

Identifying System Characteristics for Development of a Sustainability Management Accounting Information System: Towards a Conceptual Design for the Manufacturing Industry

Nickie Petcharat and Joseph M Mula*
School of Accounting Economics & Finance
Faculty of Business
University of Southern Queensland,
Toowoomba, Queensland, Australia, 4350

Abstract—This research aims to identify effective management accounting information system's characteristics to facilitate managing and measuring environmental and social costs while adding value to sustainable manufacturing organizations. This focus is motivated by current practice of activity based costing (ABC), which to date has not recognized environmental costs as appropriate costs of products. In addition, ABC has not covered measuring costs of social impacts which are becoming significant issues for stakeholders. As a result, this study will develop a conceptual model for a Sustainability Management Accounting System (SMAS) that applies the ABC approach but extended by the study. A SMAS employs environmental management accounting and social management accounting concepts and practices, to inform the development of the SMAS conceptual model using system characteristics identified to provide a holistic system for a company. Once full developed, SMAS will provide environmental and social costs information to support disclosures and internal decision making for management of these costs. This paper sets out the theoretical framework for the study that will lead to the development of the conceptual model for a SMAS.

Keywords-component; activity based costing (ABC), environmental management accounting (EMA), social management accounting (SMA), sustainability management accounting system (SMAS), environmental cost, social cost.

I. INTRODUCTION

An effective management accounting framework incorporates economic, social, and environmental information that discloses performance in the form of a triple bottom line report while adding value to an organization to ensure its sustainability [1-3]. Environmental costs thus become a significant issue that need to be identified as well as measured as reductions in and controls of these costs (wastes, solids, and/or emissions)[4-6].

In addition, social costs have to be measured in order to reduce negative impacts on society, employees, and the environment as they are now of significant concern to stakeholders [7]. A company needs to capture full costs of products, which include environment and social impact costs for internal decision making and external disclosures[8, 9].

As a consequence, this study develops a conceptual model for a Sustainability Management Accounting System (SMAS) as an effective management accounting tool to improve a management accounting information system of an organization. By having a SMAS, a company could provide cost information for environment and social impacts more accurately thus improving internal decision making. A

company can also employ this cost information to support disclosures of environmental and social performance in the form of a triple bottom line report while adding value to an organization to enhance its sustainability [1, 2].

II. RELEVANT LITERATURE

A. Theoretical perspectives

A number of theories were combined to provide the underpinnings of the theoretical framework for SMAS – deep ecology, Marx's labour theory of value, and Stakeholder theory.

Deep ecology theory was applied in the theoretical design of SMAS using shallow ecology to explain ethical and moral responsibilities of companies to measure environmental costs and to manage uses of resources, energy, and water [5, 10]. Meanwhile, deep ecology helps explain why measuring reductions of emissions and wastes will help to reduce negative impacts on the environment and society [5]. Companies are then able to provide accurate environmental cost information to improve business decision making and support stakeholders' concerns in order to improve environmental performance. However, deep ecology appears to have not been used before to examine the identification of social issues [5]. This research also used Marx's labour theory of value to explain measurement of social impact costs.

Marx's labour theory of value helped explain measurement of social impact costs while creating surplus value or maximizing profits in selling large quantities of products in markets [11]. To realise the surplus-value contained in products (under capitalism), the products must be sold in the market at a price reflecting the labour time of average (in terms of efficiency) producers [12-14]. Therefore, both workers and capitalist business owners are concerned with efficient production, training and skilling of the workforce, and selling products demanded by consumers [12-14]. Companies also need to provide cost information for social internal decision making and stakeholders' concerns. In doing so, stakeholder theory is employed to examine collecting more cost information for both environmental and social impacts.

Stakeholder theory helps in the identification of a company's stakeholders and explains the ethical and moral obligations of management to consider the interests of these stakeholders [15, 16]. This research applies stakeholder theory to explain associating disclosure with economic and social performance by combining three dimensions – stakeholder power, strategic posture, and economic performance [17].

* Corresponding author email: mula@usq.edu.au

Thus, in the design of SMAS, stakeholder theory helps determine key concerns and objectives of stakeholders while explaining ethical and moral obligations in measuring environmental and social costs. These concerns are translated into measures, which in turn will be incorporated as system characteristics for data inputs required for reporting and internal decision making. This can create more accurate cost information supporting environment and social internal decision making and external disclosures. However, as there is considerable disagreement in the literature on definitions, this study reviewed relevant literature of terminologies used to support the focus of the study in order to define key terms.

B. Definition of key terms

Activity based costing (ABC)

Activity based costing (ABC) is made up of the traditional management accounting approach to identify and allocate costs of each production activity to individual costs or cost centres (activities) in order to measure costs of activities reductions and control costs [18-21]. For environmental costs, ABC has not (to date) separately identified the costs associated with environmental and social impacts. Thus companies are having difficulties in measuring (for example) reductions and control of environmental costs and contaminants [4, 22-26]. As a result, a company is not able to measure full costs in order to successfully set correct prices of products and services [27-29]. Thus, extending the application of the ABC approach to separately identify environmental and social impact costs from overheads and to allocate to individual product costs, is appropriate for this study [19, 21, 23]. This can create more accurate cost information to support internal decision making and flow on to external reporting and disclosures as it will then incorporate sustainability accounting concept.

