



Examining sustainability performance in the supply chain: The case of the Greek dairy sector



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ABSTRACT

This paper evaluates the sustainability performance of the Greek dairy chain and the performance of its individual members by using key indicators in relation to efficiency, flexibility, responsiveness and product quality. We assessed the importance of these indicators based on the relevant perceptions of key members of this chain. A structured questionnaire was developed where nineteen sustainability-related issues were examined. Two hundred and fifty three members of the Greek dairy supply chain responded including breeders, manufacturers, wholesalers, retailers and catering companies. Our findings illustrate the immediate need for improvement in many key sustainability performance indicators. They also show the critical role of large dairy manufacturers who are the “sustainability performance champions” in this chain and are the driving force for the implementation of many sustainability initiatives.

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1. Introduction

According to Karmarkar (1996), business and management researchers tend to only examine their principal domain/function, such as marketing, operations, or finance and tend to ignore research interdependencies and synergies between their domain/function and others. However, to examine contemporary business and management issues such as business sustainability performance, a cross domain approach is required where separate domains are cross-examined in an integrated and holistic fashion (Chabowski, Mena, & Gonzalez-Padron, 2011).

In this work, we examine the integration between the marketing and operations domains. These domains are considered by Karmarkar (1996, p.125) to be a “natural pair” [of functions] due to the fact that operations deal with the production-supply frontier and marketing examines the consumer preference–demand frontier. Such recognition led Malhotra and Sharma (2002) to present a “marketing operations integration framework” noting various integration opportunities between the marketing and operation domains. One of these opportunities relates to firm/organisational performance where they recommend

further research in general and with a focus on supply chain issues in particular (Malhotra & Sharma, 2002).

Our paper addresses their recommendation by examining the Greek dairy supply chain (SC) which encompasses various industrial, business and end-to-end intermediaries such as breeders, manufacturers, wholesalers, retailers and catering firms. In general, supply chain management (SCM) is at the confluence of many disciplines and it is placed at the core interface between marketing, logistics and operations domains. This view is supported by most marketing, logistics, operations and SCM scholars (see Boyer & Hult, 2005; Ellinger, 2000; Jüttner et al., 2010; Lambert & Cooper, 2000; Mentzer et al., 2001). To this end, SCM is defined as the “integration of key business processes from end user through original suppliers that provide products, services and information that add value for customers and other stakeholders” (Lambert & Cooper, 2000, p.66). In relation to the firm/organisational performance noted earlier, Mentzer et al. (2001, p.18) stress that SCM involves “the systematic strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purpose of improving long-term performance of the individual companies and the supply chain as a whole”.

Based on the above, it is evident that there is a growing need for closer co-ordination between operations and marketing domains along the SC where improving individual firm and chain performance is extremely important. In addition, over the past few years, sustainability performance has emerged as an important factor that is increasingly influencing stakeholders' evaluations of how firms' address market demand through their operations processes (see for example, Keeble,

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Topiol, & Berkeley, 2003). Despite growing recognition of the SC's role in sustainability performance, it has been noted (Pagell & Wu, 2009) that research on the development of sustainability in SCs (with some notable exceptions, e.g. Zhu, Sarkis, & Lai, 2008) has so far tended to focus on studies of a single domain (or activity or echelon) rather than looking at the entire chain (Rao & Holt, 2005). Furthermore, it has been argued that in practice a majority of companies have focused mainly on their own sustainability performance and that only a few feel responsible also for their fellow chain members' sustainability activities (Gerbens-Leenes, Moll, & Uiterkamp, 2003; Hall, 2000).

Three key propositions emerge from the arguments put forward so far. One, that interdisciplinary research, bridging the marketing and operations domains, is crucial for advancing (and shaping) our understanding of contemporary business practice. Two, that increasingly integral to such advances are considerations relating to sustainability performance. Three, that SCM provides the conduit for examining the integration of marketing and operations domains by virtue of its advocacy and emphasis on the need to extend integration between processes from a single company (inter-firm level) to various companies (intra-firm level) within the same SC to achieve a *sustainable* (long-term) competitive advantage (see Ellinger, 2000).

Despite these observations, there has been a distinct lack of empirical analysis in the extant literature based on chain-wide sustainability performance measurement, particularly in food chains which are under increasing levels of scrutiny about their sustainability credentials. Our work aims to shed light on this shortcoming by examining firms collaborating with other firms of the same SC. In this paper, we cross-analyse the performance of various firms in the Greek dairy SC aiming to ascertain whether these firms directly or indirectly affect the performance of other SC members and illustrate the overall supply chain performance (SCP). More importantly, we aim to determine whether any of these firms can actually contribute to heightened, *integrated* (*end-to-end chain*), *sustainable* performance in this food chain. To achieve this, we use sustainable SCP measurement indicators as identified in the extant literature for relevant SC operations at firm level.

