perceptions about the influences that affect EMA implementation, a quantitative data was used, the primary data was obtained through a structured questionnaire from mill or mine accountants and to categorize data. The coded data was inputted in a Statistical Package for Social Science (SPSS) version 20. To determine the significant association between EMAP and Small-scale miner's financial performance, Spearman correlation coefficient was employed.

### **3.3 Correlational research design**

This type of the study involves the need to appreciate and weigh arithmetic relationship between EMA practices and financial performance in the absence of any other variables which makes this type of research design suitable (Canals, 2017). Three types of correlational research design include survey research, natural observation and archival research (Canals, 2017). This research followed a survey correlational design.

### **3.4 Decision on the case study design**

The case study research defined as the enquiry of the current occurrence in the current setting, but due to the criticisms of this method, it is considered a weak research tool, choosing its design is of great importance. The appropriate case study approach depends on the problem at hand, that is, one can choose a multiple-case or single-case. The drawback of the single-case approach is that it cannot offer a generalizing conclusion, especially when there are uncommon events (Yin, 2003). This issue can be resolved by triangulating the study with additional techniques in order to validate the approach. The researcher chose a multiple-case design due to the nature of the study, that is, it needs to focus on the real-life phenomenon.

#### **3.4.1 Ethical considerations**

There are various ethical implications and issues that the researcher must consider while doing the research. The researcher properly described the goal of the inquiry to the respondents in order to uphold ethical considerations. The researcher took moral considerations into account and kept the identities of research subjects private and anonymous. The researcher fully informed respondents about the scope of the questions in form of written description sent in advance and respondent's informed consent. On the questionnaire sheets, no names were to be written.

#### **3.4.2 Population**

Population refers to the entire set of individuals, objects, or events that share a common characteristic of interest to a researcher.

#### **3.4.3 Target population**

This refers to a collection of items with at least one common characteristic of interest to the researcher. This can be used for the generalization of the research conclusion. In this research, it consists of all 38 small-scale gold mines and mills in Mashonaland central. The number of small-

scale gold mines and mills was enquired from Mashonaland central Ministry of Mines offices in Bindura. The respondents comprising of all 38 mill or mine accountants in small-scale gold miners.

### **3.6 Sources of Data**

#### **3.6.1 Primary Data**

Primary data is the first-hand data, captured at very point, that was previously unknown. The primary data was relevant to this study because it is reliable and specific, however, it requires more time and its costly but this remains irrelevant to disqualify the relevance of primary data. First-hand data about the current EMAPs, factors that hinder and motivate small-scale gold mines, were gathered through observations after on-sites visits and questionnaires. To collect data from mine accountants, questions will basically concentrate on the current EMAPs and the reporting.

### **3.70 Research Instruments**

#### **3.71 Questionnaires**

According to Fraenkel (2003), questionnaires are a standardized set of questions used by researchers to gather data from respondents. For this study, a questionnaire was created based on instruments from previous research studies. A rating scale was used to gather responses from participants in various categories. The adoption of Environmental Management Accounting (EMA), environmental strategy, and organizational performance were all measured. EMA adoption was measured using 12 indicators, with a 5-point Likert Scale used to determine the extent to which firms implement EMA practices. Some indicators focused on the monetary aspects of EMA, while others focused on the physical aspects within the firm. This measurement method was used in a study by Ferreira et al. (2010). To measure overall financial performance, a Likert Scale was used to gather responses on how participants perceived their firm's financial performance and the extent to which it was affected by implementing EMA. The researcher opted structured questionnaires because it was considered a reliable and efficient way to collect data from a large number of respondents. This is important in a study of small-scale mines, as there are likely to be a large number of potential respondents. A structured questionnaires was also considered because data was needed in a standardized way. This was significant in a study of EMA, as it permits for the contrast of data from different respondents. However, it is significant to note that structured questionnaires are not without their limitations. For example, they can be inflexible and difficult to adapt to new situations. Additionally, they may not be able to capture

the full range of experiences and opinions of respondents. However, the researcher tried to use it appropriately, therefore structured questionnaires remained a valuable tool for collecting data in this research study.

