

Aligning the sustainable supply chain to green marketing needs: A case study



Clare Brindley*, Lynn Oxborrow¹

Nottingham Business School, Burton Street, Nottingham, England NG1 4BU, United Kingdom

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ABSTRACT

The research explores the challenges facing organisations in aligning sustainable procurement requirements and marketing needs and the attendant shifts in supply chain management practices. Whilst external influences are readily understood (e.g. regulation and customer demand), less is understood about the implications for suppliers trying to meet sustainable procurement requirements and the organisational challenges of aligning marketing with sustainable supply chain management. An exploratory case study of a UK University catering department has been undertaken, to explore the strategies, processes and relationships associated with synthesising sustainable supply chain and green marketing needs. The empirical findings illustrate the divergence between organisational perspectives on sustainability and procuring sustainable products with marketing demands. Thus, the findings extend the theoretical discussion on sustainable supply chains by providing empirical data based on real-life implementation and from this an emergent aligned supply chain model is proposed, which confirms two drivers for alignment, 'lean and resource efficient' and 'local and seasonal' – contingent on market demand. The findings emphasise the benefits of a reverse information flow, the importance of intermediaries, and relationships in its fulfilment, while indicating the resurgence of a supply 'push' of sustainable products into core markets. Future research directions are also posited.

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1. Introduction

Sustainability initiatives are transforming markets and distribution channels. The drivers for sustainability should not be seen solely as emanating from organisations as there appears to have been an attendant shift in consumer attitudes with regard to green products, services and processes. The inter-play between consumer attitudes, supply chains and organisational relationships is evidenced in both product and service markets. Although there are now an increasing number of conceptual studies on the link between sustainability and marketing (see Sharma, Iyer, Mehrotra, & Krishnan, 2010), the majority of academic papers have focused on manufacturing and have not used primary research. The greening of supply chains in order to meet corporate missions and/or establish a competitive edge is not well understood, in particular the challenges facing the integration of marketing 'pull' factors and operational 'push factors.'

A change in organisations' core values has resonated in the development of strategic objectives that reflect the sustainability agendas increasingly evident in markets. This has resulted in attendant changes in operation and procurement practices. A case study of a university that focuses on sustainable procurement is timely because of the lack

of empirical data on the public sector (Oruezabala & Rico, 2012). This study will investigate the sustainable procurement of food products of a UK University and the attendant shifts in supply chain management practices as it attempts to meet its goal of becoming a market leader in the sustainable campus rankings. As Oruezabala and Rico (2012: 574) found in the hospital sector, universities are "embedded in a network of stakeholders" – government, parents, students, corporate clients, regional labour markets, academic and administrative staff. One of the plethoras of university league tables in the UK is the People and Planet Green League, perhaps not surprisingly as it has been argued that universities have the power and thus, a key role in pushing the green agenda (Rovins, 2005). Hence, the case study organisation's wish to enhance its sustainable campus initiatives, which include the marketing of the sustainable food concept. Our study, by focusing on one particular aspect of the sustainability agenda, food procurement, is able to explore the implications for internal and external processes; the modifications to the supply chain and the key actors/stakeholders' perceptions of what constitutes a sustainable supply chain and how it meets core strategic values. The research objectives were based: on exploring the impact of sustainable initiatives on supply chain members (the 'pull' factors), the identification of the key supply chain drivers and the key marketplace drivers (i.e. the 'push' factors), the implications for the supply chain both internally with multiple stakeholders and externally and the management of these relationships. The paper begins with a review of the extant literature, drawing from operations, marketing and sustainability literatures in order to contextualise the study. This is followed by an

* Corresponding author. Tel.: +44 115 848 2758; fax: +44 115 848 4707.

E-mail addresses: clare.brindley@ntu.ac.uk (C. Brindley), lynn.oxborrow@ntu.ac.uk (L. Oxborrow).

¹ Tel.: +44 115 886048; fax: +44 115 848 4707.

explanation of the methodological approach and the findings from the case study. The discussion then ensues from which a number of key propositions are drawn and directions for future research are outlined to address the lacuna in applied research.

1.1. Literature review

The paper posits that attempting to arrive at a successful sustainability strategic outcome is now a multi-disciplinary task, which encompasses themes of relationships, networks, channels and partnerships. The notion of the coming together of differing disciplinary foundations is supported by Seuring and Muller (2008b) and Preuss (2009). However, Sharma et al. (2010: 330) argue that previous research “has been confined to disciplinary silos” or what Srivastava (2007: 68) calls “compartmentalised.” Indeed, Prakash (2002) suggests that organisations can be greener at the firm level, through adding value and using management systems, or at the product level, by designing new products or processes, while paying no attention to the supply chain. However, a substantial body of work is emerging that identifies the persistent need for greater integration between marketing and supply chain functions generically (Fisher, 1997; Green, Whitten, & Inman, 2012) and Green Marketing (GM) and Sustainable Supply Chain Management (SSCM) specifically (Bhat, 1993; Chan, He, William, & Wang, 2012; Liu, Kastriratne, & Moizer, 2012; Sharma et al., 2010; Vachon & Klassen, 2008). Broadly defined, green marketing is referred to as “integrating environmental issues into strategic marketing processes” (Chan et al., 2012: 558). More specifically, Liu et al. (2012: 582) refer to three distinct green marketing approaches: satisfying green consumers with green products; adapting the marketing mix to include reference to embedded environmental efficiencies; or achieving competitive advantage by adopting green values and benefits by understanding the market, managing demand for products that are sustainable in use and after use, and adopting processes that address environmental priorities. Meanwhile, Sharma et al. (2010) set out goals of a green marketing framework, in summary to reduce both *surplus* and *reverse* supply — a strategy that requires a combination of market intelligence, demand management, product development and improved supply chain processes.

Srivastava's (2007: 54–55) definition of Green Supply Chain Management (GSCM) is sufficiently broad to encompass this disciplinary milieu: “Integrating environmental thinking into supply-chain management...” and includes sourcing, process and delivery to the final consumer and thus integrates a marketing channel perspective. Liu et al. (2012) propose a broader perspective of the sustainable supply chain, adopting Carter and Rogers (2008: 368) definition that Sustainable Supply Chain Management (SSCM) is “the strategic, transparent integration and achievement of an organisation's environmental, social, and economic goals in the systematic co-ordination of key inter-organisational business processes for improving the long-term economic performance of the individual company and its chains.” In spite of these multi-disciplinary perspectives, Chan et al. (2012: 558) describe the interface between GSCM and green marketing as “unclear”, while stating that the two concepts “cannot be considered separately.”

Previous work on SSCM has largely been exploratory and there is little agreement on what are the key drivers to instituting a sustainable, or even green, supply chain. This may be due to the particular disciplinary basis of the studies. Seuring and Muller's (2008a) study on sustainable supply chain management identified the relevance of market forces as the key driver. They also suggest that supplier development may result in more win–win situations and call for research to illustrate how this is achieved. Similarly, Sharma et al. (2010) identify customer buying power as an effective pressure to become more sustainable, although they argue that pressure for sustainability mainly emanates from government regulations. Jones, Comfort, and Hillier's (2008) reflections of the Sustainable Development Commission review also look at the role of the state and both Sharma et al. (2010) and Preuss (2009) cite powerful buyers (retail or public sector) as major influences, while Chan

et al. (2012) suggest that lack of knowledge of green purchasing requirements is an obstacle in B2B markets.

