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Understanding Conditions for Sustainable Supply Chain Development

- Cases from China's Food Processing Sector

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Understanding the Conditions for Sustainable Supply Chain Development - Cases from China's Food Processing Sector

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Summary

As the world enters an era of rapidly growing demand for food, declining resource availability and rising volatility, leaders in global food processing have recognized the need for more sustainable food production and are beginning to implement strategies for improved environmental, social and economic performance in their supply chains. With significant growth occurring in emerging markets like China, multinational food processors must consider the context of the market and the impact this has on the viability of their sustainable supply chain management (SSCM) strategies. Addressing a shortage of related literature, this study aims to understand the conditions for sustainable supply chain development in China's food processing sector and factors that companies pursuing this strategy must consider.

An exploratory case study of two multinational food processors based in China and serving the domestic market, investigates progress made in implementing SSCM strategies, with a focus on the upstream and agricultural producers. Use of Transaction Cost Economics (TCE) and the Sustainable Purchasing Portfolio (SPP) model highlight differences in asset specificity and supply risk that contribute to understanding observed variations, despite the firms having similar stakeholders, common threats to triple bottom line sustainability and proven track records for SSCM in their home countries.

Findings suggest that current conditions in China's food sector may not support widespread adoption of SSCM strategies. While undergoing remarkable change, the industry is still characterized by a high degree of fragmentation and low levels of development. Intense competition, a lack of traceability infrastructure and the need for more reliable enforcement of regulations has spurred opportunistic behaviour that threatens basic food quality and safety. Stakeholders concerned with these issues and the affordability of food for consumers spending more than a third of their income on food, have low expectations for triple bottom line (TBL) sustainability. As such, the high cost of pursuing SSCM represents a significant risk to the economic sustainability of commodity food processors. However in contrast, processors of specialized inputs that require high levels of coordination to achieve quality standards face less risk in pursuing SSCM. Furthermore, the process and the relationships fostered may support reduction of supply risk stemming from market volatility and the short-term investment focus of many agricultural producers.

Future study of a wider range of MNC food processors are necessary to test the findings from in this study. Including MNCs processing for export markets or Chinese-owned MNCs may produce new insights into the application of the SPP, and facilitate a more detailed stakeholder analysis that considers differences in expectations of overseas stakeholders or those in different segments of China's domestic market. Lastly, as findings suggest the importance of supply chain relationships, a closer investigation of the entire chain using Vurro et al.'s (2009) network view of SSCM may also provide understanding of interactions with and the impact of retail and food service sustainability strategies.

Sammanfattning

När världen går in i en era av snabbt växande efterfrågan på livsmedel, sjunkande resurstillgångar och stigande volatilitet har ledare i den globala livsmedelsindustrin insett behovet av mer hållbar livsmedelsproduktion. De har börjat genomföra strategier för förbättrad miljö, sociala och ekonomiska resultat i sina leveranskedjor. Med en betydande tillväxt som sker i tillväxtmarknader, som Kina, har multinationella livsmedelsaktörer en central roll i skapandet av hållbara produktions- och försäljningskedjor (från producent till konsument). Syftet med projektet är att beskriva förutsättningar för hållbarhetsarbete i livsmedelssektorn i Kina. Fokus i studien ligger på livsmedelsproducenternas roll, men i en kontext av en värdekedja där varje aktör ger förutsättningar för nästa aktör i kedjan.

Tillgänglig litteratur inom området hållbar livsmedelsproduktion utgör en grund för den presenterade studien. Den initiala genomgången gav allmän insikt i faktorer som påverkar livsmedelssektorn i Kina. I en explorativ fallstudie av två multinationella livsmedelsproducenter baserade i Kina och med Kina som en huvudmarknad, undersökes genomförandet av hållbarhetsstrategier. Utgångspunkten i analysen är primärproduktionen av potatis respektive griskött. Skillnader mellan företagens hållbarhetsstrategier belyses i en transaktionskostnads – och en hållbar inköpsstrategimodell. Här framkommer skillnader och likheter i förutsättningar på respektive marknad, samt hur företagen tolkar hållbarhetsambitioner. Jämförelsen vilar på en teoretisk ram som bygger på ekonomiska, miljömässiga och sociala värden, den så kallade ”triple bottom line”.

Resultat tyder på att de nuvarande förhållandena i Kinas livsmedelssektorn inte stödjer omfattande förändringar som en del av företagens hållbarhetsstrategier. Livsmedelssektorn genomgår en kraftig omdaning men är fortfarande präglad av en hög grad av fragmentering och låga nivåer av utveckling, framför allt på grisköttsmarknaden. En intensiv konkurrens, brist på infrastruktur som möjliggör spårbarhet och ett behov av en mer tillförlitlig tillämpning av regler och lagar pekar på opportunistiskt beteende som främsta hot mot livsmedlskvalitet, säkerhet och hållbarhet. En genomsnittlig konsument i Kina spenderar mer än en tredjedel av sin disponibla inkomst på livsmedel. För konsumenten blir den individuella nyttan av produkten relativt priset prioriterad. Hållbarhetsmål blir mindre prioriterat. Denna marknadssituation förklarar till del prisets centrala roll i livsmedelspolitik och handel. Som kontrast visar studien att specialicerad produktion som kräver samordning, här kontraktsodlad potatis, innebär mindre risker för hållbarhetsarbete. Dessutom kan koordinationsprocessen och främja relationerna, minska risker som härrör från marknadens volatilitet och skapa möjlitheter för investeringar på kort sikt för många jordbruksproducenter.

Framtida studier av ett bredare spektrum av multinationella livsmedelsproducenter är nödvändiga för att testa de preliminära resultaten från i denna studie. Fortsatta studier av företag som är ägda av kineser eller har en produktion som är mer inriktad på export torde också ge en mer detaljerad bild av förutsättningar för hållbarhetsarbete på Kinas livsmedelsmarknader. Studier av relationer i hela livsmedelskejdan skulle också ge en förståelse för samspelet med och effekterna av detaljhandeln och livsmedelsstrategier som är riktade mot hållbar utveckling.