Sustainability accounting (SA)

Sustainability accounting is a new approach to accounting and reporting to facilitate companies' developments in three dimensions – economic, social, and environment [30, 31]. Sustainability accounting has recently supported disclosures using a triple bottom line report in order to improve internal decision making and to inform stakeholders [30, 32, 33]. A number of the current studies, e.g. [28, 33, 34], have examined sustainability accounting in terms of physical and monetary measurement to improve financial management. Nonetheless, [8] pointed out that sustainability accounting should incorporate improvements in social and environmental reporting as external disclosures in order to create shareholder value for sustainable organizations. Furthermore, sustainability accounting provides a company with measurement of all costs so a full cost accounting is implemented to support internal and external disclosure through sustainability reporting and corporate social responsibility (CSR) reporting [28, 29, 35]. As a consequence, the sustainability accounting concept is appropriate for this study as it is concerned with environmental and social cost information to support disclosures of environmental and social performance. In a design of SMAS, one component of sustainability accounting is environmental accounting using environmental management accounting to support the theoretical framework.

Environmental management accounting (EMA)

Environmental management accounting (EMA), which is a subset of environmental accounting, is used to provide environmental costs information to support internal decision making [23, 29, 36]. By [26] it was mentioned that EMA aims to reduce negative impacts on the environment while improving material efficiency (thus adding value to an

organization). EMA is mainly measured in both 'physical units such as materials, energy, water and wastes, and monetary units such as environmental costs, earning and savings' [26 cited in 23p. 19]. EMA practices were uncovered by [2] in Australian companies as well as accountants' perceptions in providing EMA information for reporting purposes. Claims were made by [2] that Australian companies appeared to develop business strategies to meet the requirements of socially and environmentally sensitive organizations. However, they identified the need for environmental costs recording using ABC to be integrated in financial reports as well as a need to develop appropriate EMA systems [2]. In discovering the relationships between environmental performance and economic performance of an electricity company in the United States, [37] found that decreasing pollution enabled the company to create eco-efficiency. Furthermore, they found that it is better if the implementation of environmental accounting included an environmental management accounting systems [37]. This enables companies to measure environmental costs from unit inputs (raw materials, energy, and water) as well as non-product outputs (wastes and emissions) [4], while evaluating reductions of these costs and contaminants [23].

Thus, by employing EMA, companies can identify and measure environment costs and allocate to the individual product costs while providing more accurate information of these costs [38]. Companies can also improve environmental performance [26] while promoting themselves as environmentally aware organizations [38]. Essentially, environmental cost information is able to support business decision making in managing resources by recording the use and flows in physical (resources, energy, and water) and monetary (financial, cost savings, and earnings) units [38].

As a result, utilizing environmental management accounting (EMA) was appropriate for this research, which will develop a SMAS conceptual model. EMA practice is applied to identify costs of environmental impacts, use and flows of resources, energy, and water as well as to measure reductions of contaminants. EMA records more accurately environmental costs information to support disclosure of environmental performance but currently does not cover social issues [23], which is a key contribution of this study. Therefore the study integrates social management accounting (part of social accounting approach) into the development of a SMAS. This may assist companies to become more involved in sustainability management accounting [11].

Social management accounting (SMA)

Social management accounting (SMA) facilitates companies' recording and measurement of social costs for internal decision making and supports disclosures of social performance. However, social costs have not been measured much because they are sometimes recorded as a company's overheads or other expenditures (if at all) rather than as costs of products [39]. Social costs have historically been ignored by traditional management accounting using ABC to identify and allocate to product costs. This has resulted in companies not using social accounting to improve their social performance [40]. Thus, disclosures on social performance in the form of corporate social responsibility (CSR) reports have become more complex as costs of social impacts have recently been captured [41]. In addition, combining environmental and social issues could go a long way to improving accounting's approach to these concerns [42]. If social accounting could be developed and incorporated into an accounting system framework or model, it will assist companies to become more socially and environmentally aware [42].

Even though, [43] developed a social accounting matrix (SAM) framework to improve the whole area of wage rates in Sri Lanka They found that employing SAM to improve qualities of employees and labourers in Sri Lanka was successful as a new way to develop economic performance. However, SAM did not include development of social performance [44]. This results in western organizations having disagreed on the ability of social accounting to reduce social impacts to support stakeholders' concerns [45]. In addition, social accounting has not been successfully employed by companies as it is seen purely as raising production costs. Thus a new conceptual model or framework for accounting for social costs is needed [46].

In this case, [47] cited in [48] argued that no matters what happens to humanity and/or society, social accounting has to provide costs or expenditures of social impacts so that companies take responsibilities. The proposed SMAS conceptual model therefore should integrate economic and social performances to add value to enhance sustainability of organizations [46]. Apart from that, due to increased concerns of stakeholders, companies are being pushed to improve qualities of society, humans, employees, and the environment by measuring social costs in order to support disclosure of social performance [49]. In doing so, companies can create better 'green' and 'social' qualities of products and services while gaining greater benefits from higher economic performance in the long-term [21]. This also improves social internal decision making [11, 50]. Thus, [51] suggested that further study should be undertaken in social accounting to consider incorporating social impacts of organizations to add value to their social and economic performance.

The point made here is that, social management accounting should be applied in measuring costs which are related to improvements for society, employees, humanity, and the environment. This would provide cost information to support disclosure of social performance. Companies will become socially and environmentally aware organizations while creating positive reputation as 'green and socially responsible producers' in the market places. The accounting concepts discussed above that underpin the theoretical framework of a Sustainability Management Accounting System (SMAS) are diagrammatically shown in **Figure 1** in order to fill these specific gaps in the sustainability accounting literature.