An evaluation of the literature on SSCM and the drivers of change in supply chains resonate with other past changes, such as the impact of ICTs (Ritchie & Brindley, 2005). Regulatory pressures, and the sometimes mistaken view that consumers are demanding better environmentally driven products and services, has led to organisational adoption especially espoused through corporate value statements. In contrast, Ginsberg and Bloom (2004) highlight the inadequacy of green product strategies, linking green products and services to market failure due to the perception of being overly expensive but otherwise inferior. Whilst Sharma et al. (2010) advocate marketing and purchasing functions working together, emphasising the need for senior management buy-in, for Krause, Vachon, and Klassen (2009) purchasing strategy is key to achieving sustainability. A supportive organisational culture and inter-functional co-operation is supported by Seuring and Muller (2008a). They argue for a wider set of performance objectives that include more than economic measures, although, as Markley and Davis (2007) outline, the incentive is competitive advantage through the creation of a sustainable supply chain. Nyaga, Whipple, and Lynch (2010) and Chakraborty (2010) focus on relationships and how they operate as key performance measures. However, how these performance criteria work needs “further research which will provide deeper insights into the real world implementation aspects of GSCM” (Chakraborty, 2010: 18) and also to theorise on how the topics inter-relate (Lee & Lam, 2012).

The use of generic supply chain concepts as a mechanism to achieve SSCM extends to several practices and approaches. Liu et al. (2012) refer to information technology and sharing, management systems, transparency and general process re-engineering; Chan et al. (2012) discuss lean, distribution systems and product development and Sharma et al. (2010) propose waste minimisation and order fulfilment strategies. Specifically in terms of food, Sharma et al. (2010) argue that Build-To-Order (BTO), to reduce unsustainable surplus supply, requires changes in internal processes, with information sharing and local supply becoming key criteria. Soler, Bergstrom, and Shanahan's (2010) study in the Swedish food market, found that the more distant the supplier was from the end consumer the greater the gap between information and practice, although the issue of adding value by using local suppliers is often in conflict with prevailing legislation and bureaucracy. Certainly it would appear that the local supply agenda is one way in which bureaucratic systems act as barriers to sustainable procurement (Baden, Harwood, & Woodward, 2011; Preuss, 2009; Thomson & Jackson, 2007). While Chan et al. (2012) suggest that reducing waste requires input from marketing to produce consistent, stable demand; however, where there is uncertainty, for example in Lee's (2002) example of Subway and its supplier market exchange system, different solutions are needed. Solutions drawn from generic supply chain management practice, such as close proximity supplier hubs, supplier representation on site and shared rollover or new product development plans help suppliers to keep abreast of market information and therefore improve their responsiveness to market needs. This avoids over supply; whilst pooling inventory and internet communications help buyers to act to avoid supply disruption, thus satisfying marketing needs. Effective response to both supply and demand fluctuations suggests that the postponement of product differentiation should occur as far downstream as possible, while information decoupling should penetrate as far upstream as possible to reduce noise in the system (Mason-Jones, Naylor, & Towill, 2000). Ismail and Sharifi (2006) and van Hoek and Chapman (2007) advocate that the design of these supply chain elements should be concurrent with product and process design, implying that the introduction of sustainable supply chain objectives needs to be an integrated and planned process, not one bolted onto existing supply chain practice. This concurs with the starting premise of the paper that better alignment is necessary between marketing and supply chain management generically and green marketing and SSCM specifically (Liu et al., 2012), suggesting the need for a more inter-functional and strategic response.

The exchange of information with suppliers is often regarded as a technological challenge, rather than one of inter-organisational relationships (Crandall, Crandall, & Chen, 2010: 402), both approaches are key to forms of marketing and supply chain integration (Liu et al., 2012). However, Delmas and Montiel (2009) proposed that suppliers are more likely to adopt standards/mandates if they have good relationships with the customers who request improvements, while seeking to improve their own green credentials. Although, it would appear that some network structures, roles and processes can help to smooth the flows of information and product. Sharifi, Ismail, and Reid (2006) stress that in effective networks, value appropriation, power and relationships must be resolved, advocating that supplier networks are designed, rather than emerging spontaneously, according to the prevailing operational needs, interests and objectives of the various participants (Holmlund & Strandvik, 1999). While these values may transfer admirably to the concept of the sustainable supply chain it is apparent that cost is almost always considered to be a constraint – consistent with Ginsberg and Bloom's (2004) interpretation of green marketing – although 'price' is disregarded in Liu et al.'s (2012) green marketing mix. Indeed Cousins, Lamming, Lawson, and Squire (2008) suggest that, in terms of competitive priorities, environmental or ethical considerations can be an order qualifier in both efficient and responsive supply chains, and order winners, decisive selection criteria, are most likely to remain as cost, quality or flexibility (Hill, 1993) respectively. Within SSCM the cost imperative should be reflected through lean thinking or waste minimisation, rather than exploitative cost reduction (Chan et al., 2012).

Capability, an organisation's managerial capacity to make use of its competences (or combined resources) is a key aspect of integration of members of the supply chain, buyer-supplier relationships and the adaptability required for responsive supply: a combination of capacities and capabilities which meet customer requirements (Johnsen, Johnsen, & Arab, 2006). Ford talks of developing the "capability to compete" (cited in Turnbull, Ford, & Cunningham, 1996: 13) by enhancing skills relating to the characteristics of the buyer-supplier interaction, rather than the technical or commercial competencies to merely deliver the product or service. For buyers the resource implications of capability enhancement and relationship management point towards supplier rationalisation favouring a streamlined, simplified network of suppliers,

selected for operational capabilities and their commitment to shared goals and strategic objectives, thus adding value (Kannan & Tan, 2006).

From the review of sustainable supply chain and generic supply chain literature a conceptual model has been developed which illustrates the anticipated stages of development of a sustainable sourcing and supply chain system. The Model, shown in Fig. 1, starts from the premise that different markets require alignment to different supply chains, apparent in generic supply chain literature (Fisher, 1997; Lee, 2002) and more recently evident as a key component of SSCM. Fig. 1 shows the dual drivers of market pressure or compliance to policy or voluntary codes (Sharma et al., 2010) as differentiators of market needs. These in turn shape supply chain characteristics, in terms of internal practices and operations, such as demand management, product strategies and hedging against uncertainty (after Ismail & Sharifi, 2006; Sharma et al., 2010) and the procurement processes, supplier capability development and relationships that comprise external networks. The subsequent revision of sourcing policy (after Preuss, 2009) is essential to establishing the networks and information exchange necessary to implement sustainable upstream supply (Kannan & Tan, 2006) and supplier capability, willingness to share information, change practices and manage their own upstream supply base (Johnsen et al., 2006) facilitates supply chain alignment with market requirements. This promotes value adding activity (Chakraborty, 2010; Fisher, 1997), and competitive advantage, even where demand or supply is subject to fluctuation (Lee, 2002).

Whereas the theoretical propositions of GM and SSCM appear to be converging and indeed advocating common agendas to meet sustainability requirements (see Liu et al., 2012), operationalising these agendas would appear challenging. The lack of exemplars in the sector advocates the need for negotiation, sharing of experiences and proactive-thinking-ahead (Rovins, 2005) but in 2011, only 34% of the UK higher education sector had a publicly available food procurement policy (Williams, 2011). This data suggests that Rovins (2005) call for universities to be at the vanguard of the sustainability agenda is premature. As Fig. 1, illustrates, organisations could have a range of stakeholder needs to serve. For example, universities have a range of target markets: on the one hand, sustainability advocates represented by corporate clients and parents of students; and on the other, staff and students who want cheap and available food.