Thus, the objective of this paper is to fill the aforementioned gap in the literature, by 'bringing together' and integrating in our empirical work the sustainability performance of various operational domains (functions) at firm/intermediary level aiming to illustrate their impact on the sustainability performance of the whole SC. This approach is supported by the literature which suggests that SCP measurement should include as many chain members as possible (Lai, Ngai, & Cheng, 2002) and should assess the performance of the SC as a whole as well as the performance of each organisation separately (Gunasekaran, Patel, & Mc Gaughey, 2004; Van der Vorst, 2006). The literature also suggests that chain members should have a common set of performance indicators that will help them to compare their performance within the chain and to gauge the end performance of the chain (Aramyan, Lansink, van der Vorst, & van Kooten, 2007).

Finally, we investigate whether there are significant differences in the SC sustainability performance between various members of the Greek dairy chain and we examine whether they over-perform or under-perform. To conclude, the study aims to answer the following research questions:

- > Are there any major differences in the SC sustainability performance between the key members of the Greek dairy chain?
- > Against which sustainability performance indicators do these members over-perform or underperform and what is the impact of their performance on the rest of the chain?
- > How does the Greek dairy chain perform in terms of the major sustainability indicators?

The rest of the paper is set out as follows: the next section discusses the concepts of sustainability and performance measurement in food SCs and introduces the key performance indicators used in our empirical work. A subsequent section describes the Greek dairy sector on

which our empirical work is focused and analyses the methodology employed. The key results are then presented, followed by a separate section discussing these results in detail before the paper concludes.

2. Literature review

Food SCs are experiencing increasing consumer demands on food quality and sustainability (Van der Vorst, Tromp, & van der Zee, 2009). Many different stakeholders are becoming increasingly vocal in their demands for sustainable performance, and these demands determine how firms align their operations and marketing activities with the principles of sustainable development (Keeble et al., 2003). Both consumers and buying firms are now much more interested in the origin of products, and governments and industry policy bodies are demanding sustainability performance reporting (Keeble et al., 2003; Kolk, 2004).

2.1. Sustainability and food supply chains

Food items tend to be produced in a complex system made up of many processes connected in SCs (Gerbens-Leenes et al., 2003). The operations and marketing functions of the SC members play a critical role in developing management systems and implementing decisions that affect sustainability performance (Klassen, 1993; in Angell & Klassen, 1999). Green marketing is greatly influenced by the sustainability credentials of most SC members' production capabilities (Sarkis, 2001). Customer concerns about environmental and social responsibility must nowadays be properly integrated with other dimensions of value when managing stakeholders (Angell & Klassen, 1999). Whilst process design and technology typically determine waste generated and resources and energy consumed, stakeholder relationships (e.g. supplier partnerships), logistics, and customer relationships magnify or attenuate sustainability performance and risks related to production (Angell & Klassen, 1999).

Carter and Rogers (2008) contend that when environmental and social aspects of sustainability that can extend beyond a firm's boundary, are coupled with economic objectives into a deliberate long-term strategy, the inclusion of SC activities in a firm's sustainability can create a pervasive and less imitable set of processes; it can also create potential bases for competitive advantage for them and associated chain members (Carter & Dresner, 2001; Carter & Rogers, 2008). To this end, Carter and Rogers (2008) defined sustainable SCM as:

"the strategic, transparent integration and achievement of an organisation's social, environmental, and economic goals in the systemic coordination of key interorganisational business processes for improving the long term economic performance of the individual company and its supply chains".

2.2. Sustainability performance indicators for dairy food chains

Angell and Klassen (1999) propose that when measurement (and incentive) systems include sustainability considerations, sustainability performance improves, without sacrificing other aspects of operating performance. Whilst the literature has recently focused on analysing sustainability issues around the triple-bottom-line's economic, environmental and social axes, it is evident that differing sustainability issues are faced in different industries (Maloni & Brown, 2006) and by different companies in the same business sector (Gerbens-Leenes et al., 2003) and thus by different SCs. Retailers in the food industry, for example, must be prepared to demonstrate responsible sustainable practices in addition to offering more environmentally friendly products (Maloni & Brown, 2006).

2.2.1. Indicator framework

Any judgement or appraisal on sustainability performance would be difficult without context and comparison (Kolk, 2004). As such, differences in sustainability performance outcomes need to be evaluated in

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