### **3.8 Measurement of variables**

Research questions on Environmental Management Accounting Practices were answered based on a 5-point Likert scale. The EMA practices was measured by the extent to which small-scale mines assessed the physical flow of materials and energy, quantification of volume of waste and energy streams and emissions, recycling of waste materials, setting environmental protection targets, assessment of material cost of both product and non-product output, assessment of prevention and other environmental management costs, toxicity of emissions and waste chemicals used, assessment of the environmental impacts and preliminary estimation of wastage costs. The same scale was also used to probe information of the factors and the barriers. To test whether there is a statistical relationship between EMA practices and financial performance, Spearman's correlation coefficient was used. EMA practices being the predictor or independent variable and financial performance being the dependent variable.

### **3.9 Validity and Reliability**

To ensure the integrity and quality of the research, validity and reliability plays a crucial role. Validity, which can be a measurement of internal or external, is measure of truth or falsity of the data obtained through using research instrument. Construct validity can be ensured through triangulation by theories (Yin, 2003). Validity can be ensured by asking respondents to participate in a pilot study. Primary data collected about the current level of EMAPs' reliability was established using questionnaire. To enhance efficiency and quality of data, a pilot study was considered as the initial step in this research from a sample of 11 respondents as it was considered as a reasonable size. Cronbach alpha was used to measure internal consistency in the pilot test of 11 questionnaire which were coded and analyzed using IBM SPSS version 20 software. Comment from the pilot study reviewed that the questionnaire was too long but important to full information required and some sections of the questionnaire was unclear. The questionnaire was modified on those areas in order to capture intended meaning.

**Table 3.1 Reliability Statistics of pilot study**

Cronbach's Alpha	N of Items
0.762	11

### **3.10 Data Presentation and Analysis**

Data analysis is the application of reasoning in order to understand the available data and determine consistent patterns and summarize it (Yin, 2003). Questionnaire answers will be translated into a form that enable the production of statistics. Descriptive data collected in the research will be presented in frequency distribution tables. The research findings of the first and second objectives was categorized using thematic coding and to measure the degree of correlation between financial performance of small-scale mines and EMA, Spearman's correlation coefficient was used and the data collected is also analyzed using SPSS version 20.

### **3.11 Chapter summary**

This chapter outlined the research methodology. It stipulates research design that will be used, research instruments employed, targeted population, sample size, data collection procedures, issues of validity and reliability, ethical considerations.

## CHAPTER IV

### DATA PRESENTATION, ANALYSIS AND DISCUSSION

#### 4.0 Introduction

This chapter focuses on the presentation of collected data from the previous chapter, it also analyses the presented data as well as discussions in line with findings of previous studies of different authors and identify if results are either in contrast or consistence with other studies. Descriptive statistics and inferential statistics were presented in tables.

#### 4.1 Data Presentation and Analysis

##### 4.1.1 Response rate

**Table 4.1 Response rate**

Target group	Administered	Returned	Response %
Mine Accountants	38	30	78.9%

Source: Primary data (2023)

The table above shows that out of 38 administered questionnaire, 30 questionnaires were returned which translates to 78.9% response rate and the remained 21.1% shows 8 unreturned questionnaires.

#### 4.2 Profile of respondents

The following table exhibits the results of descriptive statistics of the work experience of accountants in Mashonaland Central small-scale gold millers and miners that participated in this study.

**Table 4.2 work experience**

<b>work experience</b>	<b>Frequency</b>	<b>Percent</b>	<b>Valid Percent</b>	<b>Cumulative Percent</b>
6 years and below	3	10.0	10.0	10.0
7 years - 12 years	15	50.0	50.0	60.0
13 years - 17 years	7	23.3	23.3	83.3
18 years and above	5	16.7	16.7	100.0
Total	30	100.0	100.0	

Source: Primary data (2023)

The table above indicates that half (50%) of the participants have 7 years-12 years of experience in the mining sector, this percentage gives assurance that these accountants have adequate information of mining environment. The other 50% were distributed as 10%, 23.3% and 16.7 % to 6 years and below, 13 years -17 years, 18 years and above respectively.