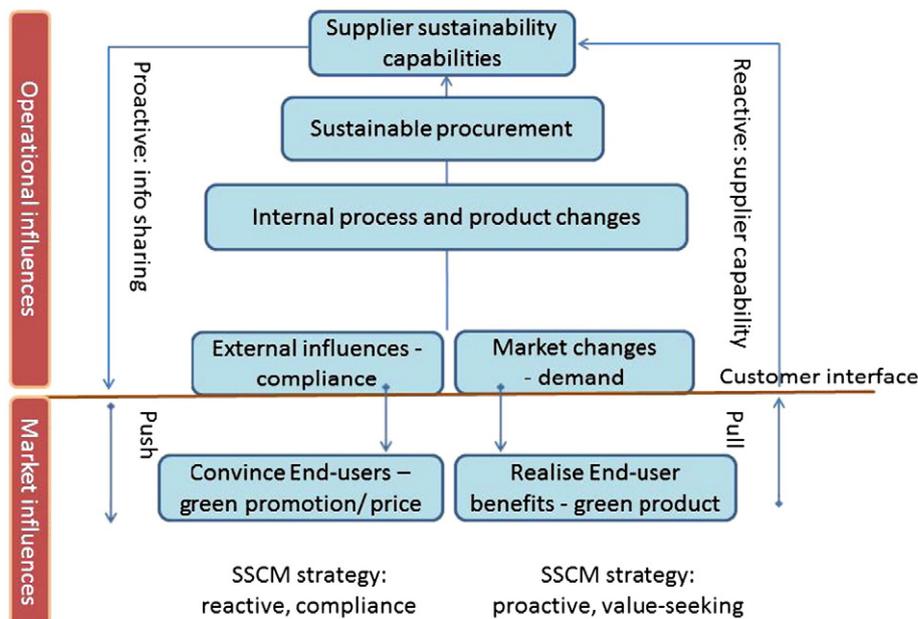


Fig. 1. Conceptual model: Adoption of sustainable supply.

It was opportune that the researchers were working in a UK university that was grappling with the process of aligning market demands with procurement and supply chain management, as it sought to enhance its sustainability credentials (a strategic goal) and achieve accreditation for its catering efforts by winning coveted Soil Association certification and a higher sustainable campus award (tactical outcomes). We were therefore in a position to engage, through a case study approach, with the challenges of operationalising a sustainable supply chain aligned to the University's strategic goals and marketing drivers.

2. Approach

The broad paradigm involved was essentially inductive, seeking to *induct* the concepts, frameworks and models on the descriptive evidence collected rather than normative prescriptions derived from existing theory. The interest in the 'rich picture' of the change agents, process, organisational strategies and relationships suggested that a case study approach would capture these elements most effectively. Ellram (1996) argued that case methodologies provide depth and richness and Eisenhardt (1989: 534) contended that the case study "is a research study which focuses on understanding the dynamics present within single settings." Whilst, acknowledging the potential weaknesses of the case model, the strengths of the case study approach lent themselves to the research objectives being reflexive (Piekkari, Nell, & Ghauri, 2010) and answering Peck's (2005) call for alternatives to positivist supply chain methodologies.

What Jankowicz (2000) refers to as the "unit of analysis" is, in this study, the catering function of a UK University, which has over 24,000 students and is based across 3 campuses. The University also has a Conference Centre that operates as a separate cost centre; although food is prepared by the same kitchen and catering staff. Thus, the Conference Centre catering forms part of the unit of analysis. The mission of the catering function is to provide high quality, sustainable food for all of its diverse customer groups. The bounded context (Miles & Huberman, 1994) in this case relates to the parameters that influence the operation of supply chains i.e. the context, organisational strategies (in terms of relationships – internal and external) and supply chain member attitudes and behaviour. Utilising Scappens (1990) categorisation the case study is "illustrative", in that the purpose is to explore new and innovative practices and after Smith and Dainty's (1991) paradigm, it is through closeness to the case that patterns are identified and analysis and theory building occurs.

The data collection focused on the conceptual framework (Fig. 1) – broadly the compliance and value seeking agendas, through the drivers of sustainability and their impact on supply chain members (the 'pull' factors) and the key marketplace drivers (i.e. the 'push' factors) and the implications of these both internally with multiple stakeholders and externally and how such relationships are managed. The use of a diverse literature base, drawing together concepts from sustainability, marketing and supply chains, supports validity and generalisability (Eisenhardt, 1989), while reliability is supported by the use of case study and interview protocols and a case study database (Ellram, 1996; Miles & Huberman, 1994) comprising interview transcripts, printed material provided by participants, web page information and other internal and external documentation. The case study followed a staged structure as recommended by Yin (1994), Ellram (1996) and Miles and Huberman (1994), sequentially analysing the organisational background; sustainability issues facing the University, customers and its suppliers; changes in markets, distribution channels and the supply chain; information systems, networks and process changes; and relationship management both internally and externally being undertaken by the University. The case study adopted a longitudinal process and followed the case through 2 years of operation from 2010 to 2012.

Initially, a content analysis of documentation (Jones, 2012; Robson, 2011) was undertaken, looking for references to sustainable

procurement, marketing, strategic goals and timeframes. The documentation encompassed external material from UK Government and EU procurement guidelines and internal material, including the University's Sustainable Food Procurement Policy and the University's Strategic Plan. The latter identified the brand values the University wished to promote. This stage of analysis was followed by accessing the University's supplier lists over a 2 year period (2009–10 and 2010–11), noting changes to the suppliers of each product, the volume of products they supplied, the catering spend with these suppliers and any other changes in the lists. The websites of those suppliers on the lists were viewed and notes made of their corporate objectives with regards to sustainability. Observations by the researchers took place in the kitchens of the main campus to look at stocks, menu preparations and directives. Evidence was recorded using photographs and notes. Three focus groups were undertaken with the aim to discuss current policy (both internally and externally driven) and changes being implemented to tendering procedures and contractual arrangements, supplier management, differing customer needs, food provision in the various catering outlets, product (menu) design and demand management, and marketing of the sustainable food concept. As the participants were moving through the process in real time, although the discussion adopted the same precepts, each focus group illuminated more fully the differing areas. The first focus group involved representatives from the University's catering and procurement teams and the University environment team. Invites to the focus group were issued to those whose job titles were broadly engaged in the catering activity, including catering staff, purchasing, marketing, strategic management and customers (Conference Centre and academic staff). The University's environment team's area of responsibility is to implement the Sustainable Campus initiative and seek continual improvement. The second focus group involved the same eight University staff and a senior manager from a nearby hospital who had achieved accreditation through introducing a sustainable catering supply chain. The third focus group involved the same University staff and 12 present and prospective suppliers to discuss the University's expectations of its suppliers in order to meet its sustainability goals. The focus groups took place over a period of 18 months. After each focus group, the participants were emailed within 24 h the summary notes drawn from the discussion and they were invited to amend/add to the notes by return email. The revised notes were then re-circulated to participants – circulating in this manner confirmed reliability. The focus groups were followed by semi-structured one hour interviews with the Executive Chef, the University's head of procurement and the food buyer. In addition, two local food suppliers (of fish and meat) were selected for their availability and willingness to be interviewed. The interviews were undertaken at the interviewees' place of work and the responses were recorded. The aim of the interviews was to uncover the interviewees' experiences of being involved in the supply chain as it had evolved over the 2 year period. Thus, the interview protocol covered: aspects of relationship and information management, upstream supply, obstacles and challenges, the suppliers' experiences of supplying sustainable products to the University and other customers, how they had felt they had been involved in marketing and their own perceptions of sustainability.

