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Editorial

Accounting for sustainability in production and supply chains☆

Three immediate important questions when considering accounting for sustainability in production and supply chains are, first, the implications of adopting the supply chain as being the entity of focus, second, how do sustainability metrics differ from conventional metrics and third, where does responsibility lie for such an accounting? Each is examined briefly in turn before the papers in this Special Issue are addressed.

1. The supply chain as an entity

One fundamental conventional accounting principle, the entity concept, provides the most challenging issue as supply chains are ill defined, can be long or short depending on the level of vertical integration in an industry, and can change quickly with new B2B-relationships (e.g. Maunders & Burritt, 1991; Seuring & Müller, 2008). The legal form of a corporation, a limited liability company, which can sue and be sued in its own right separately from the individual managers has been overtaken by the advent of the supply chain as an accounting entity. If the concept of current and future economic benefits of a supply chain are taken as the defining notion of an accounting entity's assets the process of accrual accounting becomes much more complex with potential consolidation issues for the supply chain entity across different groups and nations being raised. One major issue is that for a multinational operating its own subsidiaries and associate companies in different countries the different entities are legally bound to collect and provide data to the respective component organisations. Consolidated accounting for supply chains as a tool for decision making has yet to emerge but aggregated data quality across countries will be a primary concern.

2. Sustainability metrics

A second fundamental principle of conventional accounting is using money as a unit of account, the money measurement principle. Hence, the conventional focus is on monetary economic activity based on physical data. This conventional principle behind accounting is also challenged by accounting towards sustainable development, especially in the context of supply chain management. Accounting for sustainability of supply chains not only means that the supply chain rather than a single company is the adopted entity, it also means that the focus is on environmental and social performance as well as economic performance, with the interactions between all types of performance also needed but complex to obtain (Schaltegger, Bennett, & Burritt, 2006). Hence, accounting for sustainability of supply chains requires a broader conception of performance and its units of measurement, including adequate measures to capture environmental and/or social issues. Measurement of sustainability issues relies on tools such as life cycle assessment and environmental and water footprinting which go beyond the conventional set of accounting methods and have little focus on monetary information (e.g. Burritt, Schaltegger, Bennett, Pohjola, & Csutora, 2011; Seuring & Müller, 2008).

3. Responsibility

When a change of focus is mooted in a discipline such as the addition of a new entity concept in accounting, or a broadening of measurement foundations, existing institutional structures need to be revisited to ensure responsibility is

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pinned down. But responsibility is not easily taken up as it is not clear that any one group has the dominant interest when transdisciplinary teamwork is implied, with contributions required from a number of disciplines (Tingey-Holyoak, Pisaniello, & Burritt, 2014; Schaltegger, Beckmann & Hansen, 2013).

In light of the complexities of expanding entity scope, increased performance measurement breadth and new responsibilities varied responses emerge.

Some academics attempt to call for a holistic systems view of supply chain analysis in a sustainability context. Others look at sub-systems within the overall complex setting, for example with a focus on the relationship between economic and environmental aspects of supply chain performance, or on the social aspects when juxtaposed with economic considerations (Burritt & Schaltegger, 2010). Both views are possible and needed – the broad picture to capture all aspects of sustainability and the focus on the most relevant issues to create effective solutions. In addition, a combination of inside-out and outside-in approaches is needed to provide a logical foundation for the topic of this *British Accounting Review Special Issue* on 'Accounting for sustainability of production and supply chains'. Papers in this *Special Issue* address: the complexity of an accounting encompassing sustainability and supply chains; inside-out issues associated with linking environmental and economic performance in the context of sustainable supply chains; and twin-track accountabilities at boundaries of social and economic reporting on supply chains.

4. Sustainability performance

Burritt and Schaltegger's (2014) paper reviews reasons for the growing importance of the development and full embedding of accounting towards sustainability for production and supply chains. At the forefront are globalisation of international trade and international business. Associated with this increasing trend is trade between developed, emerging and developing countries and accounting for related environmental and social performance aspects of business which need to be taken into account by managers. The paper grapples with the notion of a supply chain entity by considering the scope of accounting and how it adjusts for sustainability considerations through the inclusion of upstream, focal company and downstream activities in the supply chain entity by assuming inter-, extra- and intra-organisational contexts. The paper argues that accounting for supply chains needs to: move from conventional to sustainability accounting; de-stress monetary performance and move to sustainability performance which includes the interaction performance effect between environmental, social and economic considerations; reconceptualize accounting away from a manufacturing corporate focus to the notion of supply chain as an entity; and build relevance within a framework of supply chain management and networking. Suggested available tools for encouraging accounting for sustainability in supply chains include: environmental accounting; environmental management accounting; activity based costing; material flow cost accounting; carbon accounting and eco-control systems; water management accounting and supply chain value added; and sustainability balanced scorecard. A fundamental requirement is the need to encourage managers to think longer term and be informed by relevant information.

5. Environmental and economic performance –decision making

Chan, Wang, and Ruffoni (2014) take the inside-out track to accounting for production and supply chains. Their research examines environmental management accounting and life cycle assessment through development of a mathematical optimisation model and a case study of green electronic products. Their model is suggested as being easy to use and inexpensive, based on algorithms locked into spreadsheets. It is concerned about periodic assessment of physical and monetary data for future investment in green product design and development processes, one of the main concerns of environmental management accounting. The model proposed uses a screening device to reduce the options needed for full life cycle assessment, treated as an environmental management accounting tool, and weighs the environmental impacts at different points of the life cycle to assess sensitivity of environmental and monetary performance. The argument is that environmental costs are locked-in to green products at an early stage. The model is said to simplify life cycle assessment thereby reducing lead times for new green products and boosting competitive advantage for industries where product life cycles are getting shorter and shorter. There is no strong focus on considering detail of the entity 'supply chain' concept as this is simply an assumed position in the paper. Likewise responsibility is not the direct focus but the inference is that research and development sections of organisations will be the responsible parties for monetary and environmental productivity gains. The authors develop a screening method using fuzzy logic and an Analytical Hierarchical Process in a supply (value) chain setting to optimise the green design and development time to market. Screening reduces unviable options and development time. The model has yet to be developed into a practical tool for commercialisation, and is partial in terms of its encompassing of aspects of sustainability. However, from an accounting perspective the paper achieves several targets. First it shows how to reduce the cost and speed the development of full Life Cycle Assessment/Costing of green design options. Second, it combines environmental monetary and physical performance measures as well as tangible and intangible aspects of performance which are a focus of environmental management accounting. Third, it provides a fuzzy optimisation model for greater effectiveness of green supply chains. Finally, it facilitates environmental risk management albeit through a subjective weighting process.