#### **4.3 Level of EMA practices.**

According to Jalaludin (2011), participants are asked to measure on a 5-point scale from 1 (not at all) to 5 (to a very large extent) on their environment-related practices. The following table reviews EMAPs and it indicates that the total mean score of PEMA and MEMA. This indicates small-scale gold mines are accounting environmental activities in physical units than in monetary units.

**Table 4.3 Environmental Management Accounting Practice**

<b>Environmental Management Accounting Practice</b>	<b>Mean</b>	<b>Standard deviation</b>
<b>Physical Environmental Management Accounting Practice (PEMA)</b>	<b>3.233</b>	<b>2.450</b>
Physical material flow assessment	3.6	1.567
Physical energy flow assessment	3.53	1.332
Quantification of volume of waste and energy streams and emissions	2.57	1.332
<b>Monetary Environmental Management Accounting (MEMA)</b>	<b>2.929</b>	<b>3.508</b>
Set targets for environmental protection activities and costs	3.33	1.398
Assessment of Material cost of product output	3.43	1.431

Recycling of waste materials	3.47	1.456
Assessment of Material cost of non-product output	1.73	1.048
Assessment of prevention and other environmental management costs	3.37	1.520
Environmental Impact Assessment (EIA)	4.17	1.085
Assessment of toxicity of emissions or waste chemicals used	2.13	1.042
Preliminary estimation of wastage costs	1.80	0.714

**Source: primary data (2023)**

The table above depicts the mean score and the standard deviation for EMA practices. These practices are divided into two major categories: Physical Environmental Management Accounting (PEMA) and Monetary Environmental Management Accounting (MEMA).

Environmental Impact Assessment has the greatest mean score in PEMA category, indicating that this practice is widely used and is considered crucial. The least practiced PEMA is the quantification of volume of waste and energy streams and emissions.

In terms of accounting EMA in monetary terms, setting targets for environmental protection activities and cost have the highest mean score indicating the most monetary environmental management accounting practice. The least practiced MEMA is the assessment of material cost of non-product output, signifying that this practice is not commonly used by small-scale gold mines in Mashonaland Central. These results are similar to that of Jamil (2015) which specified that PEMA practices are more common than MEMA practices, another study by Nyahuna and Doorasamy (2021) in South African SMEs also reviewed that SMEs practice PEMA more than MEMA. Other studies support that Physical Environmental Management Accounting is more common than Monetary Environmental Management Accounting include the study of Kurniawan et al. (2018). Ahmad & Omar (2019) also directed their study on the application of EMA practices in Indonesian manufacturing companies and found that these companies practice PEMA more than MEMA because the former is considered easier to implement and it requires fewer financial resources compared to the later. Other studies such as the study by Govender (2016) in SA.

**4.4 Factors that affect the implementation of EMA.**



**Table 4.4 Factors affecting the implementation of EMA**

<b>Factor</b>	<b>Mean</b>	<b>Standard deviation</b>
<b>Coercive factors</b>	<b>3.09</b>	<b>2.059</b>
Pressure from Environmental laws and regulatory compliance	4.37	0.964
Pressure from local community	2.33	1.269
Pressure from environmental groups	3.97	0.928
Pressure from customers	1.70	0.915
<b>Normative Factors</b>	<b>1.20</b>	<b>0.563</b>
Membership of accounting board	1.00	0.00
Motivation from staff training	1.40	0.563
<b>Mimetic Factors</b>	<b>2.41</b>	<b>2.13</b>
Imitation from competitors	1.83	0.874
Imitation from large scale mining firms	3.17	1.487
Imitation from multinational companies	2.23	1.251
<b>Other</b>	<b>3.07</b>	<b>1.098</b>
Desire to achieve competitive advantages	3.07	1.098

Source: primary data (2023).

The table above displays the mean scores and the standard deviations for different factors that could influence the decisions of small-scale gold mining firms to implement EMA practices. These factors are categorized into three groups namely: coercive, normative and mimetic.