The focus groups, interviews and documentary evidence were analysed using Template Analysis (King, 2004). This analysis engaged a coding 'template' which identified themes relevant to the sustainable supply chain focus of the study in university catering. These initial themes were then compared to the sustainable supply chain literature to generate reliability (Miles & Huberman, 1994). Based on the focus group and interview materials further codes were then developed inductively as themes such as demand management, postponement and product strategies and network design triggered a more extensive review of generic supply chain literature. This analysis enabled us to navigate through the plethora of case material. The coding table that was developed summarised concepts appearing in the sustainable/green supply chain literature, concepts of generic supply chain literature and

evidence from the various data sources relating to the catering system generally and the SME suppliers specifically. Examples of the coding exercise are shown in Table 1. The principal codes were identified as: market alignment, demand management, information exchange,

network design, supplier capability, postponement and product strategies, hedging against supply instability, procurement and performance objectives. These were then set in the context of overall drivers of change and the key issue of aligning marketing with the sustainable supply chain.

Table 1
Literature codes applied to case study findings.

Supplier examples	University examples	Sustainable supply chain management concept	Generic supply chain management concept	Code
Meat supplier offers limited range of core product which can be modified on request. Demand fluctuation and quality expectation for conference catering influences supply chain requirements.	Market-led changes influence introduction of SSCM, but this was not effectively aligned to all market segments at the outset.	SSCM requires integrated marketing to enhance competitiveness and better coordination of SCM to ensure effective delivery and real competitive and green impact.	Fisher (1997) argues for alignment between demand and supply, with efficient and responsive supply chains for innovative and functional products respectively.	4.1 Market Alignment Demand management
Fish, meat and vegetable suppliers all provide enhanced information from product source. Cooked meats are 'known' to be local, no stated source. Whole fish are supplied tagged as MSC compliant, so system integration is not a requirement.	Sourcing through wholesale suppliers facilitates exchange of information – 'what is available, in season, best quality, sustainably sourced?'	Transparency upstream is essential – to establishing sustainability, enabling green products/processes to be effectively integrated into final product and endorsing green marketing.	Supply network design should be planned to facilitate exchange of information and other process improvements aligned to the product and market requirements (Sharifi et al., 2006).	Information exchange Network design
Sandwich supplier systems not initially aligned to market needs. Supplier replaced. Meat supplier capabilities for e-business not utilised. Meat supplier does not claim to be sustainable supplier, emphasises local produce.	Tendering and sourcing process favours evidenced, existing capability rather than supplier development. Non-compliant suppliers are replaced, often by consolidation to wholesale supplier.	Transparency depends on information sharing but may also be linked to proximity and capability which may in turn require different sourcing strategies and network structures.	Enhancing supplier capability is linked to supplier development (Koh et al. 2007 or Kannan & Tan, 2006).	Supplier capability
Fish supplier able to indicate whether excess seasonal inventory is available upstream and influence BTO menu planning – at discount price. Meat supplier asked for bespoke product for special event (e.g. square sausage for barbeque)	Menu adaptations made to better utilise fresh and frozen ingredients as product platform across all outlets. Demand management necessary in staff/student outlets and new technology to blast freeze to extend shelf life.	Waste management. Build to order reduces waste.	Network structures and product design (BTO, modularisation and standardisation) linked to design of and design for SCM (Sharifi et al., 2006).	Postponement and product strategies
Vegetable suppliers tendering for new contract struggle to formalise their sustainability capability as required in tender process. Meat supplier does not see itself as 'sustainable', just good practice. Fish supplier only supplies 'special menu' items; lower cost wholesaler supplies frozen fish for mass catering.	University tendering process weights sustainability related criteria as 20% of total evaluation score. Compliance forces catering to go through new tendering process after establishing good relationships and transparency with existing supplier. Trade-off – supply of bottled water is value-adding, but not sustainable	Good practice suggests that suppliers should be selected for range of sustainability criteria, including monitoring, transparency and locality SSCM performance is no substitute for competitive performance (Nyaga et al., 2010)	Order winners and order qualifiers should be aligned to market needs. Cost for efficient supply chain, flexibility in responsive supply chain (Fisher, 1997). In most markets sustainable supply is an order qualifier but not an order winner (Cousins et al., 2008).	Procurement Performance objectives
Fish supplier liaises with customer and buys-to-order on daily basis. Two way information exchange and array of upstream sources avoids disruption, though substitution may be necessary. Meat supplier processes-to-order on daily basis, so reacts to fluctuating demand	Postponement and build-to-order aspects of menu planning enable both unstable supply and unpredictable demand to be accommodated.	Unstable supply upstream may necessitate adding product/supply complexity and variability (e.g. fewer capable suppliers or menu adjustments for seasonal availability) Oruezabal and Rico (2012)	Lee's (2002) concept of unstable supply resonates with seasonal food. Direction of improvement suggests strategies to reduce/hedge against uncertainty with better communications, inventory pooling, exchange of suppliers and value adding mediation.	Hedging against supply instability
<i>Core issues in aligning sustainable supply chain and green marketing.</i>				
Upstream suppliers are selected on the basis of what they do, not what they are prepared to change and could thus be considered pro-active. However, constraints apply. Fish supplier would buy more local/seasonal fish if cost was no object. Meat supplier changed slowly in response to customer demands.	Stated University objectives are essentially value seeking, although this is not consistent across the different outlet/customer markets or throughout the supply chain.	Level of involvement and drivers vary between customers (internal and external) and between suppliers. Chakraborty (2010) suggests that some suppliers are reactive, proactive or value seeking.	Strategic response may need to address these differences which has implications for internal process adaptation, supplier development and conflicting objectives (Holmlund & Strandvik, 1999)	Drivers of change
Potential suppliers are required to express interest on University procurement system. B2B marketing focused on tender documents. Small scale or one-off orders can be processed outside this system. Supplier briefing and upstream communications support SSCM	University communicates its brand values through league tables and accreditation. Menus and information boards help to 'push' sustainability. Differential products and terms for different segments (summer fruits or strawberries). Price reflected as good value, money-off promotions and cashless payment discounts.	Green marketing encompasses green products for green consumers; adaptation of GPs (excluding price); or achieving competitive advantage by adopting and promoting green values through marketing, products and processes (Liu et al., 2012).	Marketing function needs to be integrated into the whole supply chain process, not just order fulfilment (van Hoek & Chapman, 2007). True competitive advantage is achieved through marketing advantage that results from improved SCM (Green et al., 2012).	Integration of Integrating marketing and SSCM

3. Results

3.1. Case study background

The case University is based in the UK and has 3 campuses, 2 that are city based and one that is in a rural location. The University has over 25,000 students, and employs over 2400 staff and has a mission to deliver education and research that shapes lives and society (Strategic Plan). A commitment to environmental sustainability is a key part of the University's strategy and it employs a dedicated environmental team to encourage sustainability, exemplified by the Sustainable Campus initiative, to support the strategic plan. Part of this initiative includes sustainable food sourcing focused on aspects such as food miles, ethical/environmental impact of food growth and processing, waste reduction, health and welfare benefits, which have become one of the criteria resulting in the university winning the People and Planet Green League 'most sustainable campus' (Williams, 2011). In other words, these catering initiatives were the pathway to supporting the University's strategic objective of being seen as a sustainability champion. The University catering service (UCS) provides hot and cold food for student/staff outlets, a Conference Centre and pre-ordered, delivered catering. This sustainable strategy was operationalised through the UCS objectives to:

- Produce tasty and healthy food to stimulate learning.
- Reduce the environmental impact of catering units.
- Maintain cost levels for student catering.