C. Gaps in the literature

To fill these gaps, this study has developed a theoretical framework for a Sustainability Management Accounting System (SMAS) utilizing **environmental and social management accounting** by **applying an activity based costing approach**, as suggested by previous studies e.g. [2, 3, 7, 52]. Nonetheless, these concepts are not widely explored in the literature, particularly in relation to social performance. In addition, **environmental costs** need to be separately identified and allocated to individual costs of products in order to expose them rather than being concealed in overheads while measuring reductions of these costs and contaminants. Meanwhile, **social impact costs** need to be measured in order to develop social performance reporting addressing significant concerns of companies' stakeholders. Companies are now seeking appropriate accounting approaches and systems to relate existing financial reports to **triple bottom line reporting** to more fully disclose social and environment performance to stakeholders while supporting **internal decision making**.

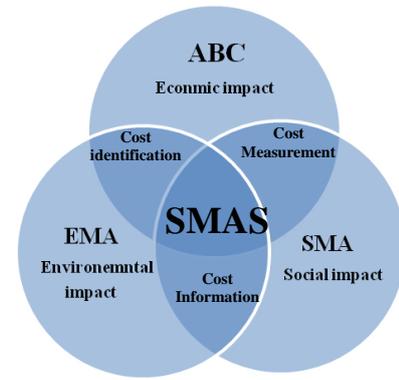


Figure 1. Accounting concepts underlying the Sustainability Management Accounting System (SMAS)

III. RESEARCH DESIGN

A. Research question

To attempt to fill the key gaps identified from the literature, this research will pose one main research question. Companies are looking for ways to manage environmental costs and allocate them to individual products and services in order to make better environmental management decisions. Without a holistic system this is difficult to accomplish. In order to be able to conceptualise an information system, system characteristics need to be identified and evaluated so that the most appropriate characteristics can be built into a SMAS. This would give more realistic costs on which to make decisions as the product or service will be more fully costed. Meanwhile, social costs could be measured and incorporated into a SMAS along with environment costs. To develop the conceptual model for a SMAS, it is necessary to enunciate the systems characteristics required that meet the informational needs of sustainable organizations drawing on best environmental and social management practices while being consistent with accounting concepts. Thus the main research question will solicit these system characteristics for a SMAS.

RQ1: What system characteristics could companies employ in their sustainability management accounting systems to meet the needs of EMA and SMA practices while adding sustainable value to organization?

This study seeks to identify a set of system characteristics that could separately identify costs of environment (rather than as overheads) while measuring reductions of these costs and contaminants [23, 52]. Also the system characteristics identified could measure social impact costs as separately identifiable expenditures of organizations [39] to capture full costs of products and provide cost information for internal decision making [53]. These characteristic capture data on metrics that are identified as environmental and social management accounting best practices. In order to arrive at the set of best practice characteristics, sub research questions need to be answered as follow.

SR1: To what extent do current accounting systems capture and report environmental costs to support internal decision making for reducing emissions and wastes?

SR2: How are companies intending to change their accounting systems to meet environment and social internal decision making needs that will support future reporting requirements?

SR3: To what extent is world best practice in environment and social accounting systems and reporting being adopted by manufacturing companies in Australia?

Answers to these sub research questions solicit current and future practices as to the characteristics of an information system and whether Australian manufacturing companies have adopted world's best practice.

B. Propositions

This study poses four propositions that focus on appropriateness of, and improvements in, employing systems characteristics solicited and comparing these characteristics with Australian firms that have adopted best practice. Evidence will be collected that supports the following propositions.

P1: Best practice companies identify costs of environment and social impacts as well as measure reductions of contaminants to reduce negative impacts on humans, society, employees and the environment.

P2: Best practice companies more accurately provide environmental and social costs information for internal decision making and to support external reporting disclosures.

Best practice companies employ system characteristics of sustainability accounting to identify and allocate environmental costs to the right product costs. Environmental costs are able to be separately allocated to individual products and services while measuring reductions in environmental costs as well as wastes, solids, and emissions. Also, social costs are measured and controlled to reduce negative impacts on society, employees, and the environment. As a consequence, companies are able to provide more accurate costs information to support reporting for internal decision making and for better external reporting. Companies are enabled to meet their reporting obligations of energy consumptions and emission abatement to the National Greenhouse and Energy Reporting (NGER) and Global Reporting Initiative (GRI) bodies.

P3: A SMAS provides best practice companies with an enhanced environmental and social costs management system to improve internal decision making and to support stakeholders' and public concerns.

P4: A SMAS provides best practice companies with a mechanism to add value in economic, social, and environment areas of performance.

A SMAS could enable a company to apply sustainability accounting concepts by continuously improving environmental costs identification and allocation as well as measure wastes, solids, and/or emissions. Companies also could continue the management of social impact costs to create enhanced qualities for society and the environment while more accurately supporting cost information for internal decision making and external reporting purposes. A SMAS can help a company to add sustainable value while continuing to preserve natural and environmental systems thus becoming sustainable organization in the long-term. Companies will be able to externally report their progress in using less energy and emissions abatement to the NGER and meet the requirements of GRI sustainability reporting guidelines.

C. Theoretical framework

The study seeks to identify appropriate system characteristics of sustainability accounting that could be employed by companies from different manufacturing sectors. Thus, **Figure 2** consolidates the appropriate literature into an integrated theoretical framework as the starting point for this

study. First, this study investigates system characteristics of sustainability management accounting companies could employ for environmental and social cost measurement. Environmental costs are recognized by recording unit inputs (quantities) such as resource extractions, energy, fuels, oils, and/or chemical (upstream) and those arising as non-product outputs such as wastes, solids, and emissions (downstream) [4, 23, 25, 26]. Meanwhile, social costs are identified from product responsibilities and improvements in society, humans, and employees which cause increases in total costs of products [8, 11, 36, 46]. Thus, environmental and social costs need to be measured in order to provide cost information for environment and social internal decision making [1-3, 28, 54]. Then, system characteristics that are (could be) employed by companies will be identified from appropriate management accounting practices in relation to environmental and social cost measurement. At this stage, of the study, the most appropriate system characteristics of sustainability management accounting will be extended as best management accounting practices to utilize in the conceptual model of a SMAS.

