Macrothink Institute™
International Journal of Accounting and Financial Reporting
ISSN 2162-3082
2015, Vol. 5, No. 2

Advancing sustainable income accounting: An Australian case study

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doi:10.5296/ijafr.v5i2.9149 URL: http://dx.doi.org/10.5296/ijafr.v5i2.9149

Abstract

This paper is an exploration of the sustainability accounting literature to investigate the variety of accounting measurement instruments/tools/methodologies applied to achieve business sustainability and whether there is a real practical concern and application by companies toward the revenue side of sustainability, as well as, cost side. The research present a classification of different implemented sustainable accounting tools to measure corporate environmental and social costs due to the limitation of tools that implemented to measure corporate environmental and social revenues. Therefore, the paper adopts an Australian textile case study to investigate and analysis reality in practice. The outcome of the case study indicates that the companies may use the implemented sustainable accounting tools which are commonly applied to measure cost side of sustainability to measure, as well, revenue side, although the majority of the business sustainability literature focuses mainly on the cost side and how to measure it.

Keywords: Sustainable Accounting tools, Sustainable Revenue Measurement, Australian Case Study.

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1. Introduction

The fundamental concept of business sustainability is “the capability of a corporate organization to add value and to continue to exist as an entity” (IFAC, 2006, p.3). Collins (2006) defined sustainable as capable of being sustained, while sustainable development from economic development angle as capable of being kept/maintained at a steady level without causing ecological damage or exhausting natural resources. For simplicity, sustainability and sustainable development will be used as synonyms in this paper with much more orientation to environmental aspect due to the limitation of tools that implemented to measure corporate social aspect separately.

Conventionally, sustainable development is typically described in three aspects: economic, environmental and social. These aspects are integral and significantly influence each other. Therefore, if organizations need to generate economic or financial benefit, they should have an interactive interest in sustainable development by handling environmental and social issues as well to be able to add value for both the organization and its stakeholders (IFAC, 2006). Three extents could be considered from the human life quality perspective; human/social, ecological, and economic. From this angle, the centering of economic criteria could be the conserving of a stable income stream. This angle of economic or income sustainability is one of the main important measures of sustainable development that can be attained by the carrying out of the concept of sustainability accounting. However, it is still ignored on the whole and typically not mentioned in the literature.

In the area of accounting for sustainability, the complexity and lack of clarity are considered as the major challenges, beginning with the need for a clearly focused definition of sustainable development (Herath & Gamini, 2005). Pyle and Forrant (2002) and OECD (2001), beside the most of the literature defined sustainable development as incorporating the society objectives including economic, social and environmental ones, in order to maximize the ability to meet the present needs for human well-being without compromising the same ability of future covalence.

As one of accounting most important purposes is to communicate relevant information for decision-makers, information type and quality enables decision-makers to realize that their adoption of environmental damage prevention and social actions may increase their profits and decrease their overall costs at the same time (Scavone, 2006). To do so, many systems and tools had been adopted in the literature either at macro level (Bartelmus, 2007; Kemmler & Spreng, 2007) or micro level (MacDonald, 2005; Bebbington, 2007) to generate relevant information. However, the most popular accounting systems adopted by firms are the environmental management accounting (EMA) system and the full cost accounting (FCA) to provide monetary information.

Organizations are applying various sustainability tools/methodologies/systems such as FCA and EMA to assist their efforts and activities to become more sustainable and to measure their sustainability level either to comply with regulations and law requirements or to create real and potential benefit or value to the community and stakeholders (Abou Taleb et.al., 2015;

Hitchcock & Willard, 2006). However, all sustainability accounting systems developed and adopted till now are mainly focus on the cost side of sustainability rather than the revenue/income side. Therefore, this paper will extend the literature as it pertains to the sustainability, environmental and social accounting literature to enhance accounting profession and practices to develop and apply effective income and profitability measurements for environmental and social factors by investigating a practical case study from Australian textile industry.