The underlying motivations for these kitchen objectives, include requests from corporate customers for the Conference Centre, student and staff customer demand based on their sustainable value seeking, enhanced learning benefits of accessible healthy food and aims to achieve the sustainable campus initiative award (Gold award moving to Platinum) and to be the first university mass catering unit to achieve the Soil Association's 'Food for Life' Silver catering award.

3.2. Implementation of a more sustainable supply chain

Since the motivation to change the sourcing and supply objectives is essentially marketing-led, it is no surprise that initial changes have been made downstream in the supply of catering. These have included:

- Sauces and stews based on in-season vegetables.
- Increasing the vegetable content of meat dishes for healthier recipes at lower cost.
- Including protein elements in all vegetarian meals; while soups and sauces are mostly fat-free.
- Incorporation of a daily local special in mass catering outlets based on standardisation of menu items across all distribution outlets.
- In addition, soil association Silver Award specifications include using only MSC (Marine Stewardship) approved fish, restricted chemical and GM ingredients, a minimum 10% organic food, a high proportion of food prepared from fresh and reduced food miles in the supply chain.

Implementing these product changes has necessitated parallel changes in process design. As a result more fresh cold food (sandwiches, yoghurts, and salads) are prepared in an on-site cold-room, while fresh cakes and ice-cream are prepared for conferences and banquets. The standardised menu sees similar food prepared for all outlets and a special quick chiller enables the safe storage of cooked foods to avoid waste, as does well-managed and regularly replenished cold/dry storage. The organic food quota is satisfied by sourcing organic milk, after it was found that other organic products are too costly for the student market.

The ingredients for the revised menus are sourced from a combination of small and large suppliers, and changes to the supply base have seen a consolidation of orders with a small number of wholesalers.

Reconsideration of some tendering arrangements is underway, but this is a lengthy process involving balancing the recommendations of sustainable procurement guidelines; EU tendering regulations, the needs of the catering establishments and the likely capabilities of potential suppliers. Within the existing supply chain, however, changes have been introduced to support sustainable supply, accounting for food-miles and logistics from local distribution centres or local suppliers, increasing the amount of information provided by fresh food suppliers to ensure that fresh, in season alternatives are selected wherever possible and use of fresh produce, such as freshly made burgers and sausages and scrambled fresh (rather than dried) egg. Some product adaptations have also been made upstream, such as a new treatment and packaging, which enables local potatoes to replace imports with no loss of quality. Changing ingredients, sourcing upstream and transparency of information (e.g., Marine Stewardship approved fish) has enabled the UCS to gain the Soil Association Silver Award for the Conference Centre catering element.

However, some changes have been harder to implement. One potential supplier of locally sourced produce is reluctant to provide the multi-drop logistics required to service the different outlets for a relatively small volume of business. A closer supplier of prepared sandwiches failed to meet the freshness and shelf-life of a more distant supplier and was deselected to avoid waste. Over the research period, a new process to collect and recycle food waste has been contracted but no adequate compromise to the lucrative sale of bottled water has been found and disposables are still used.

Overall, average monthly expenditure on food items has fallen by 14%, while purchases of fresh meat, fruit and vegetables, and fish, have increased by 27%, 28% and 45% respectively. An increase of 6% in overall purchases of groceries, frozen and commodity items, which accounts for almost half of all catering purchases, has meant consolidation of orders with one of two suppliers. Purchases of prepared sandwiches, disposables and hot drink ingredients have all fallen. While the UCS objectives have broadly been met, hence the accolades, it is not evident to what extent the carbon footprint or any other measure of sustainability has improved.

4. Discussion

Analysis of the case study revealed a number of interlinked priority areas that relate to the development of a sustainable supply chain and, in particular, link extant supply chain management and marketing literatures to the emergent issues of sustainable supply chain management, consistent with Seuring and Muller (2008b: 1706) who conclude that there is a "deficit in the take-up of theoretical background both from within supply chain or operations management, as well as from a wider perspective". The discussion follows coded themes drawn from the literature (see Table 1) relating to alignment of the SSCM to demand and supply variability, and using operations and supply chain concepts, drawing on Lee (2002) – such as postponement and product strategies, information exchange within the context of the supplier network, and supplier capability – to meet the changing performance objectives of the SSC. In particular, the case facilitates an inductive approach, linking together the emergent supply chain literature, which broadly indicates what should be achieved in SSCM, with generic Supply Chain and Operations Management literature, to which we turn for a more detailed conceptual explanation of how SSCM can be achieved. This is reflected in Table 1. Which illustrates the inductive process from primary data collected from the case, cross-referenced to SSCM concepts, which are in turn, linked to the generic Supply Chain approaches that can help to operationalise these objectives. The inductive approach has also highlighted the importance of considering marketing issues within the SSCM paradigm (in line with Seuring & Muller, 2008b; Chan et al., 2012 and Liu et al., 2012). This too is reflected in the discussion.

4.1. Implementing the sustainable supply chain

From the case perspective, the motivation to adopt more sustainable sourcing policy is dominated by the University's value proposition. Convergence in demand from Conference Centre clients and the growing importance of accreditation in attracting prospective students has generated demand for university processes to be sustainable, a strategic shift aimed at achieving competitive advantage (Markley & Davis, 2007) and satisfying market expectations (Seuring & Muller, 2008a). The UCS activities to support the sustainability agenda have thus been well-received by the Senior Management team, one criteria for success (Sharma et al., 2010). The sections below discuss the issues that have surfaced while exploring the process undertaken by the University to implement this core aspect of its value proposition, and are followed by discussion of the core issues relating to alignment of the supply chain with the marketing function.

4.1.1. Market alignment

The catering establishments service a wide range of clients, ranging from the day-to-day catering for staff and students to banquets, and this variety challenges the catering team to identify common customer needs. For some target markets it has operated as a 'pull' for others it has been more of a 'push' strategy. This has provided one of the challenges of greening the catering supply chain. Student catering is price sensitive, while much internal catering relies on internal recharges, rather than generating 'new' revenue. Sustainability may be an aspiration and shared value but increased cost is an ever present issue. Managing these various and sometimes conflicting objectives challenges internal teams and directly involves internal catering, purchasing, facilities and marketing teams, and the Conference Centre, with an indirect impact on admissions, finance and even student welfare, Student Union and teaching teams, through well-being and learning benefits. Internal relationships therefore emerge as a key theme, after Sharma et al. (2010) and Liu et al. (2012) who advocated the importance of team working to meet sustainability targets. Like Oruezabala and Rico (2012) conflicting priorities came from endogenous (the differing service functions) and exogenous (the suppliers capabilities). Balancing improvements in sustainability requires measures to avoid the potential cost-sustainability trade-off and aspects of product design and purchasing have deliberately been managed accordingly, rather than evolved (Sharifi et al., 2006). This suggests that, while aligning to the needs of different markets is testing enough, adding a sustainability dimension has added to the challenge. Following Fisher's (1997) model, different supply chain strategies have been adopted for different products and markets, such as buying speciality fish and cakes, locally for fine dining clients, while mass-market alternatives are purchased from national wholesalers for regular catering. However, as suggested by Sharifi et al. (2006) there have also been attempts to identify common product platforms and standardise some provision in order to gain the maximum sustainable benefit, as well as achieving economies of scale, as is seen in the 'local special' featured in hot food outlets everyday, which shares the same product platform as that served in pre-ordered catering services. A similar process upstream means prepared meats are ordered from a limited range and made-to-order daily. This resonates with the findings of Oruezabala and Rico (2012: 577) who found "sourcing policy tends to focus on fewer suppliers with 'green' skills."