Coercive factors, was the most influential factor for small-scale miners understudy to adopt to environmental practices as indicated with the highest mean score. This submits that there is a wide range of responses amongst mining companies to these external pressures, with some being more affected than others. The chief important coercive factor is pressure from environmental laws and regulatory compliance. This submits that most small-scale gold mining firms are highly responsive to these regulations. This is consistence with the study of Wachira and Wang’ombe (2019) in Kenya, Javed et al., (2022) in China, Ferdous et al., (2019), Jamil et al., (2015), Moses et al., (2021) in Zimbabwe. The findings can also be supported by the principles of the coercive institutional theory which argues that companies adopt EMA practices as a response to regulatory and legal

pressures. Other recent studies have shown that coercive pressures can be powerful motivators for EMA include a study by Trinks et al. (2020), found that regulatory pressures were a significant factor in driving American firms to adopt carbon accounting practices. Another study by Turner et al. (2018) found that coercive pressures from industry associations motivated Australian firms to disclose their environmental impacts. The result of the study together with prior studies may leads to the conclusion that most firms in different countries and sectors are forced to implement EMA practices, therefore this can help in explaining that the organizations' motives of EMA implementation were far away from the propositions of the signal theory or the application of the signal theory can mislead stakeholders as the theory is based on the assumptions that organisations can use environmental practices to send signals to stakeholders about their commitment to environmental protection and sustainability.

On the other hand, pressure from customers has a low mean score, signifying that small-scale mining companies are not as responsive to customer demands as they are to other external stakeholders. The results indicated the insignificant of the stakeholder theory in explaining EMA adoption by small-scale gold miners as customers were reluctant in demanding transparency of environmental sustainability practice information. The results are in contrast with recent studies such as a study by Baxendale and Sinnott (2020) found that stakeholder pressure was a key driver of EMA practices in the UK manufacturing industries. Another study by Islam and Deegan (2020) also found that stakeholder pressure and engagement played a significant role in shaping the development and implementation of EMA practices in Australian mining industry. The results may not be in line with the above empirical studies due to the differences in the contexts of the studies. It appears that the above-mentioned studies were undertaken in developed countries and in large organizations whilst the current study bases on small-scale miners in Zimbabwe, a developing country.

Normative factors have a relatively low mean score. This suggests that firms do not practice EMA as a result of normative factors. The most important normative factor is the motivation from staff training. This suggests that small-scale mining firms are highly motivated to provide training to their employees. The normative factors have little effect on EMA adoption which makes Normative institutional theory not much relevant in explaining EMA adoption by small-scale miners. Mimetic factors, which refer to imitation of other companies, have a mean score of 2.41

and a relatively high standard deviation of 2.13. This indicates that there is a wide range of responses among mining companies to these factors. The most significant mimetic factor is imitation from large scale mining firms. This suggests that small-scale mining firms are influenced by the practices of larger firms in their industry.

#### 4.5 Barriers linked with EMA practices.

This section analyses the factors that hinder the implementation of EMAPs which comprises of 14 items grouped into five categories: financial barriers, institutional barriers, management barriers, information barriers and attitudinal barriers as these are consistent with other previous studies presented earlier. As this study concentrates on the participant’s views on the barriers to EMA adoption in small-scale gold millings and mines in Mashonaland Central province, Zimbabwe, the mean as a measure of central tendency was used to measure and compare the views of participants on the barriers of EMA adoption in small-scale gold millings and mines in Mashonaland Central province, Zimbabwe. The following table shows the means and respective standard deviations of each barrier.

**Table 4.5 Barriers linked with EMA practices**

<b>Items</b>	<b>mean</b>	<b>Standard deviation</b>
<b>Financial barriers and resource barriers</b>	<b>4.02</b>	<b>2.010</b>
Resources scarcity to implement environmental practices	3.53	1.432
High implementation costs	4.30	0.988
Difficulties in accessing cleaner technologies	4.23	1.006
<b>Institutional barriers</b>	<b>1.50</b>	<b>0.731</b>
Absent of institutional pressures to environmental practices	1.50	0.731
<b>Management barriers</b>	<b>3.79</b>	<b>2.449</b>
Low expertise on Environmental Management Accounting issues	3.67	1.348
Lack of environmental cost accountability and responsibility	3.23	1.478
Environment costs not integrated into strategic planning	4.27	0.828
Lack of incentives to manage environmental costs	4.00	1.145