The paper will start by highlighting diverse sustainability assessment methodologies had been adopted by accounting literature to achieve business sustainability. Then, the paper will take a thorough look at an Australian case study to find out whether companies in reality consider the revenue/income side of sustainability or not, followed by findings and conclusion.

2. Literature review

To plan and measure sustainable development, many tools and methodologies have been developed and applied over the years. These measures are applied to sustainability as a whole or in parts (environmental, social or economic). However, in spite of these efforts to facilitate sustainability assessment and decision-making at the micro level, there is still a need for standardised tools and methodologies. As presented in Table 1, sustainability assessment methodologies or tools could be classified into two categories: 1) methodologies based on life cycle thinking, and 2) methodologies based on non-life cycle thinking.

For measurement of sustainability, sustainability assessment tools used in literature are involving excessive numbers of existent indicators of sustainability that are commonly measured in diverse units and their absolute values are very different (Diaz-Balteiro & Romero, 2004; Liposcak, Afgan, Duic, & Carvalho, 2006). Consequently, without having any aggregation, a set of indicators is difficult to interpret, cannot present a concise general overview of system behaviour, and is not valuable for decision-making purposes (Kemmler & Spreng, 2007). To handle this problem, some sustainability assessment tools had been calculated the combined effect by selecting a small set of a few lead indicators and combine them in the form of a general index of sustainability (Afgan, Pilavachi, & Carvalho, 2007; Krajnc & Glavic, 2005). However, the indices were usually not accurate or thorough enough and definitely not extent to measure revenue or benefit side of sustainability.

Table 1: Sustainability assessment methodologies

	Based on non-Life Cycle Thinking	**Based on Life Cycle Thinking**
Country level	• Triangle Method (Xu et al., 2006). • Energy Indicators System (Kemmler & Spreng, 2007).	• Method for the Identification of Environmental Impact Category Weights (Soares, et al. 2006). • System of Environmental and Economic Accounting (SEEA) (Bartelmus, 2007; de Haan &

		Kee, 2003).
Industry or sector level	• Agricultural Sustainability Index (Nambiar, et al. 2001). • Potential of Multi-Criteria Assessment (Afgan et al., 2007). • Overall Sustainability Function (Van Calker, et al. 2006). • Index of Sustainability (IS) (Diaz-Balteiro & Romero, 2004).	• Environmental Life Cycle Impact Assessment (Brentrup et al., 2004). • Social Impact Indicator (SII) (Labuschagne & Brent, 2006). • Social Willingness-To-Pay (WTP) (Wu, Zhang, & Chen, 2005). • Social and Environmental Life Cycle Assessment (SELCA) (O`Brien, et al. 1996). • Framework for Sustainability Indicators (Azapagic, 2004). • Full Cost Environmental Accounting (FCEA) (Epstein, et al. 2011; Herborn, 2005).
Company level	• Composite Sustainable Development Index (CSDI) (Krajnc & Glavic, 2005). • Global Reporting Initiative (GRI) (Moneva, et al. 2006). • Sustainable Value Added (Figge & Hahn, 2004). • Sustainability Balanced Scorecard (Figge, et al. 2002).	• Social Life Cycle Impact Assessment (Dreyer et al., 2006). • ISO 14001 Environmental Management Systems (EMS) (MacDonald, 2005; Rezaee & Elam, 2000). • Environmental Management Accounting (EMA) (Antheaume, 2007; Bebbington, et al., 2007; Bebbington & Larrinaga, 2014; Birkin, 2000; Gray, 1992; Herbohn, 2005;Lamberton, 2000; Rikhardsson et al., 2005; Yang, 2007).
Product or project level	• Road-Map for Integration of Sustainability Issues (Waage, 2007).	• Life Cycle Sustainability (Wolf, et al. 2001). • Life Cycle Environmental Cost Analysis (LCECA) (Senthil et al., 2003). • Environmental Life Cycle Assessment Social Criteria (Gauthier, 2005). • Model that Allows Adding Value

		for Customer to a Product (Bovea & Vidal, 2004). • Sustainability Assessment Model (SAM) (Bebbington, 2007; Fraser, 2012).