4.1.2. Demand management

The use of local, seasonal supply counters trends in current supply chain thinking in that, although growers and producers can be sensitive to demand early in the production process, at the point of delivery uncertainty along the way means that product is essentially 'pushed' onto the market, according to availability. Thus, the suppliers are effectively managing demand by offering information about what is available, with early involvement in menu planning decisions and price incentives to customers, to avoid situations where produce is

wasted – adopting an 'influence' strategy as described by Crandall et al. (2010). A sustainable supply chain carries a double imperative to balance supply and demand, thus avoiding cost and waste. Involvement of both suppliers and the purchasing function at the earliest stages in product and process development can, according to Tan (2001) support these objectives through superior relationships, developing good lines of communication and making best use of supplier capabilities, which USC is mirroring. For example, when broccoli is reaching the end of the season, the price goes up and another vegetable is offered as an alternative. Similarly, the fish supplier, when there is a glut of a certain type of fish, will ring the University from the market to see if they could use some. A vegetable processor may suggest: "a large retailer can't take all our bubble and squeek this week, could you include it in your menus at short notice... we can do a great deal!" or the chef may work with suppliers to use the less saleable cuts of meat in prepared meals.

4.1.3. Information exchange

As already mentioned the exchange of information is critical in managing demand downstream, as well as the transparency required to endorse a sustainable supply chain. In a process resonant of Lee (2002), the fish supplier relies on a good two-way exchange of information and talks of an initial call from the head chef to notify of an upcoming event, later discussions with both suppliers and chef about what might be available and a final conversation to confirm what and how much is required. This information, generated by a personal relationship, is used to inform a daily 'buy-to-order' service from the fish-market which helps to improve responsiveness to market needs and reduce waste. The sustainability credentials of the fish are then communicated direct to the kitchen via tags attached to the fish avatar. For the larger wholesalers a similar exchange of information takes place but based on an ordering system which identifies products as local, seasonal or having other sustainable criteria, such as GM free, organic, or fair-trade. Although a much larger volume of business is placed with the wholesaler it is evident that this is a much more 'hands-off' process aimed at efficiency of information rather than flexibility of service, which, in line with Lee (2002), supports pooling of inventory to reduce supply disruption. Prepared meats are even more hands-off, with an informal understanding that meats are from local farms.

It is not evident that there is any formal transfer of information further upstream which, according to Mason-Jones et al. (2000), helps to increase supply chain effectiveness. This is at least in part due to the relative lack of importance of the UCS contracts to both small and large suppliers alike. However, the dominance of information being passed downstream in the supply chain contrasts to the view of Nyaga et al. (2010: 105) that food suppliers rely on data from customers. This appears to be a particular trait of the sustainable supply chain in order to support both transparency of sustainable credentials and also hedge against instability of supply (Lee, 2002) to avoid waste and add-value.

4.1.4. Network design

To facilitate this exchange of information the design of the supplier network is an important consideration. Compliance to EU legislation requires transparency of large contracts and hence several suppliers are sourced using a central university purchasing platform known as SNUPI to simplify this process. The difficulty experienced in negotiating with a new supplier for one key product suggests concurrence with Sinha, Whitman, and Malzahn (2004) in that better information and relationship developments are needed to enable a range of suppliers to participate in the sustainable supply chain. Instead, the complication of tendering arrangements, compliance to purchasing legislation and the complexity of dealing with many suppliers is a factor in the consolidation of purchasing into a few accredited wholesaler/distributors. Understanding the upstream networks beyond these wholesalers is challenging. It is evident that parallel supply chain structures exist in which fresh fish and cooked meats/sausages, sandwiches, and some

cakes are supplied by specialist small suppliers, while larger volume fresh and frozen meats, fruit and vegetables, dry goods, bottled drinks and disposable items are supplied by five generalist wholesalers. There are some signs that the two networks support different catering lines and market imperatives (Fisher, 1997; Lee, 2002). The fish supplier commented: “I only supply the specialist catering, the bulk uses frozen fish from elsewhere.” Almost all direct suppliers, however, have responsibility for sourcing from upstream tiers of producers and further research is needed to understand the complexity of these networks.

4.1.5. Postponement and product strategies

Related to issues of network design are the design of product and process strategies. Key changes within the kitchen have been incorporating standard product platforms, using fresh and healthy ingredients, to support menus in hot food outlets as well as delivered catering. Technological investments have simplified the process of preparing and storing bulk prepared food items to minimise the effects of variability in demand and secure economies of scale. Meanwhile, in line with Sharma et al. (2010), catering menus retain an element of ‘Build to Order’ with daily specials and vegetable of the day items reducing commitment to unseasonal ingredients and cold food preparation on-site reducing waste. This in turn enables suppliers to interact with menu planning by communicating availability of seasonal/local goods. In turn, the fish supplier buys to order and meats are prepared to order – allowing agreed variation to the standard products, such as alternative sausage recipes and even shape. Postponement in this context provides a solution to demand variation (Sharifi et al., 2006) as well as a benefit to suppliers in managing supply uncertainty (Lee, 2002) making both commercial and environmental sense.

4.1.6. Supplier capability

Krause et al. (2009) suggest that the supply chain is critical to the competitive success of a focal company. However, dealing with the expectations of managing information, upstream sourcing and involvement in product design, tests the capability of any supplier, after Johnsen et al. (2006) and Koh et al. (2007). Evidence from the focus groups suggests that existing time bound and seasonal relationships limit the willingness of suppliers to undertake any relationship-specific development. Suppliers are selected on the basis of existing capability in both, commercial and sustainability criteria, as advocated by Kannan and Tan (2006) and reinforcing the idea proposed by Cousins et al. (2008), and Nyaga et al. (2010) that sustainability can, at best, be an order qualifier, rather than an order winner. Supplier selection is especially important to developing network and relationships as it appears that there is an absence of the additional (or indeed any) clear performance measurement or risk analysis, as advocated by Seuring and Muller (2008a), beyond the initial selection process.

4.1.7. Procurement matched to performance objectives

During the research phase, a procurement process was undertaken to award a new contract for the supply of selected food stuffs. The existing contract had expired and, because of the size of the purchase, the new tender needed to meet European procurement regulations. The process was lengthy and undertaken mainly by the procurement team with some input from the catering department. While the tender specifications are weighted towards factors that might impact upon sustainability, this has complicated the tender process – a factor which is off-putting to many suppliers. It became clear that suppliers experience difficulty in marketing themselves in this way, i.e. expressing their potential contribution to the University’s sustainability goals through the tender system, which means that few performed well against the selection criteria. It was also evident that, in spite of the rhetoric of weighting sustainability highly in the specification, the key performance objective was to source cost efficiently, at least for the main contract, which impedes the selection of small and local suppliers. In practice, it was found that procurement compliance undermines

existing relationships and networks, even when these are functioning well, and this in turn has created a friction between the Executive Chef and procurement teams.

4.1.8. Hedging against supply instability

The seasonal aspect of locally or sustainably sourced foods creates an aspect of variability upstream which needs to be managed to meet market needs. Postponement and build-to-order aspects of menu planning enable both unstable supply and unpredictable demand to be accommodated. As discussed, the fish supplier liaises with customers and buys-to-order on a daily basis. Two way information exchange and an array of upstream sources (at the regional fish market) are used to hedge against supply disruption, although substitution of ingredients is sometimes necessary. However, the downside of this strategy is the unsustainable 100 mile daily round trip. This aspect of the sustainable supply chain constitutes a backwards step in the context of contemporary improvement strategies as suggested by Lee (2002), who emphasised the importance of the holistic relationship, information and process changes needed to minimise any mismatch between supply and demand. The meat supplier reports no such instability and processes sausages and meats each day, just-in-time for delivery.

