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# Water management accounting and the wine supply chain: Empirical evidence from Australia



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### ABSTRACT

Sustainable water management in the supply chain is critical to the long term viability of wine producing organisations. Yet despite its potential importance as a link to convert good intentions of managers into sustainable water use, thus far knowledge concerning how environmental management accounting can assist is largely non-existent. Drawing on contingency theory and new institutional sociology a telephone survey was used to investigate the current use of water-related environmental management accounting information (here termed water management accounting) for assessing the long term implications associated with water management in Australian wine supply chains. Organisational size, regulatory pressure and corporate environmental strategy were found to be consistent drivers of water management accounting use. However, other drivers of supply chain-oriented water management accounting differ depending on whether the information considered is monetary or physical. Existence of a certified environmental management system and involvement of managers with industry associations are points of difference. These findings indicate a two-step incentive process for implementation is likely to be the most effective for promoting the collection and use of physical and monetary information for environmental management in the wine industry.

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## 1. Introduction

Extending the notion of sustainable business operations to include both up and downstream supply chain activities and partners is becoming an increasingly prominent topic in the business and accounting literature (Schaltegger & Burritt, 2014). While knowledge about this topic is certainly increasing, tools to support sustainable supply chain management, especially from a water-related accounting perspective, remain relatively new and certainly underdeveloped. Nonetheless, recent years have seen a number of generic environmental studies published, especially in the environmental management accounting (EMA) literature, explicitly concerning this issue and drawing attention to long term thinking. Examples of such work include Lee (2012), Viere, von Enden, and Schaltegger (2011) and Jasch (2011). Yet despite recent efforts there is still much that needs to be discovered. This study seeks to extend knowledge by investigating the association between assessment of long term supply chain water management and use, a critical principle of sustainability (Bruntland, 1987), and of accounting information.

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Access to water and water management issues are among the most important social, economic and environmental concerns currently facing the human race. Thus it is not surprising the business implications associated with what has come to be known as ‘water risk’ and ‘water value’ are being increasingly recognised by the accounting profession. Recent publications from major accounting firms including Ernst and Young and PricewaterhouseCoopers, have all been explicit in urging business to adopt water management and stewardship strategies as a means of minimising areas of potential vulnerability (Ernst & Young, 2012; PricewaterhouseCoopers, 2011).

One industry often thought of as being environmentally benign and that is especially vulnerable to water shortages is the wine industry (Christ & Burritt, 2013b). Indeed, water access and management have been identified as among the main concerns currently facing wine organisations, especially those located in Australia which constitutes the driest inhabited continent on Earth (Mosse, Patti, Christen, & Cavagnaro, 2011).

Water is a vital input for winegrape cultivation and the production of wine, and wine organisations are often exposed directly and through the supply chain to water management issues (Gabzdyllova, Raffensperger, & Castka, 2009). It has been suggested therefore that if the industry is to secure access to the quantity and quality of water required to support current and anticipated future activities, organisations need to engage with supply chain oriented approaches to water management (Russell & Battaglene, 2007). Reducing reliance on water and improving environmental outcomes along the supply chain are important elements required if the Australian wine industry is to realise the end goal of long term sustainability as identified in various industry-based strategic initiatives (Russell & Battaglene, 2007; Waye, 2008). Consequently examination of a long term perspective of water management through the wine industry supply chain offers a potential foundation for making progress towards sustainability for the wine industry and the larger community.

It is interesting that despite the many environmental issues currently facing wine producing organisations, each of these areas have gone largely ignored by the environmental accounting community (Christ & Burritt, 2013b). This study seeks to make inroads into redressing this oversight.

Investigation of the current use of water-related EMA information (hereafter for convenience referred to as water management accounting or WMA) within Australian wineries was implemented through a telephone survey. Informed by contingency theory and new institutional sociology, a research framework was developed that sought to address the following research question: *How do different contingent and institutional factors affect the use of WMA in the context of the frequency with which long term supply chain water management is evaluated by Australian wine organisations?* In considering this area the decision was made to take a long term focus as required by sustainability thinking. The decision to concentrate on the long term contrasts with the majority of publications in the EMA area which overwhelmingly concern short term interests and, in particular, the use of, and potential for, environmental cost accounting (Burritt, Herzig, & Tadeo, 2009). However, the potential for EMA research in which a long term focus is taken has been recognised by numerous academics including Parker (2000) and Burritt, Hahn, and Schaltegger (2002). In addition, from a generic sustainability perspective, Bonn and Fisher (2011, p. 9), argue “addressing sustainability [ ... ] requires ongoing management attention and a continuous need to identify, analyse and create new strategies to promote sustainability in the *long-term*” (emphasis added).

The remainder of this paper is arranged as follows. Section 2 provides a review of literature relevant to the paper. This is followed by Section 3 which considers the theoretical framework developed for the study. Section 4 discusses the methods used and Section 5 provides detailed coverage of the data analysis and results. The paper then closes with a combined discussion and conclusion in Section 6.

## 2. Literature review

### 2.1. Environmental management accounting and supply chain management

Mentzer et al. (2001), p. 4 define the supply chain as “a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer” (emphasis in original). Recent years have seen much interest given to extending this concept via notions such as sustainable supply chain management and ‘greening’ the supply chain (Schaltegger & Burritt, 2014). This interest has also permeated the environmental and sustainability management accounting literature with sustainable supply chain initiatives putting increased pressure on supply chain partners to gather and exchange EMA information for mutual benefit (Burritt, Schaltegger, Bennett, Pohjola, & Csutora, 2011). Indeed, Viere et al. (2011) argue EMA tools are critical to efforts to improve overall supply chain sustainability. The need for appropriate measurement and management of sustainability performance in supply chains has also been recently addressed by Schaltegger & Burritt (2014) who present a framework by which this can be achieved which explicitly incorporates selected EMA tools.

EMA emerged in the 1990s in response to calls for the business sector to exhibit greater responsibility in the management of its relationship with the physical environment (Qian, Burritt, & Monroe, 2011). EMA is primarily concerned with internal management and seeks to extend traditional management accounting via the explicit recognition of environmental information (Christ & Burritt, 2013a). Recent years have seen the EMA literature develop substantially and there is now considerable evidence demonstrating EMA to be an effective tool for managing resource use and minimising both costs and the negative environmental impacts associated with business activities (Schaltegger, Viere, & Zvezdov, 2012; Staniskis & Stasiskiene, 2006; Viere et al., 2011). Given sustainability is a broad notion that extends beyond the confines of any one organisation it is not surprising there have been calls to extend the EMA concept to incorporate a supply chain approach.

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