Source: Combined from literature

For sustainability measurement at company level, EMA was commonly used as a managerial instrument which permits connecting the ecological activities with financial results. Fundamentally it is a focused on data gathering, analysis and communication of the outcome information. EMA includes diverse accounting instruments (Deegan, 2003; Jasch & Stasiškienė, 2005; Rikhardsson et al., 2005; UNDSD, 2001); range from environmental cost accounting and performance measurement, material flow accounting to FCA. EMA adoption had been considered as an appropriation of managerial innovation advancement that following recognized implementation approaches: an imitation process, forced adoption or efficient choice. Burritt (2005) inspects the issues identified with the EMA execution in associations. He recognized two sorts of the difficulties: issues that emerge from the traditional management accounting and issues with the absence of the distinguishment of ecological effects.

Burritt (2005) provides diverse meanings of EMA that have been commonly accepted by the different bodies and supplements it with a concise verifiable synopsis. By comparing EMA with traditional management accounting, it is obvious that both objectives are paralleled in providing information to be utilized to the planning, controlling and decision-making. Bennett and James (1997) specified the primary useful areas of EMA, when they specified cost reductions; guiding product pricing; enhancing customer value; improve opportunities and decision development; future-proofing investment with long term consequences; prioritizing environmental actions; assessing the eco-efficiency and/or sustainability of a company‘s activities. As noted, these are mainly the core of any business and definitely have a vital role in the decision-making. Consequently, it is critical for the business to consider EMA implementation, to a certain extent, for the use in strategic planning, if they are striving after the sustainability, rather than only considering it for the reporting purposes (Reynolds & Tilt, 2013).

Environmental costs accounting is a sub-branch of the EMA. It mainly focuses on analyzing aspects of the costs avoided, costs caused and benefits created by the environmental management. It is sometimes reflected in the performance measures of eco-efficiency, where measures are jointly combined the environmental and economic performance in particular indicators. This switch has been emphasized by Schaltegger and Wagner (2005) as a major shift has taken place in the environmental costs accounting during the last decade. It helps organizations to move from the traditional approach; where environment protection activities were causing environmental costs and do not bring any economic benefit, to a new approach where all costs related to material and energy use either directly or indirectly are defined as environmental costs. Additionally, the accounting of the future costs due to future environmental costs, budgeting and environmental risks constitute one of the most complicated and significant parts of the environmental costs accounting. Further, the environmental accounting instruments have been generally categorized by Lang et al. (2005) into product-oriented instruments such as life cycle assessment instruments and process-oriented instruments such as flow cost accounting, environmental performance indicator, input-output balance and etc.).

There is a growing sustainability accounting literature that combined with variety implementation of EMA tools in academe and in practice (Bartelmus, 1992; Bebbington, 2001; Birkin, et al. 2005; Gray, 1992; Lamberton, 2005; Schaltegger & Burritt, 2006; Taplin, et al. 2006; Reynolds & Tilt, 2013). However, measuring of business sustainability is still laming toward the cost side of sustainability rather than balancing between cost and revenue sides (Antheaume, 2007; Bebbington, et al., 2007; Bebbington & Larrinaga, 2014; Birkin, 2000; Gray, 1992; Herbohn, 2005; Lamberton, 2000; Yang, 2007). The majority of sustainability literature in accounting emphasis on measuring and reporting the cost side of sustainability either from environmental, social and/or financial perspectives in monetary and/or in non-monetary units (Abou Taleb et.al., 2015).