Abbreviations

CIA	Central Intelligence Agency
CNY	Chinese Yuan (China's currency, also known as the Reminbi - RMB)
CPI	Consumer Price Index
CR	Corporate Responsibility
CSR	Corporate Social Responsibility
DJSI	Dow Jones Sustainability Index
FAO	Food and Agriculture Organization of the United Nations
GAP Program	Good Agricultural Practices Program
HBS	Harvard Business School
HFIC	Hormel Foods International Corporation
JV	Joint Venture
MNC	Multinational Corporation
NGO	Non-governmental Organization
R&D	Research and Development
SAI Platform	Sustainable Agriculture Initiative Platform
SCM	Supply chain management
SEK	Swedish krona (Sweden's currency)
SPP	Sustainable Purchasing Portfolio
SSC	Sustainable supply chain
SSCM	Sustainable supply chain management
TBL	Triple Bottom Line
TC	Transaction cost
TCE	Transaction cost economics
TWB	The World Bank
UK	United Kingdom
WEF	World Economic Forum
WWF	World Wide Fund for Nature

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1 Introduction

As global leaders met in Davos for the World Economic Forum (WEF) 2011 Annual Meeting, the issue of sustainable food production was a key topic of discussion among global representatives from government, NGOs and the food industry, who have all recognized the challenges ahead as the world enters "a new era, marked by scarcer resources, greater demand and higher risks of volatility" (www, WEF, 2011, p.4). Tackling environmental and social issues related to food production is in fact pivotal to the success of society's overall efforts to pursue sustainable development (Aiking & Boer, 2004) as the food industry "has perhaps the largest global environmental and social footprint of any human activity" (Senge *et al.*, 2010, p.20). The expanding reach of multinational (MNC) food processors into emerging markets adds to the complexity of this challenge faced by firms attempting to improve their sustainability performance (Roth *et al.*, 2008). In addition to wide ranging environmental and social issues, each new market also represents unique "social, political, legal, economic, cultural and ethical factors" (Roth *et al.*, 2008, p.35).

1.1 Problem background

Scientific advancements in the 1960s contributed to significant growth in agriculture and a dramatic reduction of hunger in many parts of the world (Cribb, 2010). However these achievements also produced a modern production system that food industry leaders recognize wields significant influence in society (Senge *et al.*, 2010) and both "contributes to and is threatened by environmental degradation and climate change" (www, WEF, 2011, p.7). A report spearheaded by 17 of the world's largest agri-food companies and presented at the WEF 2011 annual meeting outlined the extent of this influence, highlighting agriculture' responsibility for "70% of water withdrawals, up to 30% of greenhouse gas emissions (including 16% from deforestation) and 40% of worldwide employment" (www, WEF, 2011, p.6).

In acknowledgement of this influence and the industry's responsibility, business leaders in the global food sector have begun joining forces to develop standards targeting a reduction in this footprint and improved performance relating to environmental, social, and economic issues (Senge *et al.*, 2010; www, WEF, 2011). As a result, major food processors and retailers in Europe and North America have undergone a significant change in approach to sustainability management, with formerly peripheral activities becoming part of the core strategy of the company (www, Food Navigator, 2011, 1; Senge *et al.*, 2010).

Key sustainability issues with high visibility exist at the agricultural producer level of the food chain (Smith, 2007; Vurro *et al.*, 2007). Therefore food processors face growing expectations to not only address environmental and social issues in their own operations but also those of their upstream suppliers (*ibid*). Towards this end, a number of players have "defined binding targets for procuring raw materials from sustainable sources" (Ries-Hafner, 2010, p.10).

Beyond the drive of stakeholder expectations, companies have also "realized that the long-term supply of agricultural products is becoming increasingly precarious and are therefore focusing their attention not only on price but increasingly on the long-term

secure supply of raw materials" (Ries-Hafner, 2010, p.9). Again there is recognition among industry that securing a sustainable supply of inputs makes it necessary to control the supply chain's environmental, social and economic performance (www, Food Navigator, 2011, 1; Hamprecht *et al.*, 2005).

While tackling sustainability in the food supply chain of a company's home market is a challenge in itself, changing dynamics in the global food industry add yet another dimension to this exercise (Cribb, 2010; Smith, 2007). Emerging markets like China have come to represent key opportunities for multinational food processors, with some companies seeing them representing up to 70% of business within the next decade (www, CNN Money, 2011, 1; www, The Telegraph, 2011, 1). Low labour costs and growing food production capabilities have also contributed to China's rapid growth as an important supplier of inputs for much of the world (Roth *et al.*, 2008). In light of China's growing importance in the world's food industry, global food processors pursuing sustainable supply chain strategies must therefore also develop systems attuned to this market.

1.2 Problem

Significant commitments to implementing sustainable supply chains have recently been made by leaders in the global food sector as a means of addressing the industry's environmental and social impact (Senge *et al.*, 2010; www, WEF, 2011), as well as growing agricultural resource scarcities that are a threat to their long-term viability (Ries-Hafner, 2010). As participants in the global food industry, these commitments also extend to emerging markets like China, which offer both significant growth markets and a source of materials for international food supply chains (www, CNN Money, 2011; Roth *et al.*, 2008; www, The Telegraph, 2011).

While the food industry in Europe and North American has begun to recognize the importance of sustainability as a component of core strategy, "much of the rest of the world is trailing" (Senge *et al.*, 2010). Developing a sustainable supply chain in China's food processing sector may present challenges, since in spite of growing public concern and government efforts (Tan, 2007; Zhu *et al.*, 2005), some firms still "do not understand the benefits of responsible corporate behaviour, such as environmental protection" (Roth *et al.*, 2008, p.29). Supply chain sustainability also involves deep commitment to an extended process (Carter & Rogers, 2008; Seuring & Müller, 2008) and intense competition and the rapid rate at which China's market evolves contribute to a lack of long-term perspective among many organizations (Roth *et al.*, 2008). Multinational food processors aiming to develop sustainable supply chains in China must therefore consider not only the technical aspects of developing sustainable supply chains but also the economic, social and political context of the market, which impacts both the process and the expectations of stakeholders (Feller *et al.*, 2006; Roth *et al.*, 2008; Trienekens, 2011).