<b>Attitudinal barriers</b>	<b>3.39</b>	<b>1.979</b>
Environmental costs considered insignificant	3.17	1.315
Lack of environmental cost accounting priority	4.90	1.03
Resistance to change to sustainability or environmental management practices	2.10	1.062
<b>Informational barriers</b>	<b>3.78</b>	<b>0.906</b>
Lack of Environmental Management Accounting guidance	4.27	0.907
Low awareness of environmental issues	2.83	1.416
Problems in gathering or assigning environmental costs	4.23	0.898

**Source: primary data (2023).**

The table provides the mean and standard deviation for different types of barriers to environmental management accounting in small-scale gold millings and mines in Mashonaland central province. The mean score for each item ranges from 1.5 to 4.9, with higher scores signifying greater barriers. The standard deviation ranges from 0.731 to 2.449, representing the degree of variability in responses for each item.

Financial barriers and resource barriers have the highest mean score, indicating that these are the most significant barriers to EMA. This is followed by high implementation costs, difficulties in accessing cleaner technologies, and environment costs not integrated into strategic planning. Institutional barriers and attitudinal barriers have relatively low mean scores, indicating that they are less significant barriers compared to other factors. However, informational barriers have a moderate mean score of 3.78, indicating that lack of guidance and low of environmental are significant challenges. Overall, the results suggest that financial and resource barriers, as well as implementation costs and lack of integration into strategic planning, are the most significant barriers to environmental management accounting. Addressing these barriers can help organizations to implement effective environmental management practices and improve their environmental performance. These findings are consistent with that of Jamil (2018) which identified financial barriers as the major factor that hinders the implementation of EMA. The results indicated that small-scale miners have got no good resource base which makes them unable to accomplish EMA practices. This can be viewed from the fundamental proposition of the Resource-based theory in the adoption of EMA which posits that the accomplishment of EMA is directly influenced by the availability of the bundle of intangible and tangible resources and

capabilities. However, Elhossade et al, (2022) ranked the barriers in the following order, institutional, management, informational, financial and lastly attitudinal barriers.

#### **4.6 Relationship between EMA practices and financial performance**

The fourth objective of the study was to establish the relationship between EMA practices and financial performance of small-scale gold mills and mines in Mashonaland Central province. The initial step was to transform data to create two target variables namely Environmental Management Accounting practices and financial performance. The EMA practice variable was created from numeric expression of 11 variables namely set targets for environmental protection activities, assessment of Material cost of product output, recycling of waste materials, assessment of material cost of non-product output, assessment of prevention and other environmental management activities, environmental impact assessment, assessment of toxicity of emissions, physical assessment of material flow and energy flow, preliminary estimation of wastage costs and quantification of volume of waste and emissions. The financial performance variable was created from numeric expression of 4 performance variables namely, reduction in waste, cost saving, profitability and efficient energy usage. The two resultant variables were then tested to observe if there is any significant relationship between them. The results of the regression reviews that the model has a P-value of 0.03 which is somewhat above 0.01 (1%) of a two-tailed significant level. this clarifies that this model is important in explaining the relationship that exist between EMA practices and financial performance of small-scale mills and mines in Mashonaland Central, Zimbabwe as shown below:

Spearman's correlation coefficient

**Table 4.6 Spearman's correlation coefficient**

**Correlations**

		Financial Performance	Environmental Management Accounting Practices
Spearman's rho	Financial Performance		
	Correlation Coefficient	1.000	0.526
	Sig. (2-tailed)	.	0.03
	N	30	30
	Environmental Management Accounting Practices		
	Correlation Coefficient	0.526	1.000
	Sig. (2-tailed)	0.03	.
	N	30	30

Correlation is significant at the 0.01 level (2-tailed)

The results from the above, reviewed a significant relationship between EMA practices and financial performance as shown by Spearman's coefficient of 0.526. This was in consistence with other prior studies such as Deb and Rahman (2022) in Bangladesh's SMEs; Mayndarto and Murwaningsari (2021). Other studies that are consistence with the research findings include the study of Mohammed and Alabdullar (2021); Larojan and Thevaraban (2014); Faudah et al., (2021); Mayndarto and Murwaningsari (2021). The results of the study show that there is a positive and significant correlation between financial performance and EMAPs. This finding is consistent with previous studies, which have found that EMA can help organizations to improve their financial performance by reducing environmental costs, increasing environmental efficiency, and improving their reputation with stakeholders.