As one of the attempts to examine the rule of EMA techniques in nonprofit/nongovernmental sectors, Papaspyropoulos et al. (2012) examine the implementation of Environmental Cost Accounting techniques in a Greece nonprofit forestry organization. As a starting point, they advised about the ability to use EMA as a useful instrument to identify many dimensions of accountability in nonprofit/nongovernmental sectors. The study's limitation is its inability to measure income or profit sustainability in nonprofit organization due to its goals’ nature. While, Wahyuni (2009) presented some techniques provided by wide range of EMA literature to date for costing analysis (such as material flow cost accounting, life cycle assessment (LCA) and activity based costing (ABC)), performance management based on balanced scorecard, and investment appraisal such as total cost assessment (TCA) based on capital budgeting. In addition to some benefits and advantages that companies can grasp from implementing those EMA techniques such as cleaner production, cost reduction, better product pricing, innovation, and increased shareholder value. The limitations of those techniques are its focus on measuring all types of costs and costs reduction/savings through business life cycle with a limited lens to provide clear measurements for income sustainability from environmental and social angles.

Similarly, Letmathe and Doost (2000), Kumaran, et al. (2001) and Yang (2007) were mainly focused on the cost side of environmental life cycle assessment, while, Bebbington (2007) and Bebbington and Larrinaga (2014), who adopted full cost accounting (FCA) technique to consider all types of costs through business life cycle and as an approach that addresses the interlinkages between sustainable development problems and an entity. Further, Figge, et al. (2002) and Scavone (2006) utilized the sustainability/ environmentally balanced scorecard methodology to provide the integrated performance information for decision-makers. However, nothing of these EMA-environmental accounting tools provide clear measures for income/revenue side of sustainability or how to contribute to sustainability in a monetary measurable way. Therefore, to investigate whether companies, in practice, adopting any approach/technique to calculate revenue side of sustainability, the research is using the primarily data of one of the Australian leading textile companies.

3. Australian Case study

The textile industry is one of the oldest known industries in the world. It dates back to pharos era 5000 B.C., where scraps of linen cloth were used to wrap mummies and found in ancient Egyptian tombs (USEPA, 1997). Primarily the industry was a domestic and family one until beginning of 1500s when the first factory based on manual power was established. While the water power machines for spinning and weaving were invented to replace manual power, in the 18th century, where the Industrial Revolution in England (Neefus, 1982).

The main feature of textile industry is product specialization. Most large western factories only engage in one process or raw material. For example, a factory may be engaged in either broadloom weaving of wool or broadloom weaving of cotton. Similarly, many factories specialize in either spinning or weaving operations. However, larger integrated factories may combine the two operations but they normally do not conduct their own dyeing and finishing operations and usually send out their fabrics to dyeing and finishing plants (USEPA, 1996). In Australia, textile industry is considered the seventh contributed industry to the Australian Gross Value Added in 2014-2015 by 5,549 million and the eighth industry by the number of workers (Australian Government, 2015). However, based on Australian Bureau of Statistics (2015), it is characterized the third industry by the trade volume in 2014-2015, as exports 2,335 million and imports 14,688 million.

Broadly defined, the textile industry consists of establishments engaged in spinning natural and manmade fibers into yarns and threads. These are then converted (by weaving and knitting) into fabrics. Finally, the fabrics and in some cases the yarns and threads used to make them, are dyed and finished. The raw materials be used could be natural fibers such as cotton, wool, silk, and linen or manmade fibers. Previous case studies found that fibers length on cotton seed have different rate about 40% and 50% for wool fibers, thus there is an obligated wastes for natural raw material. While manmade raw material wastes result from worker’s careless or machines errors. This paper will focus on the spread-down waste cost and revenue in one of leading Australian cotton spinning mill, as presented in Table 2, with a capital investment of over $10 million and producing sales of approximately $5.5 million per annum. The mill employs over 90 people in Australia. In this cotton spinning mill, textile fibers are converted into yarn by grouping and twisting operations used to bind them together (see figure 1). Although most textile fibers are processed using spinning operations, the processes leading to spinning vary depending on whether the fibers are natural or manmade (see USEPA, 1997).