1.3 Aim and research questions

In light of the problem described above, this research aims to understand the conditions for sustainable supply chain development in China's food processing

sector and the factors companies pursuing this strategy must consider. To fulfill this objective, answers will be sought to the following questions:

- How do conditions in China affect the ability of food processors to develop sustainable supply chains?
- How can food processors in China develop a sustainable supply chain?
- Does working with partners influence the development of sustainable supply chains in China and if so, how?

1.4 Outline

This thesis is composed of nine chapters, arranged according to the outline depicted in Figure 1. Chapter one provides an introduction to the problem and aim, establishing the parameters for the research conducted. Chapter two then offers a review of literature on the topic of sustainable supply chains, giving rise to relevant issues and theories that may be applied in tackling the research problem. The theories used in this study are covered in chapter three, while the research method and related choices are described in chapter four.

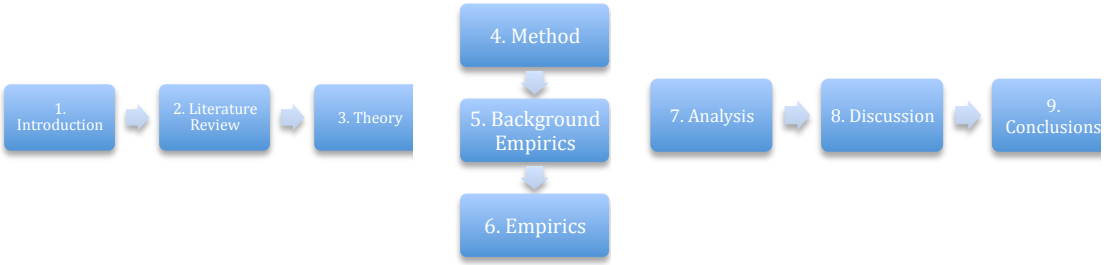

Figure 1. Study outline.

After that, chapter five offers background empirics that give context to the empirical findings introduced in chapter six. In chapter seven, findings are analyzed on the basis of the applied theories, after which they are discussed and compared with the findings of other literature in chapter eight. Finally, research conclusions and opportunities for additional research will be presented in chapter nine.

2 Literature review

This chapter provides an overview of literature relevant to the topic of sustainability in the supply chain, identifying issues, approaches and theoretical frameworks that have been applied in this field. The concept of sustainable supply chain management (SSCM) is considered first in order to establish a context for the content to follow.

2.1 Sustainable supply chain management

Sustainable supply chain management (SSCM) is a relatively recent area of study as highlighted by Seuring and Müller's (2008, p.1702) literature review on the topic that found only 31 of a total 191 papers reviewed could be classified as truly addressing sustainability. Furthermore these only began to appear in 2002. A study conducted by Carter and Rogers (2008) agreed with this finding, pointing out that prior to work done by Carter and Jennings in 2002, "most logistics and supply chain management research examined issues such as environment, safety, and human rights in a standalone fashion, without consideration of the potential interrelationships among these and other aspects of social responsibility" (Carter and Rogers, 2008, p.360). In light of the deficit of supply chain management literature addressing sustainability issues, Seuring and Müller (2008) highlight the potential of this topic for future research.

2.1.1 SSCM defined

To fully understand the concept of SSCM, one must first have a clear understanding of its component parts. Studies by Seuring and Müller (2008), Carter and Rogers (2008) and Carter and Easton (2011) all begin investigations into frameworks for SSCM by establishing these definitions. Seuring and Müller (2008, p. 1700) first consider the meaning of supply chain management, quoting a definition by Handfield and Nichols (1999), which states:

> "The supply chain encompasses all activities associated with the flow and transformation of goods from raw materials stage (extraction), through to the end user, as well as the associated information flows. Material and information flow both up and down the supply chain. Supply chain management (SCM) is the integration of these activities through improved supply chain relationships to achieve a sustainable competitive advantage."

In establishing their understanding of SCM, Carter and Rogers (2008, p.368) begin by quoting Mentzer *et al.* (2008), which sees SCM as:

> "The systemic, 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 purposes of improving the long-term performance of the individual companies and the supply chain as a whole" (Carter and Rogers, 2008, p. 368).

Carter and Rogers (2008, p.368) then introduce a second interpretation by Lambert *et al.* (2006), which defines SCM, as:

> "The integration of key business processes from end-user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders" (Carter and Rogers, 2008, p. 368).

SSCM requires a broader approach to SCM (Svensson 2007) and moving on to consider the added concept of sustainable development, Seuring and Müller (2008, p.1700) introduce a definition by the Brundtland Commission (World Commission on Environment and Development, 1987) in which it is described as:

> "A development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Carter and Rogers (2008, p.363) also open with this much-quoted definition of sustainability, however they note the challenges organizations may face in applying this macro-economic definition, which offers little guidance in terms of identifying and dealing with future versus present needs, and balancing an organization's responsibilities to its many direct stakeholders as well society and the environment. Furthermore they point out that the broadness of the Brundtland Commission's definition makes it difficult for organizations "to determine their individual role within this broader, macro-economic perspective" (Carter & Rogers, 2008, p.363).

Acknowledging the existence of diverse interpretations of the concept of sustainability, Seuring and Müller (2008) suggest that the 'triple bottom line' approach (Elkington, 1998) is a central concept that helps to operationalize sustainability. Carter and Rogers (2008) concur on the centrality of the triple bottom line approach, seen as "the intersection of environmental, social, and economic performance" (Carter and Easton, 2011, p.48).

Having explored the base concepts of supply chain management and sustainability, Seuring and Müller (2008, p.1700) combine these ideas to define SSCM as:

> "The management of material, information and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development, i.e., economic, environmental and social, into account which are derived from customer and stakeholder requirements."