4.2. Drivers of change

Taking the above factors into account, it is apparent that working towards SSCM is neither straight forward nor problem free, and so it is also important to establish what drives organisations to make such changes. As identified by Chakraborty (2010), drivers for involvement in sustainable supply chains can be value-seeking, pro-active or reactive. The University strategy has value-seeking as its main driver, to enhance differentiation and achieve competitive advantage. This strategy fails to impact upstream within the supply chain. As Delmas and Montiel (2009) propose, upstream changes in the supply chain are often dependent on relationships downstream and mandatory changes which are off-putting to suppliers, especially SMEs (Baden et al., 2011), and risk inhibiting the achievement of shared objectives upstream. For suppliers, the regularity of payments and some consistency of orders (in meat only) is a major incentive to maintain their relationship with UCS. From the case it can be seen that relationship aspects do encourage supplier proactivity (the fish supplier seeking sustainably sourced fish) but there is little to indicate a more comprehensive adoption of sustainable practices, and indeed to some extent it is circumstantial that the sustainably sourced fish also happens to be of better quality – a clearer objective of the supplier:

“If it was up to me I would only buy crab from Cromer, shellfish from Scotland and mackerel from Cornwall, because those are...without doubt... the very best products – but there is always the issue of cost and availability....” (fish supplier).... “as a small business I can keep low overheads and pass on the saving to customers. To grow bigger would involve a lot of investment, and increase costs like the large wholesalers. I don’t want to go there.”

There is therefore little real indication of suppliers upstream being proactive in achieving sustainable supply, indeed there is more evidence of cost, quality and flexibility imperatives (Hill, 1993) being prominent in order to sell their sustainable product and the meat supplier admits to being traditional, rather than an innovator in sustainability terms. Larger wholesale suppliers demonstrate more proactivity in adopting EMS, as well as managing generic information systems and registering on SNUPI. Indeed, the wholesalers that have gained business over others are those that perform best in these areas. Gaining accreditation has necessitated some direct contact and information sharing between the University and upstream suppliers, bi-passing the wholesaler. This opportunity was seen by the Chef as beneficial, indicating that the network structure should not act as a barrier to transparency. In

summary, it is apparent that the drivers are clearest at the consumer facing supply chain interface and become weaker further upstream.

4.3. Integrating SSCM with the marketing function

One of the early findings of the research enabled the direct participants in the UCS to realise that, while their strategic objectives and emerging practice were working towards delivering more sustainable food, few of their customers and stakeholders were actually aware of this – a disjoint between the marketing and supply chain functions (Chan et al., 2012). Since then, measures have been put in place to communicate changes in practice and the benefits to consumer groups, in particular, as well as existing and potential suppliers. These include improved communications of the food and supplier attributes on menus and notice boards, promotional vouchers to manage demand, awareness raising events such as a National Sausage Week barbeque and the regular local special menu item. In addition, the catering procurement teams have added potential supplier briefing sessions to their recent procurement processes and the Executive Chef has actively communicated the accolade of achieving the Soil Association Silver Award to both customers and importantly suppliers, whose information sharing was instrumental in the success. As a result there has been a noticeable uplift in people using the catering outlets and business through the Conference Centre is also growing. Most noticeable is the differentiation between 'push' of sustainability values onto a cost conscious market for the core catering activity aimed at staff and students, while the move towards SSCM in niche markets for Conference events has been 'pulled' by influential organisational clients.

5. Conclusions

5.1. Contribution of study

The sustainable supply chain is having a significant impact upon business practices. However, it would appear that most commentators, whilst recognising the impact, are not able to predict with any precision the nature of the business or supply chain models that will emerge. Although the integration of sustainability into strategic planning may only be partial at this stage, the limited longitudinal evidence available suggests that rapid changes are taking place in relation to both the large and smaller organisation, operating both in service and product markets. From the Case, it is evident that members of the supply chain are being influenced by changes not only in the structure of the supply chain but equally the changing relationships within this structure. They may, for example, receive new added value offerings from members of the chain with whom they already interface (e.g., internal services) or from members who have previously been more distant in the chain (e.g., local farmers).

However, changes within the supply chain are not uniform – the response to making the supply chain more sustainable appears to take two strategic directions. Firstly, 'lean and efficient' which involves consolidation of the supply base into accredited wholesale suppliers able to meet the sustainability objective through their EMS systems, local distribution centres, small but regular deliveries, management of packaging, and product selection from an array of upstream suppliers etc. This route appears to satisfy the external objectives of regulation, standards, and potentially offers a measurable improvement to the carbon footprint – in other words, the 'push' emanating from the supply chain operation.

This contrasts to 'local and seasonal' – the route which appears to offer most opportunity to suppliers and is typical of the value-seeking proposition or the marketing 'pull'. However, adopting local and seasonal supply – evidenced in fresh meat, fish and vegetables in the case – exposes the supply chain to a greater upstream risk of availability, supply failure, obsolete inventory and information transparency. Strategies to overcome these risk factors are adopted by both customer

and supplier, often relying on the regular (and customised or personal) exchange of information, collaborative adaptation of menus, postponement strategies, and intensive management of upstream sourcing activity through 'buying-to-order'. While there is evidence that the local suppliers have the opportunity to play to their capability strengths, these are also limiting factors, since cost and resource constraints could preclude growth of these services, while efficiency savings could eliminate the value-adding activity. This replicates generic supply chain arguments proposed by both Fisher (1997) and Lee (2002) in relating unpredictable demand and uncertainty of supply (respectively) to the need for an agile or risk hedging supply chain. While for both Fisher (1997) and Lee (2002) the direction of improvement is towards eliminating uncertainty, this pushes a burden upstream to the sustainable suppliers and suggests that, for the buyer, the progression towards a sustainable supply chain is not necessarily linear in terms of those other, more generic, supply chain improvements discussed above.

The revised conceptual model in Fig. 2 confirms that the sustainable supply chain is, like the conventional supply chain, characterised by a divergence of alignment according to the needs of different customer groups and their respective drivers towards sustainability, resource efficiency or value-seeking. The different groups respond to different green marketing approaches too, with a characteristic 'pull' associated with convinced sustainable value-seekers (Chakraborty, 2010) distinguished from the 'push' evident in cost conscious consumer markets. The model (Fig. 2) also reflects the proactive information sharing that the Case reveals upstream in the supply chain, and the limited opportunity for supplier development within the organisational procurement system because of stringent selection criteria.

However, it is the balance between 'push' and 'pull', in the USC case, that also shows how the sustainable food supply chain contrasts to conventional supply chain thinking. Seasonal supply effectively signals a partial return to a 'push' supply culture, with information about availability leading to subtle substitution of ingredients or even major changes to menu items. This progresses the work of Lee (2002) by adding a sustainability dimension, in that postponement and build-to-order menu planning enables the catering establishment to respond to a combination of demand fluctuation and supply uncertainty, and provides a real opportunity for the local or seasonal supplier to add value from in-season available items or liquidate surplus inventory of short-life products, providing both an environmental and financial benefit.