In a SMAS, environmental management accounting concepts are used to separately identify costs of environment and allocate to individual product costs by expanding the application of the activity based costing approach [21, 23, 26, 55, 56]. **Deep ecology** is employed in designing a SMAS to recognize costs of environment, manage uses and flows of resources, and measure reductions of these costs and contaminants [57] to support improvements in environmental performance [5]. Social management accounting will measure costs of social impacts in order to improve social performance of organizations [46, 54]. **Marx's labour theory of value** is used to explain the need to measure social costs relating to improvements in skills, knowledge, and 'qualities' of employees while maximizing profits from higher consumption

[13, 58-60] and developing social performance [11].

A SMAS could also track and report the impact of the movement of stocks and flows of products and services thus creating positive reputations for organisations as socially and environmentally aware in the eyes of stakeholders [61, 62]. Measurement of environmental and social costs become more accurate when providing cost information to support financial reports and disclosure of environment and social performance [23, 26, 29]. Thus, **stakeholder theory** is utilized to explain ethical and moral obligations of management to consider the interests of companies' stakeholders [15, 16] in disclosing environmental and social performance [63, 64]. The theory also helps describe the needs of companies to incorporate improvements in environmental and social concerns into economic performance [17].

By incorporating three fused theories in this theoretical framework it supports a SMAS to measure full costs of products when collecting direct costs from materials and labour and indirect costs of overhead, social, and environment costs [28, 35, 53] while meeting the requirements of sustainability management accounting practices [8, 11, 65].

A SMAS will assist a company to add sustainable value in three areas – economic, social, and environment [1, 28, 33, 66, 67]. A company can disclose these three areas of performance through integrated triple bottom line reporting to stakeholders and the public [6, 34, 50].

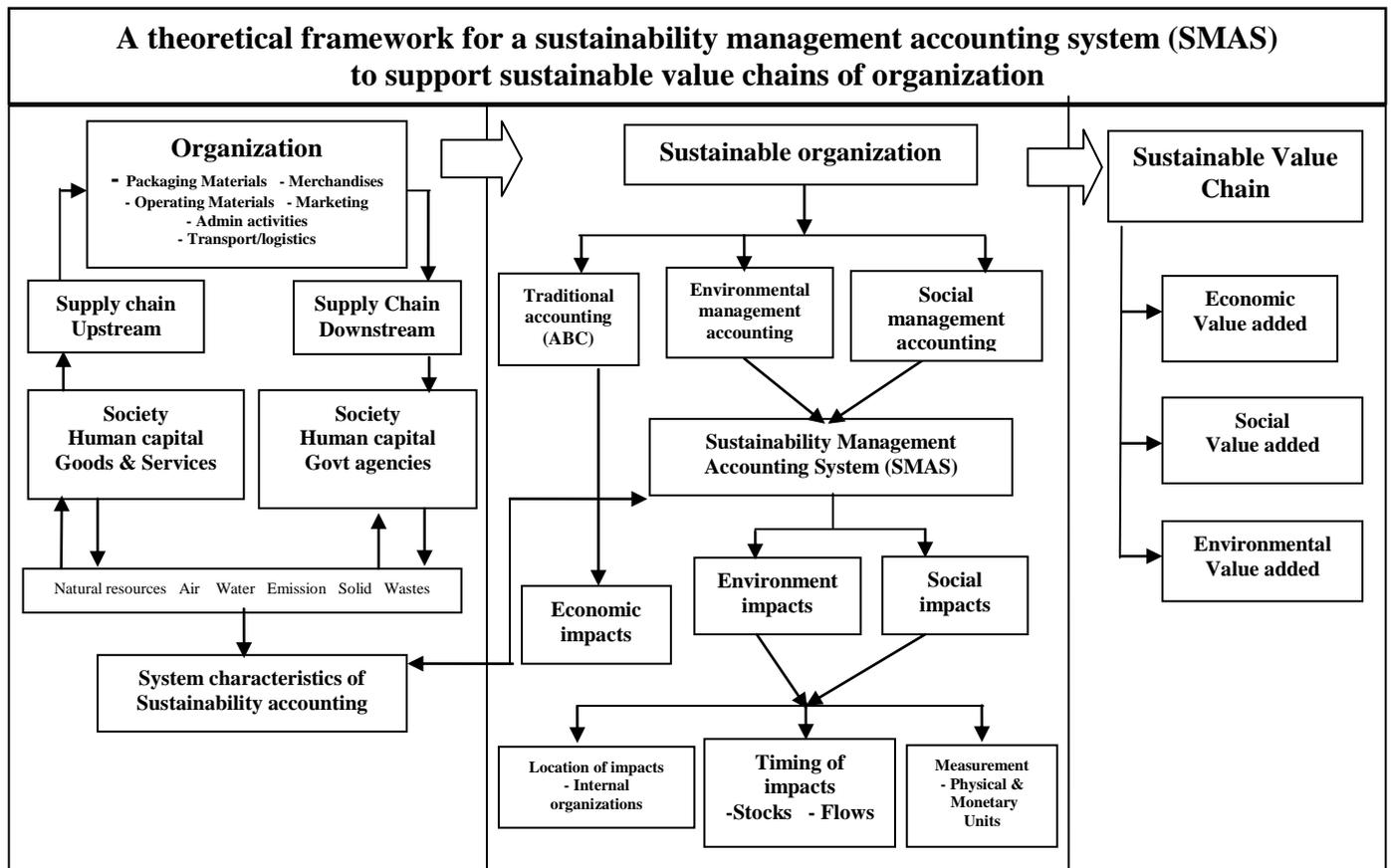


Figure 1 A theoretical framework for a sustainability management accounting system (SMAS)