They see the fulfilment of environmental and social criteria as a prerequisite for members of a supply chain who wish to remain engaged, but at the same time also consider it to be a potential source of competitiveness derived from meeting the needs and economic criteria of customers (Seuring and Müller, 2008). Carter and Rogers (2008) agree that engaging in sustainability is a requirement; however their SSCM framework also directly emphasizes the importance of the economic dimension. They suggest that sustainability for an organization is more than just identifying and engaging in "social and environmental activities, which hopefully help, or at least not harm, economic performance" (Carter & Easton, 2011, p. 48). Rather it involves clearly following the principles of the 'triple bottom line' (Elkington, 1998), that "explicitly directs managers to identify those activities which improve economic performance and dictate the avoidance of social and environmental activities which fall outside this intersection" (*ibid*, p. 48-49). This idea is supported by Pagell and

Wu's, (2009, p.38) investigation of case studies of exemplar firms aimed at building more complete SSCM theory, which proposes that a SSC is "one that performs well on both traditional measures of profit and loss as well as on an expanded conceptualization of performance that includes social and natural dimensions."

Expanding on the model introduced by Carter and Rogers (2008), Carter and Easton (2011) describe SSCM as involving long-run improvements to the organization's financial performance and guiding managers through the process of identifying tangible actions that will help it to thrive in the foreseeable future and beyond. They furthermore highlight four facets that Carter and Rogers (2008) have identified as facilitators of SSCM including (Carter and Easton, 2011, p. 49):

(1) "*Strategy* – holistically and purposefully indentifying individual SSCM initiatives which align with and support the organization's overall sustainability strategy;
(2) *Risk management*, including contingency planning for both the upstream and downstream supply chain;
(3) An *organizational culture* which is deeply ingrained and encompasses organizational citizenship, and which includes high ethical standards and expectations (a building block for SSCM) along with a respect for society (both within and outside of the organization) and the natural environment; and
(4) *Transparency* in terms of proactively engaging and communicating with key stakeholders and having traceability and visibility into upstream and downstream supply chain operations."

Therefore, combining the two concepts of SCM (Mentzer *et al.*, 2008; Lambert *et al.*, 2006), Elkington's (1998) triple bottom line and these four facilitating facets, Carter and Rogers (2008) and Carter and Easton (2011) employ a definition of SSCM, seen as:

> "The strategic, transparent integration and achievement of an organization's social, environmental, and economic goals in the systemic coordination of key interorganizational business processes for improving the long-term economic performance of the individual company and its supply chains" (Carter & Rogers, 2008, p.368).

In Figure 2 below, we see that true sustainability is found where environmental, social and economic performance intersect and where these three areas are incorporated into the development of long-term strategic objectives (Carter and Rogers, 2008).

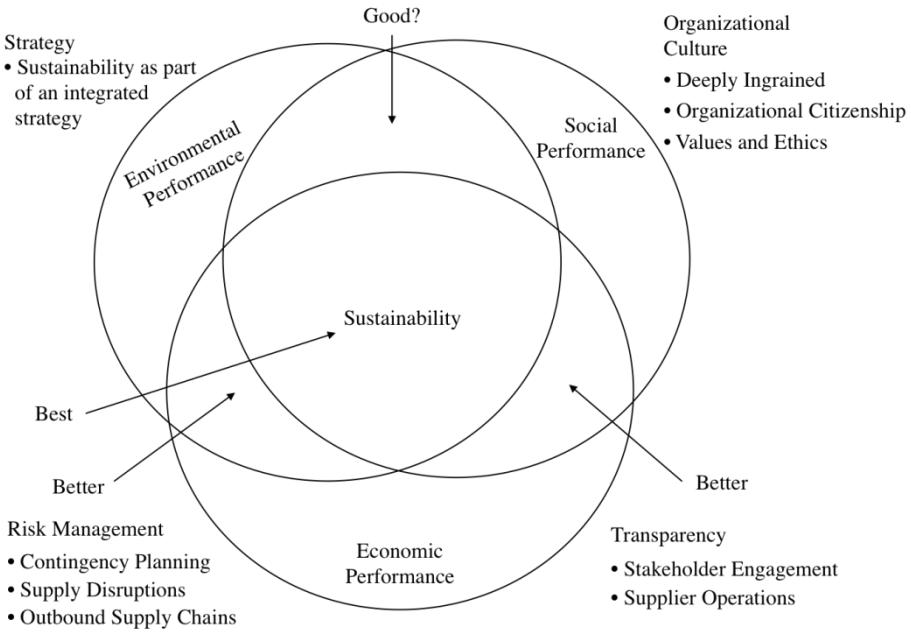

Figure 2. Sustainable Supply Chain Management (Carter & Rogers, 2008, p.369).

Pagell and Wu (2009, p.38) bring a touch of reality to the discussion, describing a *truly* sustainable supply chain as one that "would at worst do no net harm to natural or social systems while producing a profit over an extended period of time." Based on the fact that none of the exemplars they studied have made claims of having achieved *true sustainability* and positing that no such supply chain actually exits to date, Pagell and Wu (2009, p.38) suggest that, "most are actually more sustainable than others in their industry." That being the case, they then look at SSCM as "the specific managerial actions that are taken to make the supply chain more sustainable with an end goal of creating a truly sustainable chain" (Pagell and Wu, 2009, p. 38).

2.1.2 Supply chains and value chains

Having established an understanding of supply chains, it is useful to consider the meaning of the related concepts of value and value chains, which also receive coverage in some of the literature on SSCM (Closs *et al.*, 2011; Vurro *et al.*, 2009; Smith, 2007; Senge *et al.*, 2010).

The notion of value chains was developed in 1985 by Porter who defined *value* as, "the amount buyers are willing to pay for what a firm provides" and *value chain* as "the combination of nine generic value added activities operating within a firm" (Feller *et al.*, 2006, p.1). Porter further developed the concept of a *value system* to represent the linkage of value chains between businesses, however "in the present era of greater outsourcing and collaboration the linkage between multiple firms' value creating processes has more commonly become called the *value chain*" (Feller *et al.*, 2006, p.1).