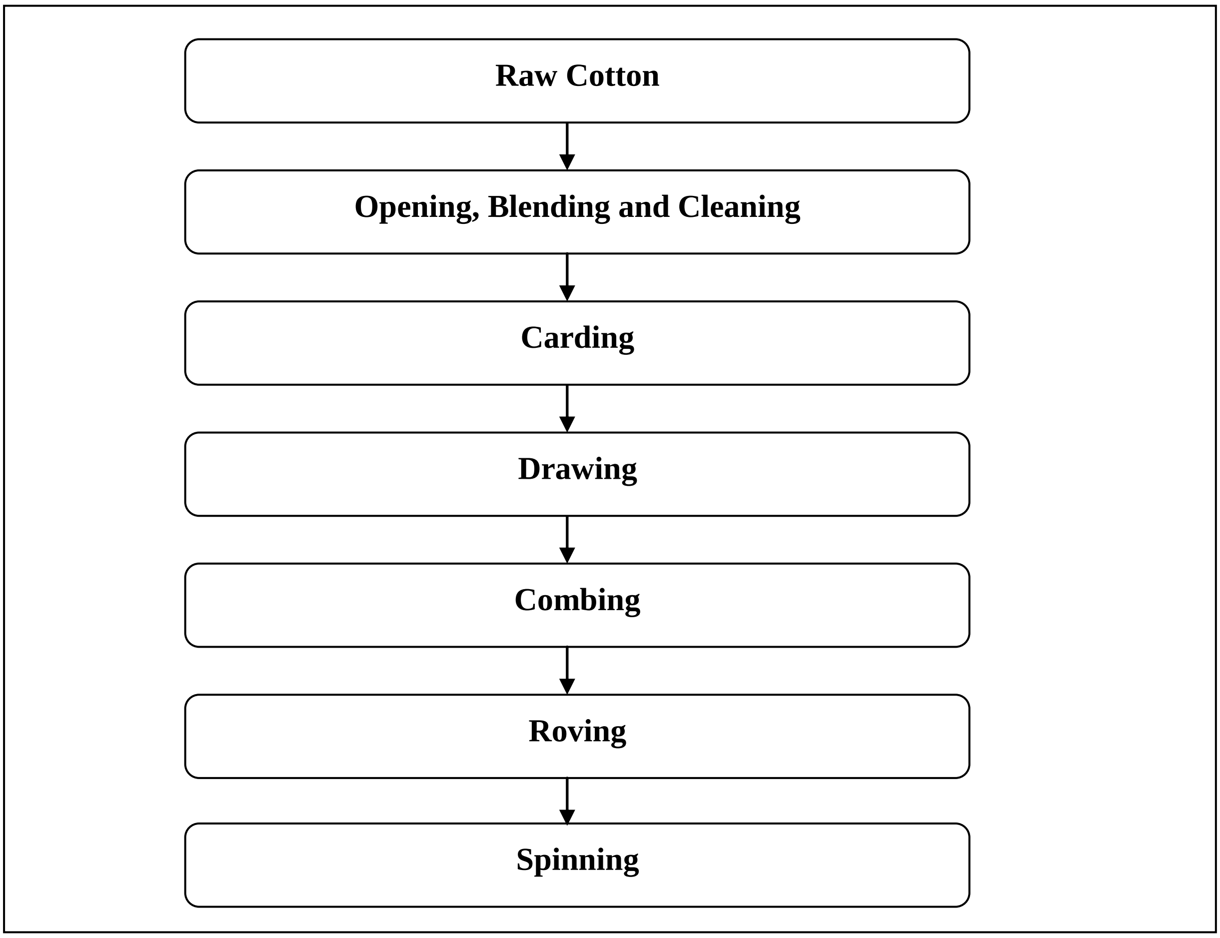

Figure 1: Yarn Formation Processes

From table 2 below, the spinning section went through three main phases. The first one before 2005, where spread-down (as a fiber waste that results from yarn formation stage) manually collected as a critical step toward compliance with national environmental and safety regulations. Second phase between 2005 and 2009, when exhaust fans were installed to collect harmful spread-down in the spinning section as significant step to be ISO 14001 certified textile manufacturer. Third phase after 2009 till August 2015; when advanced auto-detection exhaust fans were installed as a sustainable innovative action to achieve sustainability objectives and fully interact with stakeholder and community concerns. Therefore, the waste spread-down waste quantities collected, recycled and/or sold were increased strongly by 91% and 149% respectively beginning from second and third phases because of the installation of various exhaust fans equipment in the spinning section.

Table 2: Measurement of income sustainability from spinning spread-down waste pollution

	EMA approach / technique	Q		C		R		S	
		Ton	**%**	**A$**	**%**	**A$**	**%**	**A$**	**%**
Phase one before 2005	LCA	97.5	-	53789.6 551.7 per ton	-	30712.5 315 per ton	-	-23077.1 -236.7 per ton	-
Phase two 2005 - 2009	EMS/ ISO 14001	186.5	+91	60966 326.9 per ton	+13	76838 412 per ton	+150	15872 85.1 per ton	+168
Phase three 2009 - 2015	FCA	243	+149	57082.6 234.9 per ton	+6	127575 525 per ton	+315	70492.4 290.1 per ton	+405

Where;

Q → Average annual quantity per ton of spread-down waste collected, recycled or sold.

C → Average annual environmental and social costs incurred including capital and/or maintenance costs plus workers' medical and sick-leave costs due to exposure to spread-down waste pollution.

R → Average annual revenue from recycled and/or sold spread-down waste.

S → Average annual sustainable contribution to profit from preventing/reducing spread-down waste pollution effects.

% → Performance improvement/ diminishment compared against phase one where minimal sustainable techniques were adopted to comply with national regulations.

4. Findings from case study