IV. RESEARCH METHODOLOGY

The approach of the study is to apply mixed methods combining quantitative and qualitative approaches to collect and analyse data using triangulation for credibility, thus avoiding social bias and build strong results [68-70]. As an exploratory study, this research employs quantitative methods of survey to identify system characteristics of sustainability accounting that are and are intended to be employed by companies for social and environmental cost measurement. The results of the survey are used to compare with an analysis of management accounting best practice using qualitative methods.

In employing a qualitative approach (cases studies), this study investigates management accounting practices and system characteristics of companies from different manufacturing sectors identified (from the survey) as adopting best practice. Using multiple case studies is considered an appropriate approach for this study to create a deeper understanding of existing business systems and practices [71] without pre-expectation and/or prediction [72]. This study utilizes inductive analysis as a paradigm of choice [72] to analyse management accounting best practices along with a benchmarking model.

In addition, secondary data, such as analysing cost accounting systems of companies and published reports will

also be explored to identify the extent of cost saving practices, management of environmental and social costs, and investment, from the past three to five years, to support measures. Secondary data is useful for this study because it saves time and is a cost effective way of collecting data to support the quantitative and qualitative research methods adopted [73].

To select a sample group, this research will employ simple random sampling to select 500 Australian manufacturing companies from five sectors (one-hundred from each sector) such as paper and furniture products, machinery and equipment, constructions, automobile and metal products, and coal, mining and chemical industries [74].

The companies to be studied will be selected by utilizing a purposive sampling method. Thus, manufacturing companies that apply best practice to measure costs of environment and social impacts as well as evaluate reductions of these costs and impacts will be targeted. As a result, the purposive sampling method assists this study to select appropriate case studies for investigation and gain fuller information from investigations among sectoral groups [70, 72, 75]. Thus, accountants dealing with environmental and social issues will be targeted for data collection.

To collect data, chief accountants, controller accountants, chief financial officers, and management accountants dealing with environmental issues [2] of 500 manufacturing companies will be requested to complete a survey questionnaire. Responses from approximate 100 manufacturing companies are targeted. The questionnaires solicit current practices and system characteristics which are being employed as well as respondents' attitudes, opinions, and points of views as to what system characteristics should be incorporated into a SMAS for manufacturing company and their future intentions to incorporate characteristics into their systems.

In addition, a qualitative approach is used to collect data using in-depth interview with chief accountants, controller accountants, chief financial officers, and management accountants dealing with environmental and social issues of up to fifteen manufacturing companies in Australia. Secondary data such as cost accounting data relating to environmental and social costs as well as reports will be collected from the past three to five years. As a consequence, questionnaires, case studies, and secondary data are useful for this study, as they have been identified as appropriate instruments in creating reliability, trustworthiness, and to avoid social bias [70].

Quantitative data analysis use cluster analysis to answer sub research questions (SR1, SR2, and SR3). Hierarchical cluster analysis will be used to identify existing groups of observations while determining observations belonging to each group of system characteristics [76, 77]. Agglomerative methods of hierarchical cluster will also be employed to agglomerate all objects into individual clusters while minimizing similarities (final cluster) at the maximum distance of the complete linkage approach, so each object falls into its own cluster in order to avoid chain samples or observations [76].

Thus responses of **SR1**, where there are high correlations falling into the final cluster, would indicate that those intending to capture and report environmental and social costs meet the needs of environmental and social management accounting practices. Then, based on intentions to change their accounting systems (**SR2**), high correlations of responses falling into the final cluster would indicate that those intending to change their accounting systems meet the needs of environmental and social management internal decision making. For responses from **SR3** to world best practice, high correlations of responses falling into the final cluster will be identified with world's best practice. The results from the survey that meet the requirements of environmental and social management accounting practices [23, 26] are identified as system characteristics currently used and to be used.

Qualitative data analysis will employ inductive data analysis method along with a benchmarking model (**Figure 3**). Benchmarking is a business improvement tool using comparative management practices adopted by organizations to be more effective [78]. Previous studies e.g. [52, 78-80] claimed that benchmarking can inspire organisations to identify business opportunities by comparing similar business practices from different organizations. In developing a benchmarking model, this study adopts DMAIC of Lean Six Sigma Improvement Cycle Process as a measurement tool and improvement approach. DMAIC is considered appropriate for this study to measure business performance using an improvement process to **define** business activities, to **measure** existing business activities, to **analyse** appropriate business practice to meet needs of business goals, to **improve** appropriate business best

practice, and to **control** improvement processes while achieving sustainability [81-83]. However, this study will not undertake the control process step because it is outside the scope of the study as the conceptual model will not be implemented.