Feller *et al.* (2006, p.1) suggest that the benefits customers receive, the interdependent value creating processes and the resulting demand and flow of funds created, are "the primary focus in value chains." In an effort to bring clarity to the idea of value, Feller *et al.* (2006, p.1) highlight that "value occurs when needs are met through the provision of products, resources or services," however it is also "a subjective

experience that is *dependent on context*." Additionally they point out that the concept of value can be understood as an experience that flows *from* the customer. As such, "the key difference between a value chain and a supply chain is that they flow in opposite directions" as represented in the Figure 3, comparing value chains with supply chains (Feller *et al.*, 2006, p.1).

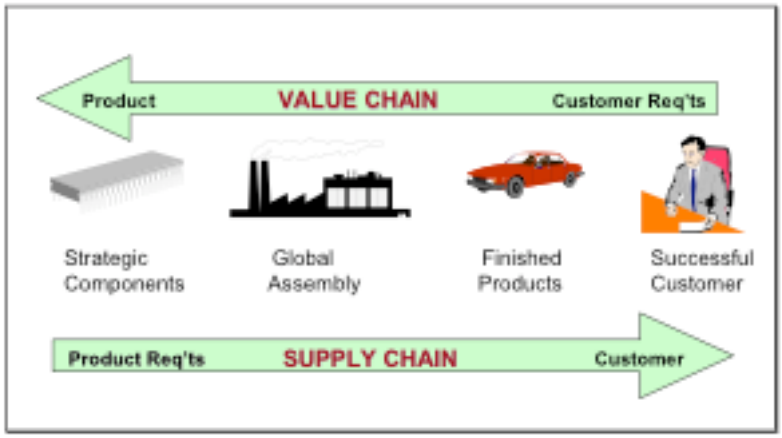

Figure 3. A comparison of a Value Chain with a Supply Chain (Feller et al., 2006, p.2).

In light of the relationship displayed above, Feller *et al.* (2006) suggest that firms can maximize the value generated by their supply chains, by matching the flow of products or services supplied with the flow of value demanded by customers. Doing so requires integration of the concepts of supply and value chains in "a holistic view of the end-to-end business process throughout the product life cycle" (Feller *et al.*, 2006, p.6). Although this study focuses primarily on corporate supply chains, it is important to be cognizant of their relationship to value chains and therefore the impact of value.

2.1.3 SSCM in the agri-food sector

Having developed an understanding of SSCM and established the connection with related notions of value and value chains, it is important to consider these concepts from the perspective of the agri-food sector as different issues may arise depending on the industry and its supply chain (Maloni & Brown, 2006; Carter & Easton, 2011; Senge *et al.*, 2010).

In light of the complex nature of the food sector, the concept of sustainability has been described from many different perspectives (Aiking and Boer, 2004). Nonetheless, the food industry has begun to reach consensus on a framework for sustainability (Senge *et al.*, 2010). One example providing an overview of the issues incorporated by food processors and collaborative networks that have formed in the food industry to address sustainability is the SAI Platform framework as depicted in Figure 4.

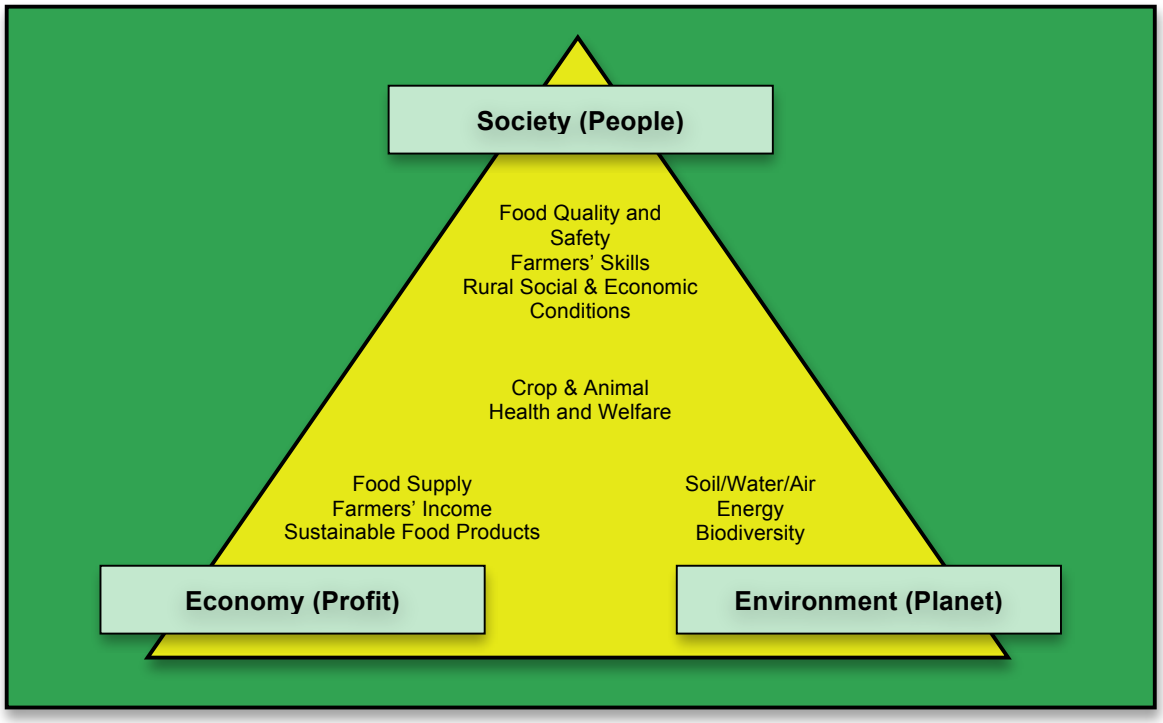

Figure 4. Issues Related to the Principles of Sustainable Agriculture (www, SAI Platform, 2011, 2).