For example, AlKhajeh and Khalid (2018) EMA is directly correlated with SMEs financial performance in South Africa. Additional study by Love and Roper (2015) studied the empirical evidence on the connection between management accounting practices and small and performance of SMEs. The study found that management accounting practices are positively correlated with performance, but that the strength of this connection differs depending on the specific practices used and the setting in which they are implemented.

The findings of these studies suggest that EMA can be a valuable tool for organizations that are looking to improve their financial performance. However, it is important to note that the relationship between EMA and financial performance may be complex and may vary depending on a number of factors, such as the specific EMA practices used, the context in which they are used, and the industry in which the organization operates. Small-scale mining firms that are considering applying EMA should prudently consider their specific needs and circumstances.

The conclusion that there is a positive relationship between the use of EMA and financial performance provides additional support for the use of EMA as an instrument for improving small-scale gold miner's financial performance. This finding is particularly important in light of the increasing focus on sustainability among businesses and investors. The fact that the correlation is significant at the 0.01 level (2-tailed) suggests that the relationship between EMA and financial performance is not due to coincidental. This is vital because it means that small-scale gold miners can be assured that adopting EMA is likely to lead to improved financial performance. Nevertheless, it was also vital to note the fact that the correlation was not perfect, which suggests that there are other factors that can also affect financial performance. This means that small-scale mining firms should not depend solely on EMA to improve their financial performance. They should also focus on other factors.

However, there are some studies that found that there is no significant relationship between EMA practices and financial performance. The evidence suggests that the use of EMA practices may not be beneficial for improving the financial performance of companies. However, it is imperative to note that the findings of these studies may not be generalizable to all organizations. The relationship between EMAPs and financial performance may vary depending on a number of factors, such as the specific EMA practices used, the context in which they are used, and the

industry in which the organization operates. Those studies include a study of Aras and Ozgen (2016), The study found that there is no significant relationship between the use of EMA and environmental performance in Turkish manufacturing firms. Another study of Cordery and Dobler (2018), the study reviewed the literature on the role of management accounting in sustainability. The study found that there is no clear consensus on the relationship between management accounting practices and sustainability performance. Some studies have found a positive relationship, while others have found no relationship or even a negative relationship. In addition to that, Rezaei and Nikzad (2017), found that there is no significant relationship between the use of EMA practices and environmental performance in Iranian manufacturing firms.



## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Introduction

The principal purpose of this research study was to explore the current EMA practices within small-scale gold mills and mines in Mashonaland Central, identifying the factors that motivates the adoption of EMA and the associated barriers that hinders EMA adoption. This chapter provides a summary, conclusion and recommendations for the study. This chapter also provide suggestions for future studies.

#### 5.2 Summary of research study.

The first chapter pursues to find small-scale gold mills and mines' current EMA practices in Mashonaland Central, Zimbabwe. The research study follows four research objectives, firstly, it seeks to understand the current EMA practices available, then aims to understand drivers and barriers to the implementation of EMA and lastly the study seeks to identify the statistical relationship of EMA practices to financial performance of small-scale gold mines under study. The chapter also explain the boundaries, limitations of the study and assumption. The second chapter was used to highlight the gaps in literature and it focus on the general development of EMA, environmental costs and accounting and sustainability accounting. The limited literature in Zimbabwe gives sufficient evidence that the value brought about by EMA cannot be accounted for. The significance of EMA in companies that account for environmental activities through increased profits are empirically evidenced from a lot of previous studies. To understand the reasons and factors that motivates or drives small-scale gold mills and mines under study, various theories including institutional theories and other green theories was employed. The methodological approach followed by this study was that the primary data was collected through close-ended questionnaires send to mill or mine accountants. The first three research objectives apply descriptive research design and the final objective of finding the relationship between EMA practices and financial performance was inferential in nature through Spearman's correlation coefficient.