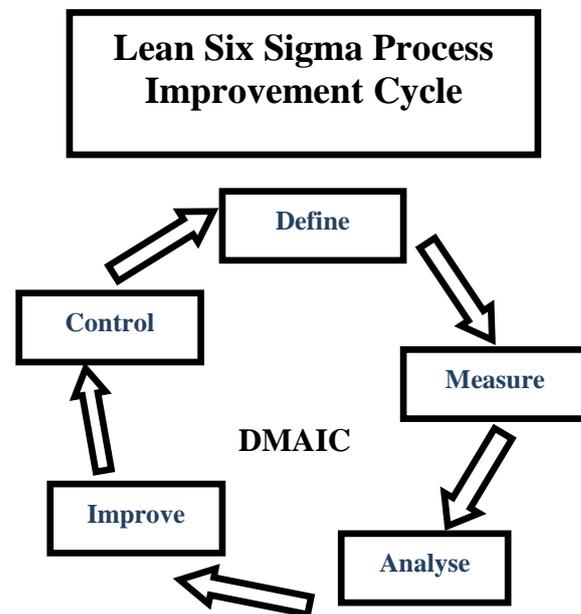


Figure 3 DMAIC of benchmark theory adapted from [84]

As a consequence, benchmarking is considered appropriate for this study to compare existing business practices among different manufacturing companies and sectors against the case study companies adopting best practice to improve the development of an effective management accounting system [78], in the form of a conceptual model for a SMAS. It is hoped that a SMAS will be an essential management accounting tool for a company to enhance environmental and social costs measurement.

V. CONCLUSION

An effective management accounting information system is a significant need of manufacturing companies to measure costs of environment and social impacts. This is because increased concerns of companies' stakeholders require organizations to provide disclosures incorporating the development economic, social, and environmental performance in the form of triple bottom line reporting. Thus, a conceptual model of a SMAS as proposed is an appropriate tool that can assist companies to capture full costs of products while providing cost information to support the demand of their stakeholders. Companies can then employ environmental and social cost information to enhance decision making and management of these costs.

REFERENCE

- [1] R. V. Berkel, "Managing for Sustainable Development: Using environmental management accounting and sustainable development reporting," *CPA congress*, vol. 21, pp. 1-18, 2003.
- [2] D. Gadenne and M. Zaman, "Strategic Environmental Management Accounting: An Exploratory Study of Current Corporate Practice and Strategic Intent "

- Journal of Environmental Assessment Policy and Management*, vol. 4, pp. 123-150, 2002.
- [3] G. Hubbard, "Measuring Organizational Performance: Beyond the Triple Bottom Line," *Business Strategy and the Environment*, vol. 19, pp. 177-191, 2009.
- [4] R. Gale, "Environmental management accounting as a reflexive modernization strategy in cleaner production," *Cleaner Production*, vol. xxx, pp. 1-9, 24 August 2005 2005.
- [5] M. Jacob, "Forum; Sustainable Development and Deep Ecology: An Analysis of Competing Traditions," *Environmental Management* vol. 18, pp. 477-488, 1994.
- [6] S. K. Sikdar, "Sustainability and Recycle-Reuse in Process Systems," *Clean Technology Environment*, vol. 9, pp. 167-174, 8 March 2009 2007.
- [7] H. Nachtmann and M. H. Al-Rifai, "An Application of Activity Based Costing in The Air Conditioner Manufacturing Industry," *The Engineering Economist*, vol. 49, pp. 221-236, 2004.
- [8] R. Gray, "Social, environmental and sustainability reporting and organisational value creation? Whose value? Whose creation?," *Accounting, Auditing & Accountability Journal*, vol. 19, pp. 793-819, 2006.
- [9] R. Gray, M. Javad, D. M. Power, and D. C. Sinclair, "Social and Environmental Disclosure and Corporate Characteristics: A Research Note and Extension," *Journal of Business Finance & Accounting* vol. 28, pp. 327-356, 2001.
- [10] B. Devall and G. Sessions, *Deep Ecology*. Utah: Gibbs M. Smith, Inc, 1985.
- [11] C. Jasch and Ž. Stasiškienė, "From Environmental Management Accounting to Sustainability Management Accounting," *Environmental research, engineering and management*, vol. 34, pp. 77-88, 2005.
- [12] K. H. Marx, *Capital: A Critique of Political Economy Volume 1*. London: Penguin Classics, 1976.
- [13] K. H. Marx, *Capital: A Critique of Political Economy Volume 2* London: Penguin Classics, 1978.
- [14] K. H. Marx, *Capital: A Critique of Political Economy Volume 3*. London: Penguin Classics, 1981.
- [15] E. R. Freeman, *Strategic Management: A Stakeholder Approach* Boston: Pitman, 1984.
- [16] E. R. Freeman and D. L. Reed, "Stockholders and Stakeholders: A New Perspective on Corporate Governance," *California Management Review*, vol. 25, pp. 88-106, 1983.