Founded in 2002 by three of the food industry's largest players, the SAI Platform now has 25 members with a shared view on sustainable agriculture (www, SAI Platform, 2011). The organization sees it as a "productive, competitive and efficient way to produce agricultural products, while at the same time protecting and improving the natural environment and social/economic conditions of local communities" thus paralleling the TBL approach to sustainability (www, SAI Platform, 2011). While sets of indicators have also been developed for these categories of sustainability issues, priorities and values can differ by industry segment (Senge *et al.*, 2010). As such there is most agreement on the environmental dimension, while efforts related to social and economic issues has been slower (*ibid*).

According to Senge *et al.* (2010), some initiatives combine social and economic related impacts as the economic wellbeing of individual players in agri-food supply chains is often linked to the health of their communities. In addition to the social impacts listed by SAI Platform, they also cite "labor rights of workers and the health of communities, whether that is in access to or affordability of food, cultural integrity or consultation processes to allow for community involvement in issues that impact them" (Senge *et al.*, 2010, p.16). Extended points regarding economic impacts include "viable livelihoods for supply chain members, as well as the sustainability of the overall value chain" (*ibid*).

Yet another perspective is one developed by the UK Sustainable Development Commission that incorporates the views of a wide range of stakeholders. In addition to issues already mentioned, it highlights the production of healthy food and accurate information that meet the demands of the market, the need to minimize resource inputs and not exceeding natural resource limits, and the provision of a safe work

environment and appropriate training for employees of the supply chain (Smith, 2007).

2.2 Motivations for sustainable supply chain initiatives

Understanding the potential motivations for SSC initiatives may help to understand the differences in SSC activities or lack thereof. Carter and Easton (2011) suggest there are many factors driving interest in sustainability including increased awareness and understanding of climate change science, more transparency regarding organizations' environmental and social behaviour and the impact of supply and demand on energy consumption. Although all managers have a need to address increasing stakeholder demands for organizations to manage environmental and social issues impacted by their business, "supply chain managers are in a particularly advantageous position to impact environmental and social performance" through decisions such as supplier selection or supplier development (Carter & Easton, 2011, p. 47).

Closs *et al.* (2011) highlight the connection between risk assessment and enhanced value creation in managing a firm's triple bottom line. The following section provides an overview of findings from the literature on these triggers for SSCM.

2.2.1 Managing risk

With the rising interest in sustainability issues, SSC initiatives are seen as an important component of a firm's strategy "to plan for, mitigate, detect, respond to, and recover from potential global risks" (Closs, 2011, p.102). In their framework for SSCM, Carter and Rogers (2008) specifically highlight the need to identify and manage not only economic but also environmental and social risks. Perceived deficiencies regarding environmental and social performance can prompt consumer or NGO activism, tarnishing a firm's reputation and leading to reduced market share and profitability (Maloni & Brown, 2006; Smith, 2007). Anticipating issues and addressing them through SSC initiatives that integrate with daily operations is therefore a means of protecting the firm's reputation (Maloni & Brown, 2006; Seuring & Müller, 2008). According to Smith (2007) some commentators see this as the primary rationale for investment in sustainable sourcing, however Seuring and Müller's (2008, 2, p.464) Delphi study, which surveyed a panel of experts in SSCM "concluded that NGO pressure is less of a motivator for SSCM than is commonly portrayed in the literature."

Vulnerability to changes in government regulation is another risk that companies may attempt to address through implementation of SSC initiatives (Closs *et al.*, 2011; Seuring & Müller, 2008, 2; Hopwood *et al.*, 2010). Svensson (2007) believes that research findings such as the 2007 UN report on climate change has increased this risk and will lead global authorities such as the UN, the European Union or other regional trade bodies to implement regulations requiring sustainable practices in the public and business sectors.

In addition to these external threats, SSC initiatives are also being used to manage the risk of potential disruptions of operational processes (Seuring & Müller, 2008), tackling issues such as talent management, threats to the supply of strategic inputs and reliability of the supply chain (Carter & Rogers, 2008; Hopwood *et al.*, 2010, Closs *et*

al., 2011). However, as Closs (2011) points out, risk reduction is not the only driver for SSCM, with multiple facets of value creation influencing this trend as well.

2.2.2 Creating value

A focus on sustainability broadens the perspective on optimizing operations in the supply chain to incorporate the complete production system (Linton *et al.*, 2007), leading to "improved efficiency and profitability over the long term" (Closs, 2011, p.102). In addition to reducing waste and cost, SSC initiatives support the development of the individuals and communities that contribute to a firm's operations and help to minimize reliance on scarce and therefore increasingly important natural resources (Closs, 2011). Furthermore, SSC are less easily replicated "particularly if suppliers devote asset-specific investments or share rich information and develop higher levels of trust associated with the embedded ties" thereby providing a competitive edge (Carter & Rogers, 2008, p.374).

While the notion of value creation through optimization and increased competitiveness seems logical, Linton *et al.*, (2007, p.1080) suggest that it may not be so straightforward since addressing sustainability in the supply chain dramatically increases "the complexity associated with defining, coordinating and interacting with stakeholders" and furthermore means having to deal with environmental and social issues that are less easy to quantify. At the same time, the practice of SSCM can facilitate mutually beneficial relationships with suppliers and possibly even provide the "license to operate or to expand into certain international markets" (Smith, 2007, p.851).

Risk management and value creation are further linked as motivators for firms to engage in SSCM since the flipside to the reputational risk for firms who fail to responsibly address environmental and social issues is "the opportunity to actively engage and show their commitment towards society, which could lead to added-value in their products and services through enhanced corporate image" (Mark-Herbert *et al.*, 2010, p.6). Adding value to products is tied to market demand for both "intrinsic (product quality, composition, packaging, etc.), and extrinsic product attributes, which are related to typical process characteristics" (Trienekens, 2011, p.69). Increased interest in extrinsic characteristics relating to environmental and social performance among Western consumers has therefore spurred growing attention to sustainability issues in corporate supply chains (Trienekens, 2011).