Furthermore, Lee (2002) plays down the opportunity for upstream supply disruption to benefit those suppliers able to share information downstream – in both supply chains. Pooling of inventory by wholesalers and monitoring of seasonally available produce enables unpredictable upstream produce to be introduced into the more stable and predictable mass catering chain (sustainable risk hedging). Extant literature focuses much more consistently on the (often limited) transmission upstream of information, whereas this Case suggests that the reverse information flow has as much, if not more, impact on product flow through the chain, eliminating waste at all stages. The mediation role is important in enabling the network to act upon information, since institutional buyers cannot "quickly identify alternative supply sources" in the event of supply failure (Lee, 2002: 116). The emerging model in Fig. 3 is based on Lee's (2002) underpinning theory, drawn from generic supply chain management. The framework attempts to summarise the points set out above. The model visualises four sustainable supply chain options: lean and efficient that relates to the compliant, monitored supply chain procured for most mass market sustainable products; the seasonal risk hedging supply chain where information from suppliers enables customers to adapt products and scheduling according to upstream availability (e.g. of fresh vegetables) and where cost savings can be passed on as market incentives. The local and seasonal market is based on small or flexible local suppliers able to respond quickly to fluctuating market needs; while the waste minimisation option sees process adaptations and demand management to reduce wastage of products that are being pushed into the market, regardless of demand.

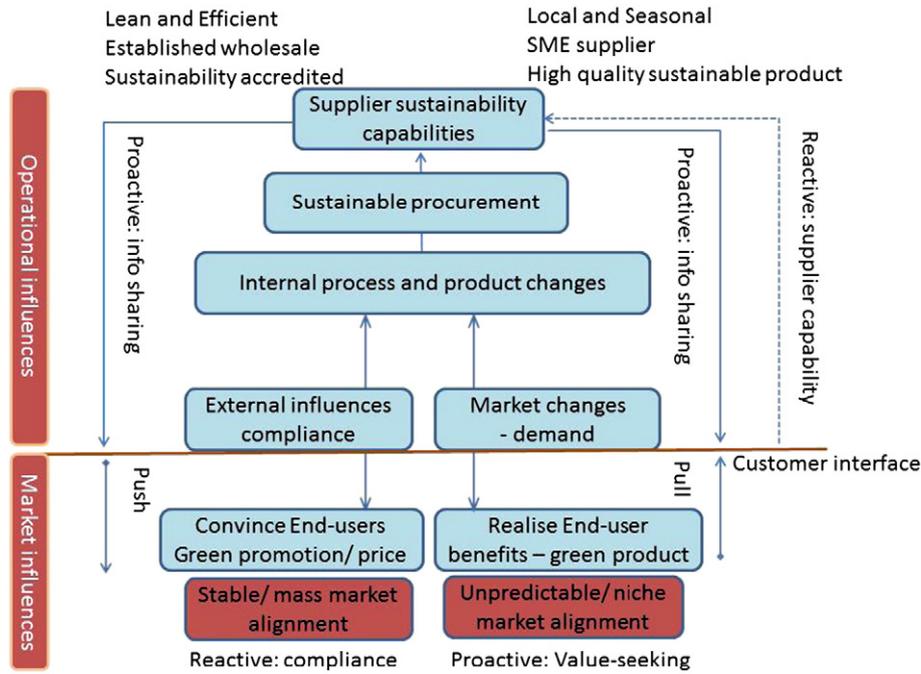


Fig. 2. Revised conceptual model: Differentiated sustainable supply drivers.

The role of the intermediary is emphasised in both the lean and efficient and local and seasonal supply chain. In both cases transparency of product conformity, availability and qualities is essential to the transition towards sustainable supply. However, the role of the mediator in terms of other added-value services, in particular selection of products upstream, servicing the unpredictable demand, inventory and logistics, is emphasised (Popp, 2000) but contrasts prior work (Abecassis, Caby, & Jaeger, 2000) and perceived good practice, which favours a flatter network structure. Internal process and practice modifications are emphasised in the seasonal risk hedging and waste minimisation supply chains.

From the perspective of the generic supply chain, the drive is towards achieving stable supply in a stable market position, which can be at odds with the market driven objective. Our findings build on the work of Sharma et al. (2010), evidencing the importance of demand management both in resolving issues of seasonality and in balancing the needs of multiple stakeholder and customer groups in the sustainable supply chain. Only through some convergence of demand and supply can sustainable supply chain management, in a complex setting, be

delivered effectively without compromising fundamental marketing imperatives and business objectives. Relationship development both internally and externally is key to this convergence and is a necessary prerequisite for aligning supply chain and marketing needs, as evidenced by the empirical data from this Case. Vehicles, like the University's Sustainable Procurement Policy and Strategic Plan have clearly promoted to all stakeholders the sustainable values or indeed aspirational values held by the University. These documents have then resulted in and informed cross-functional teams. Moreover, a more obviously external facing unit, the Conference Centre, has supported solutions that embrace marketing and procurement drivers. The whole improvement process has also involved a shift in internal marketing activity.

5.2. Limitations and implications for further research

The case underlines the need for marketing to be combined with SSCM to achieve marketing and competitive advantage objectives (Green et al., 2012). Furthermore, it evidences the lack of a one-size-fits-all solution to matching GM with SSCM practices. As with other operational priorities, GM and SSCM need to be aligned by strategically focusing on those processes and practices best able to meet the needs of specific customer groups. Since there is a gap in extant knowledge about sustainable targets in B2B marketing (Chan et al., 2012) there is an opportunity for further research especially, as identified by the case, upstream in the supply chain and from the perspective of the supplier as well as the buyer. One particular issue which is apparent in extant literature but not evident in the case is that of monitoring and measurability and this might be expected to be prioritised in other contexts.

The case is limited to a small number of suppliers in a relatively concentrated supply chain and there is an opportunity to explore more deeply the upstream supply and processes, networks and flow of information, as well as the internal marketing processes. The University catering department has 20 principal suppliers and, as this research was exploratory, focus was given to 12 suppliers who participated in the focus group and interviews. The emerging issues relating to the capability needs of suppliers participating in the sustainable supply chain signals the need for further work to explore the risk and trade-off challenges faced by proactive and reactive suppliers, a categorisation that

	stable market	unpredictable market
Stable supply	Lean and Efficient Cost/ compliance driven	Misaligned level schedule Waste minimisation driven
Unstable supply	Seasonal risk hedging Availability driven	Local and Seasonal Market driven

Adapted from Lee (2002)

Fig. 3. Emergent aligned sustainable supply chain concept.

emerged from the findings. The research also raises questions relating to the conflicting standards between procurement and sustainability policies and the need for policy makers to understand the reality, diversity and opportunity of the sustainable supply chain. The reverse flow of information, which seems a characteristic of sustainable supply chains, is a phenomenon also worthy of further investigation. However, the study is based on a single case and transferability to other organisations and sectors should be explored (Eisenhardt, 1989), for example through comparable cases in other public sector organisations (e.g. NHS), and other product categories, such that the University's environmental team are focussing upon i.e. print, textiles, construction. The aim of the study was to explore the issues in a single case but the findings from this study, now provide the basis to undertake research into other public sector organisations in the first instance.

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Dr. Clare Brindley FRSA is a Professor of Marketing and Entrepreneurship at Nottingham Trent University. Prior to her academic career, she worked in industrial and service organisations as a marketing manager. Her research is focussed on women working in the small business sector and the impact of marketing on supply chain risk.

Lynn Oxborrow is the Principal Lecturer in Supply Chain Management at Nottingham Trent University and is the project lead for a European Regional Development Funded Project concerned with sustainable design. Lynn's research interests explore supply chain issues within SMEs, with a particular interest in the textile industry.