- [17] A. A. Ullmann, "Data in Search of a Theory: A Critical Examination of the Relationships among Social Performance, Social Disclosure, and Economic Performance of U. S. Firms " *The Academy of Management Review*, vol. 10, pp. 540-557 1985.
- [18] M. Armstrong, "Handbook of Management Techniques: A Comprehensive Guide to Achieving Managerial Excellence and Improved Decision Making ", 3rd ed London: Kogan Page, 2006.
- [19] S. Căpusneanu, "Implementation Opportunities of Green Accounting for Activity-Based Costing (ABC) in Romania," *Theoretical and Applied Economics*, vol. 1 (518), pp. 57-62, 2008.
- [20] L. C. Northrup, "Attaining Sustained Value and Bottom-Line Improvement," Florida: J. Ross Publishing Incorporated, 2004.
- [21] C. Sendroiu, A. G. Roman, C. Roman, and A. Manole, "Environmental Management Accounting (EMA): Reflection of Environmental Factor in the Accounting Processes through the identification of the Environmental Costs Attached to Products, Processes and Services," *Theoretical and Applied Economics*, vol. 10, pp. 81-86 2006.
- [22] S. Bose, "Environmental Accounting and Reporting in Fossil Fuel Sector: A Study on Bangladesh Oil, Gas and Mineral Corporation (Petrobangla) " *The Cost and Management*, vol. 34, pp. 53-67, 2006.
- [23] IFAC, "Environmental Management Accounting," International Federation of Accountants, New York 2005.
- [24] A. K. Pramanik, N. C. Shil, and B. Das, "Environmental Accounting and Reporting with Special Reference to India." vol. 7712 India: Munich Personal RePEc Archive, 2007, pp. 1-26.
- [25] W. Qian and R. Burritt, "Environmental Accounting for Waste Management: A study of local government in Australia," *Environmentalist*, vol. 27, pp. 143-154, 22 February 2007 2007.
- [26] UNDSO, "Environmental Management Accounting Procedures and Principles," United Nations Division for Sustainable Development (UNDSO), New York 2001.
- [27] H. Englund and J. Gerdin, "Structuration theory and mediating concepts: Pitfalls and implications for management accounting research," *Critical Perspectives on Accounting* vol. 19, pp. 1122-1134, 2008.
- [28] G. Lamberton, "Sustainability accounting—a brief history and conceptual framework," *Accounting Forum*, vol. 7, pp. 13-14, 2005.
- [29] The Sigma Project, "The Sigma Guidelines - Toolkit: Sustainability Accounting Guide," The UK Department of Trade and Industry (DTI), London 2003.
- [30] A. Ball, "Sustainability Accounting in UK Local Government: An Agenda for Research," The Association of Chartered Certified Accountants; University of London, London 2002.
- [31] M. J. Milne, "On Sustainability; The Environment and Management Accounting," *Management Accounting*, vol. 7, pp. 135-161, 1996.
- [32] M. Bennett, J. J. Bouma, and T. Wolteres, "Environmental Management Accounting: Informational and Institutional Developments," USA: Kluwer Academic, 2002.
- [33] J. R. D. Taplin, D. Bent, and D. Aeron-Thomas, "Developing a Sustainability Accounting Framework to Inform Strategic Business Decisions: a Case Study from the Chemicals Industry," *Business Strategy and the Environment*, p. 13, 2006.
- [34] S. Schaltegger and M. Wagner, "Integrative management of sustainability performance, measurement and reporting," *International Journal Accounting, Auditing and Performance Evaluation*, vol. 3, pp. 1-19, 2006.
- [35] ICAEW, "Information for Better Markets Sustainability: the role of accountants," Institute of Chartered Accountants in England & Wales, UK 2004.
- [36] J. Pittman and K. Wilhelm, "New Economic and Financial Indicators of Sustainability," *New Directions for Institutional Research*, vol. 134, pp. 55-69, 2007.
- [37] R. D. Burnett and D. R. Hansen, "Eco-efficiency: Defining a role for environmental cost management," *Accounting, Organizations and Society*, vol. 33, pp. 551-581, 2008.
- [38] R. L. Burritt, C. Herzig, and B. D. Tadeo, "Environmental management accounting for cleaner