According to Linton *et al.* (2007, p.1078), "a focus on supply chains is a step towards the broader adoption and development of sustainability, since the supply chain considers the product from initial processing of raw materials to delivery to the customer." However recalling Pagell and Wu's (2009, p.38) suggestion that most SSC are not truly sustainable but rather "more sustainable than others in their industry," helps to understand the argument by some marketing professionals that:

> "The sheer complexity of the sustainability concept involving an enormous range of social and environmental issues, trade-offs, time scales and priorities, makes marketing 'produced using (more) sustainable agriculture' and 'delivered to you through a (more) sustainable supply chain' an impossible proposition" (Smith, 2007, p. 852).

This challenge may be particularly evident for processors and retailers with supply chains involving commodities or multiple streams of supply (Smith, 2007). Although consumers clearly see the value of attributes such as product safety, quality and performance, interest in extrinsic attributes related to "more sustainable production is insufficient to justify the higher supply chain costs and reduced flexibility inherent in a smaller, more-sustainable supply base" (Smith, 2007, p.851). Therefore, if SSCM fails to generate added value for consumers, "simple global economics and competition will kill the businesses that pay premiums to suppliers to support change or carry high extra costs for certification and identity preserved supply chains" (Smith, 2007, p.852).

However a sustainable approach to SCM expands the perspective on value creation to a wider group of stakeholders, which in addition to a firm's investors and customers would also include employees, supply partners, society in general and the natural environment (Svensson, 2007). Firms motivated by a sense of responsibility to this expanded stakeholder base may face "trade-offs between what is economically rational for supply chain members and what is of greatest value to the entire system or population" (Linton *et al.*, 2007, p.1079). Seen from this perspective, SSCM incorporates external costs such as damage caused by excessive resource use or the release of pollution and waste into the environment, thereby representing the true total cost (Linton *et al.*, 2007). Mark-Herbert *et al.* (2010, p.5), point out that beyond "giving back something to society" businesses can also set a positive example, thereby influencing the industry.

2.3 SSCM and the impact of the business environment

In a world of increased global interconnectedness it is important to remember the importance of context as, "value is highly conditioned by the larger social and economic environment through which complex and numerous interactions affect the human perception of value-based transactions" (Feller *et al.*, 2006, p.6). Similarly, the nature of the inputs being sourced and the firm engaged in establishing the supply chain, both impact the feasibility for SSCM (Smith, 2007; Trienekens, 2011; Hamprecht *et al.*, 2005; Ton & Bijman, 2006; Yakovleva *et al.*, 2009). According to Trienekens (2011, p.76), consideration of the business environment is critical as it "may both enable and constrain value chain upgrading processes."

2.3.1 Economic, social and institutional environment

Supply chains develop over time and are heavily influenced by the economic, social and cultural setting in which they evolve (Osinga & Hofstede, 2005). For example, in developing countries food security is often a primary concern and therefore "may take precedence over environmental impacts" (Aiking and Boer, 2005, p. 360). Furthermore, a lack of knowledge, educated labour, technology, infrastructure and funds required to invest in improvements may also present barriers to developing SSCM (Osinga & Hofstede, 2005; Smith, 2007; Trienekens, 2011). A government that supports such innovations is also clearly central to the development of these important factors (Trienekens, 2011).

Aside from the economic factors, Linton *et al.* (2007, p.1079) cite "cultural norms, individual and group behaviours, role of government and community, relationship with science, and relationship with the natural environment" as critical to

interpretation and attitudes regarding sustainability. Other relevant cultural characteristics that may impact efforts to pursue SSCM practices include views on money and time perspective in relation to investments, a society's approach to acknowledging and resolving problems, and considerations of trust (Roth *et al.*, 2008; Hofstede *et al.*, 2010). Failing to consider potential cultural differences can lead to breakdowns of trust that challenge supply relationships (Hofstede *et al.*, 2010).

Closely linked to the economic, social and political environment is the institutional environment, which includes:

> "Regulative institutions (legislation and government regulations and policies), normative institutions (business practices, business policies and ethical standards), and cognitive institutions (the way people interpret and make sense of the world around them on the basis of rules and schemata) impact organizational life" (Trienekens, 2011, p.56).

Clearly all three categories of institutions will impact a firm's ability to implement a SSC. Absent or ineffective legal institutions may present a challenge if contracts play an important role in the implementation of SSC initiatives (Wei & Zhang, 2004; Trienekens, 2011). Likewise normative and cognitive institutions affect stakeholder perceptions of sustainability practices and will have an effect on the implementation of quality control and other necessary functions and investments (Osinga & Hofstede, 2005).

2.3.2 Nature of the inputs

Material inputs range from commodity products to customer-specific products that require advanced capabilities to produce and the nature of the inputs used by a firm is another factor that will impact its ability to implement SSC initiatives (Trienekens, 2011).

Commodity inputs are "mass-produced, unspecialized products that are typically widely available for ready exchange in the market, leading to smaller profit margins and diminished importance of factors other than price" (www, Merriam-Webster, 1). As such, commodity supply chains are not conducive to influence, the flow of knowledge or traceability, which are important for SSCM (Smith, 2007, Carter & Rogers, 2008). Therefore a firm using commodities or near-commodities and aiming to develop a SSC would need to "create parallel, smaller, expensive identity preserved supply chains in-house before making any higher-level sustainability claims, thereby negating most of the transaction and bulk handling cost savings introduced by the use of baseline standards and management systems" (Smith, 2007, p.852).

On the contrary, the use of non-commoditized inputs requires a flow of knowledge and compliance between all parties from the manufacturer down to the primary producer in order to achieve the higher value-added benefit (Trienekens, 2011). An example of this from the food sector would be processors that use an input requiring specific practices to grow in order to achieve superior quality, such as crop variety, harvesting technology, or geographical production area that ties to the image (Smith, 2007). A situation like this is conducive to SSCM, as it requires the development and maintenance of closely linked supply chains involving advanced capabilities between farm and consumer (Smith, 2007; Trienekens, 2011).