### **5.3 Summary of research finding**

This section of the study shows the main findings from data analysis as per objective.

#### **5.3.1 Current Environmental Management Accounting Practices by small-scale gold mills and mines in Mashonaland Central, Zimbabwe.**

The results reviewed that; PEMA is more commonly practiced than MEMA because it seems cheap for them to track physical units used in the production. The only monetary environmental accounting practices that are compulsory are largely practiced such as Environmental Impact Assessment (EIA) with the highest mean score of 4.17.

#### **5.3.2 Factors affecting or drives the implementation of EMA.**

The implementation of EMA practices largely depends on coercive factors, desire to achieve competitive advantages, mimetic factors and normative factors respectively.

#### **5.3.3 Barriers to the implementation of EMA practices.**

The implementation of EMA in small-scale mines were hindered by financial barriers, management barriers, informational barriers, attitudinal barriers and institutional barriers respectively.

#### **5.3.4 Relationship between EMA practices and financial performance**

There is a positive association between EMA practices and financial performance of small-scale miners that implement environmental related activities or practices.

### **5.4 Conclusions**

The previous chapter references that coercive factors have a weighty impact on EMAPs. With growing coercive pressures, small-scale gold custom millings and mines in Mashonaland Central are more prepared to practice EMA. This is in the same views with institutional theories that highlights the influences of economic, social and political institutions on behavior of companies regarding making changes or implementing new practices (Chang, 2007) to gain acceptability for their actions. In reality, the Government of Zimbabwe should form stringent environmental rules and legislations, in view of the role played by institutional pressures and stakeholders' concerns in EMA implementation. The implementation of EMA remains low in developing countries because managers in those companies are blind of the benefits of value added by enhancing environmental

performance and reducing environmental effects (Mohamed, 2018). This results in lost prospects to decrease environmental costs (Schaltegger, 2018). The implementation of EMA is low because of ineffective environmental laws, low awareness of environmental issues and absent of stakeholder pressures (Chaturangani and Madhusanka, 2019; Susanto and Meiryani, 2019).

### **5.5 Recommendations of the study**

This research recommends the prioritization of EMA by small-scale gold mills and mines in Mashonaland Central, Zimbabwe. Environmental Management Accounting should not be implemented on a tick-box approach but small-scale gold mills and mines should do it on results-oriented. It is also recommended that the sustainability reporting that was mandated to listed companies should not leave small-scale mills and mines and other unlisted companies immune. The government of Zimbabwe should effectively and accurately measure air emissions and devote resources to environmental audits. The study also recommends that the government should introduce tax incentives to those which has environmental practices and charge ecological taxes to polluters such as polluter pays principle. The contribution of EMA in Zimbabwe to achieve its sustainability targets is not questionable such as 2022 Zimbabwe budget theme was “Reinforcing Sustainable Economic Recovery and Resilience”, with one of the objectives of mitigating climate change and energy security because EMA incorporates two core areas of sustainable development, which is the economic and the environmental pillars. Zimbabwe government also sets Sustainability Development Goals (SDGs) which seeks to optimize the value of natural resources by leveraging on the enormous mineral resources for quicker growth without compromising the environment.

### **5.6 Recommendations for future studies.**

Given the limitations of this study, there are certain recommendations that could be made for future research. One way would be to replicate the study on a larger scale and in different contexts, including various countries and regions. It is also advisable to focus on different industries in future research such as service industries as this study only used one industry. Changing the research method to something other than a case study could also be beneficial, especially given that EMA is still a developing discipline in terms of its conceptual framework. Additionally, other contingency factors, such as management style and culture, could be investigated to deepen understanding of the impact of EMA usage.

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Appendices

## **Appendix A: Questionnaire**

Questionnaire

My name is B193409B, studying bachelor of Accountancy Honors Degree at Bindura University of Science Education (BUSE).