- production: The case of a Philippine rice mill," *Journal of Cleaner Production* vol. 17, pp. 431-439, 2009.
- [39] M. Hazilla and R. J. Kopp, "Social Cost of Environmental Quality Regulations: A General Equilibrium Analysis," *The Journal of Political Economy*, vol. 98, pp. 853-873, 1990.
- [40] S. C. Mobley, "The Challenges of Socio-Economic Accounting " *The Accounting Review*, vol. 45 pp. 762-768 1970.
- [41] T. Tinker, C. Lehman, and M. Neimark, "Falling down the Hole in the Middle of the Road: Political Quietism in Corporate Social Reporting," *Accounting, Auditing, and Accountability Journal*, vol. 4, pp. 28-54, 1991.
- [42] R. Gray, "The Social Accounting Project and Accounting Organizations and Society Privileging engagement, imaginings, new accountings and pragmatism over critique?," *Accounting, Organizations and Society*, vol. 27, pp. 687-708, 2002.
- [43] G. Pyatt and A. Roe, *Social Accounting for Development Planning with Special Reference to Sri Lanka*, Printed ed. London: Cambridge University Press, 1977.
- [44] J. Quarter and B. J. Richmond, "Accounting for Social Value in Nonprofits and For-Profits," *Nonprofit Management & Leadership*, vol. 12, pp. 75-85, 2001.
- [45] T. Tinker and R. Gray, "Beyond a critique of pure reason: From policy to politics to praxis in environmental and social research," *Accounting, Auditing, and Accountability Journal*, vol. 16, pp. 727-761, 2003.
- [46] L. Mook, B. J. Richmond, and J. Quarter, "Integrated Social Accounting for Nonprofits: A Case From Canada," *International Journal of Voluntary and Nonprofit Organizations*, vol. 14, pp. 283-297, 2003.
- [47] S. Gallhofer and J. Haslam, *Accounting and emancipation: Some critical interventions*. London: Routledge, 2003.
- [48] M. Chwastiak and G. Lehman, "Accounting for war," *Accounting Forum* vol. 32, pp. 313-326, 2008.
- [49] J. v. Geibler, C. Liedtke, H. Wallbaum, and S. Schaller, "Accounting for the Social Dimension of Sustainability: Experiences from the Biotechnology Industry," *Business Strategy and the Environment*, vol. 15, pp. 334-346, 2006.
- [50] F. Borga, A. Citterio, G. Noci, and E. Pizzurno, "Sustainability Report in Small Enterprises: Case Studies in Italian Furniture Companies," *Business Strategy and the Environment*, vol. 19, pp. 162-176, 2009.
- [51] C. Spence, "Social accounting's emancipatory potential: A Gramscian critique," *Critical Perspectives on Accounting* vol. 20, pp. 205-227, 2009.
- [52] G. R. d. Snoo, "Benchmarking the Environmental Performances of Farms," *Jnt J LCA, Agriculture*, vol. 11, pp. 22-25, 2006.
- [53] J. Bebbington, R. Gray, C. Hibbit, and E. Kirk, "Full Cost Accounting: An Agenda for Action," The Association of Chartered Certified Accountants, London 2001.
- [54] B. J. Richmond, L. Mook, and J. Quarter, "Social Accounting for Nonprofits Two Models," *Nonprofit Management & Leadership* vol. 13, 2003.
- [55] M. Bartolomeo, M. Bennett, J. J. Bouma, P. Heydkamp, P. James, and T. Wolters, "Environmental management accounting in Europe: current practice and future potential," *The European Accounting Review*, vol. 9, pp. 31-52, 2000.
- [56] R. L. Burritt and C. Saka, "Environmental management accounting applications and eco-efficiency: case studies from Japan," *Cleaner Production*, vol. 14, pp. 1262-1275, 2006.
- [57] C. J. Barrow, *Environmental management; Principles and Practice*: Routledge; Taylor & Francis Group, 1999.
- [58] K. Marx, *Wage Labour and Capital*. Moscow: Progress Publisher, 1847.
- [59] S. Keen, *Debunking economics* London: Zed Books, 2001.
- [60] D. Little, *Scientific Marx*. Minnesota, USA: University of Minnesota Press, 1986.
- [61] Carbon Trust, "Carbon Management: Assessing and Managing Business Responses to Climate Change," London 2005.
- [62] EPA Victoria, "Draft Carbon Management Principles- EPA Discussion Paper " EPA Victoria, Victoria 2007.
- [63] D. Cormier, I. M. Gordon, and M. Magnan, "Corporate Environmental Disclosure: Contrasting Management's Perceptions with Reality," *Journal of Business Ethics*, vol. 49, pp. 143-165, 2004.
- [64] E. Eljido-Ten, "Applying Stakeholder Theory to Analyse Corporate Environmental Performance: Evidence from Australia's Top 100 Listed Companies," in *AFAANZ Victoria*: paper represented to AFAANZ, 2005.
- [65] R. Goodland, "Sustainability: Human, Social, Economic and Environmental," *Responding To Global Environmental Change* p. 1, 2002.
- [66] A. Ball, "A sustainability accounting project for the UK local government sector?: Testing the social theory mapping process and locating a frame of reference," *Critical Perspective on Accounting*, vol. 15, pp. 1009-1035, 2004.
- [67] R. A. Wahaab, "Sustainable Development and Environmental Impact Assessment in Egypt: Historical Assessment," *The Environmentalist*, vol. 23, pp. 49-70, 2003.
- [68] J. W. Creswell, *Research Design: Qualitative, quantitative, and mixed methods approaches*, 3 ed. Los Angeles: SAGE Publications, Inc, 2009.
- [69] S. Gorard, "Combing Methods in Educational Research," McGraw-Hill Education 2004, p. 43.
- [70] L. W. Neuman, *Social Research Methods: Qualitative and Quantitative Approaches*, 6 ed. Boston: Pearson Education, Inc, 2006.
- [71] R. K. Yin, *Applications of Case Study Research* vol. 34. London: Sage Publications, 1993.
- [72] M. Q. Patton, *Qualitative Evaluation And Research Methods*, 2nd ed. California: Sage Publications, 1990.
- [73] D. Davis, *Business Research for Decision Making*, 6th ed. OH: Thomson South-Western, 2005.
- [74] PricewaterHouseCoopers, "About PriceWaterHouseCoopers(PWC)." vol. 2009 Australia: PriceWaterHouseCoopers International Limited, 2009.
- [75] R. K. Yin, *Case Study Research: Design and Methods*, 4th ed. vol. 5. Los Angeles: Sage Publication, 2009.
- [76] J. F. Hair, R. E. Anderson, R. L. Tatham, and W. C. Black, *Multivariate Data Analysis*. New Delhi: Pearson Education 1998.
- [77] M. Manning and D. Munro, *The Survey Researcher's SPSS Cookbook*, 2nd ed. NSW: Pearson Education Australia, 2007.

- [78] B. Karlof, K. Lundgren, and M. E. Froment, *Benchlearning: Good Examples as a Lever for Development*. Chichester: John Wiley and Sons, Ltd. , 2001.
- [79] I. M. Herremans and S. Herschovis, "Sustainability Reporting: Creating an Internal Self-Driving Mechanism," *Environmental Quality Management*, vol. 10, pp. 19-29, 2006.
- [80] L. Najjar and M. J. Schniederjans, "A Quality Information Benchmarking Methodology: A US Banking Industry Empirical Study," *Quality & Quantity*, vol. 40, pp. 419-433, 2006.
- [81] Aberdeen Group, "The Lean Six Sigma Benchmark Report," Boston, Massachusetts 2006.
- [82] H. Koning and J. Mast, "a rational reconstruction of Six-Sigma's breakthrough cookbook," vol. 23, pp. 772-773, 25 October 2008, 2006.
- [83] Lean Australia, "LEAN Thinking - What's it all about?." vol. 2009, 2009.
- [84] Segla International, "Introduction to Lean Six Sigma." vol. 2009, 2009.