It is clear that the manufacture in the case study had adopt different EMA tools and techniques to measure cost and revenue sides of the spread-down waste in the spinning section; starting with LCA, ISO 14001 till FCA. Although the negative sustainable contribution to profit in phase one, the manufacture reached the optimum sustainability point in the third phase by achieving the highest annual revenue and sustainable contribution to profit by 315% and 405% subsequently against phase one and by 66% and 344% respectively compared with phase two.

It is notable that the medical and sick-leave costs were significantly high compared with capital and maintenance costs in the first phase. However; medical and sick-leave costs declined dramatically in the second and third phase against capital and maintenance costs. On the other hand, the total costs increased in phase two and three compared with phase one total costs. Although it could be considered as a diminishing sign from sustainability performance point of view, it is justifiable as majority of the costs are due to the advanced detection equipment and expensive spear-parts and maintenance costs. Further, medical and sick-leave costs had been dropped significantly in phase three which cause a decline in total costs compared with phase two total costs. While, installing exhaust fans in phase two caused indirect non-monetary benefit via decreasing in number of sick-leave days caused by exposure to spread-down waste pollution which led to decrease in the cost of paid sick-leaves from one side (monetary benefit), and the medical costs on the other side (monetary benefit).

5. Conclusion

Although the wide variety of sustainability accounting research and its related sustainability accounting techniques/ approaches, there is a limitation in assessing sustainability revenue/income that related to companies' social and environmental activities. The case study presents the individual effort by some manufacture to measure the sustainable revenue side of their adopted sustainability strategies and its implemented techniques to achieve the balanced sustainability position in which they can measure both sides; costs and revenues. There is a need for further studies in the area of business income sustainability to go beyond the current limitations of accounting systems and adopt new and/or wider accounting tools and approaches include both case and field studies in area of environmental and social income sustainability.

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