I am undertaking a research study titled “**Environmental Management Accounting Practice for small scale mines in Zimbabwe**”. I hope that the results of the study will serve as a fertile ground for future studies that will benefit the mining industry, the government of Zimbabwe and Accountants by offering a wealth knowledge and information that will lead to a better environmental approach.

The aims of this questionnaire are to ask your perceptions and views regarding the current practices, implementation of Environmental Management Accounting Practices (EMAPs) as well as barriers to the implementation of it by Small-Scale mining firms in Zimbabwe.

I am asking for your participation to take part in this research as one of the respondents. Note that, your response is crucial to me, but participation is not compulsory or is totally voluntary.

No personal information is required such as name and contact details on the questionnaire. Due to ethical principles, I assure you that your information will be used for academic reasons and will not be disclosed to anyone and it will be reported in summary form.

Therefore, be confident to give more information as you can. Your views and participation will be gratefully acknowledged.

### **Questions**

You can select by marking the appropriate box or indicate by writing where suitable

Tell me about yourself

1. For how long did you work in the mining sector (working experience)

Below 6yrs

7yrs-12yrs

13yrs-18yrs

19yrs-above

**Use the following scale to rank question 3 to 10**

1 = not at all, 2 = small extent, 3 = moderate extent, 4 = large extent, 5 = very large

**2. To what extent does the following Environmental Management Accounting Practices are implemented in your organization?**

<b>Environmental Management Accounting Practices</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Set targets for environmental protection activities and costs					
Recycling of materials					
Assessment of Material costs of product output					
Assessment of Material cost of non-product output					
Assessment of prevention and other environmental management costs					
Environmental Impact Assessment (EIA)					
Assessment of Toxicity of emissions or waste of chemicals used					
Assessment of volume of waste or emissions					
Physical material flow assessment					
Physical energy flow assessment					
Preliminary estimation of wastage costs					
Quantification of volume of waste and energy streams and emissions					

**3. To what extent does the following factors affecting the implementation of Environmental Management Accounting Practices in your organization?**



<b>Factor</b>	1	2	3	4	5
Pressure from Environmental laws and regulatory compliance					
Pressure from local community					
Desire to achieve competitive advantage					
Pressure from Environmental groups					
Pressure from Customers					
Membership of accounting body					
Motivation from staff training					
Imitation from Competitors					
Imitation from Large mining firms					
Imitation from Multinational companies					

**4. To what extent does the following barriers hinders the implementation of EMAPs in your organization?**

<b>Barriers to Environmental Management Accounting Practices</b>	1	2	3	4	5
Resource scarcity					
Lack of Environmental Management Accounting guidance					
Low awareness of environmental issues					
Low expertise on Environmental Management Accounting issues					
Environmental costs considered insignificant					
High implementation costs					
Lack of environmental cost accounting priority					
Resistance to change					
Absence of environmental accountability and responsibility					

Environment not integrated into strategic planning					
Lack of incentives to manage environmental costs					
Absent of institutional pressures to environmental practices					
Difficulties in accessing cleaner technologies					
Problems in gathering or assigning environmental costs					

5. To what extent does the following improves as a result of implementing Environmental Management Accounting in your organization.

1= not at all, 2= to a small extent, 3= to a moderate extent, 4= to a large extent, 5= to a very large extent.

Item	1	2	3	4	5
Profitability					
Reduction in waste					
Cost saving					
Efficient energy use					

## Appendix B

### Summary of reliability results of a pilot study

Practices	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Set targets for environmental protection activities and costs	.272	.762
Assessment of Material cost of product output	.437	.740
Recycling of waste materials	.465	.736

Assessment of Material cost of non-product output	.413	.744
Assessment of prevention and other environmental management costs	.471	.736
Environmental Impact Assessment (EIA)	.476	.736
Assessment of Toxicity of emissions or waste of chemicals used	.500	.736
Physical material flow assessment	.488	.733
Physical energy flow assessment	.469	.736
Preliminary estimation of wastage costs	.266	.759
Quantification of volume of waste and energy streams and emissions	.277	.758