2.3.3 Configuration of supply chains

According to Smith (2007), the ability of an actor to influence others in a supply chain varies significantly in accordance with the flow of goods, money knowledge and influence. As "principles of accountability, transparency and stakeholder engagement are all highly relevant to SSCM," supply chain configuration will therefore impact the ability of a firm to implement a SSC (Yakovleva *et al.*, 2009, p.3).

While short, (in particular local) supply chains are relatively easy to map, understand and control, longer and more complex supply chains require significantly more effort to engage participants beyond immediate suppliers (Smith, 2007). The stronger the ties between links in a supply chain, the easier it is for information to flow between them (Vurro *et al.*, 2009). Traceability and information flow are further hampered by activities such as mixing and substitution (Smith, 2007), while sharing a common supplier complicates the pursuit of sustainability, since a supplier's capacity to meet multiple standards comes at a high cost (Hamprecht *et al.*, 2005). Therefore, processors employing complicated or dynamic supply chains that cannot be reliably mapped will find it challenging to implement SSC initiatives and may need to accept the risks not addressed by ordinary quality management system (Smith, 2007).

2.3.4 Nature of the firm

Retailers and brand manufacturers tend to play a lead role in managing and upgrading value in the supply chain (Yakovleva *et al.*, 2009; Ton & Bijman, 2006). Given their close proximity to customers and the public in general, they also face the greatest pressure to take responsibility for product sustainability, leading them to pursue SSCM as a means of addressing suppliers' environmental and social performance (Yakovleva *et al.*, 2009). The more central a firm is in the chain, the better positioned it is to influence the network and implement an integrated approach to value adding activities such as SSCM (Vurro *et al.*, 2009).

While role and position are clearly important, Smith (2007, p.849) suggests that the attitude of a business towards "extending responsibility for product quality into social and environmental performance within their own supply chains" is another key factor in SSC development. This point is supported by Carter and Rogers (2008) and Pagell and Wu (2009) who see SSCM as facilitated by a corporate culture that promotes decision-making that adheres to the TBL and enhances environmental, social and economic capital. For this to be possible, responsibility for social and environmental performance need to be shared by all employees and fully incorporated in the supply chain (Pagell & Wu, 2009). In addition to a supportive corporate culture, effective SSCM also requires innovation capabilities and a proactive approach to aligning environmental and social targets with the business model (Pagell & Wu, 2009; Carter & Rogers, 2008; Seuring & Müller, 2008, 2).

2.4 Governance structures for SSC

Having contemplated the motivations of a firm for implementing SSC and the impact of the context in which this occurs, it is important to consider the role that supply chain governance or management has on this process. When critical value drivers are in the supply chain, the structure for selecting, motivate and managing suppliers can be key (Johnson *et al.*, 2008). Furthermore, in the context of managing sustainability

in supply chains firms face additional challenges relating to the need to keep current with new findings on environmental and social issues and the process of integrating sustainability performance aspects with economic controls (Hamprecht *et al.*, 2005).

Collaborative governance is widely seen as important for improving environmental and social performance of suppliers and therefore key to managing a SSC (Carter & Rogers, 2008; Seuring & Müller, 2008; Vurro *et al.*, 2009, Pagell & Wu, 2009; Smith, 2007). However the literature reviewed discusses its relevance from two perspectives including "supplier management for risks and performance" (Seuring & Müller, 2008, p.1704; Carter & Rogers, 2008) and "supply chain management for sustainable products" (*ibid*, p.1705; *ibid*).

2.4.1 Governance for risks and performance

Frameworks for SSCM introduced by Seuring and Müller's (2008) and Carter and Rogers (2008) discuss concepts for governing supply chains as a means of addressing risks and operational performance. Risks to the reputation of the firm stemming from the poor environmental and social performance of suppliers are a key concern for firms following this governance strategy; however those leading to disruptions of operational processes are also considered (Seuring & Müller, 2008). Therefore "as dependence on resources rises, firms should attempt to increase vertical coordination" with the suppliers involved (Carter and Rogers, 2008, p.372). Furthermore, in the event a firm faces complex or dynamic conditions in the supply chain that lead to uncertainty, vertical coordination becomes all the more important (Carter & Rogers, 2008) as it supports monitoring, evaluation and reporting (Seuring & Müller, 2008). The dynamics of Seuring and Müller's (2008) view on supplier risk and performance management are displayed in Figure 5.

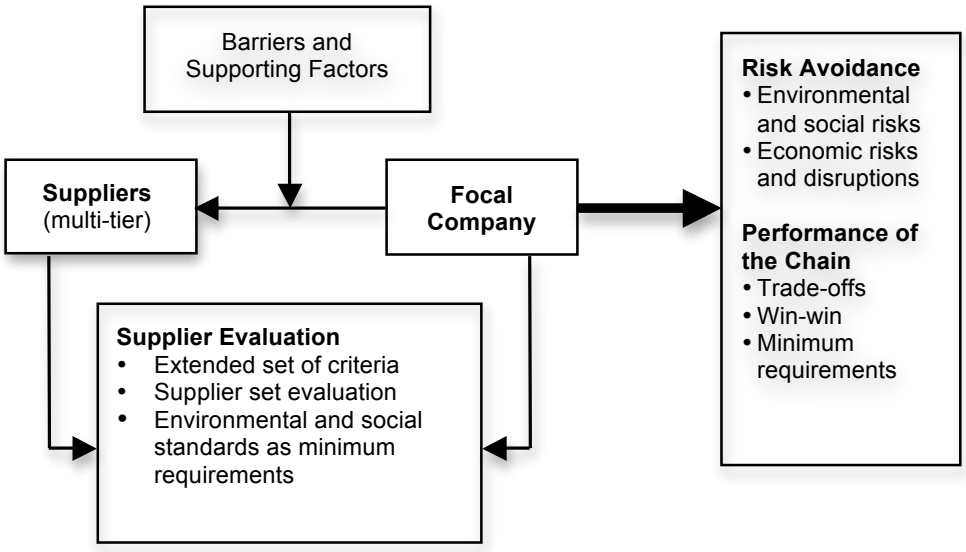

Figure 5. Supplier management for risks and performance (Seuring & Müller, 2008, p.1706).

Managing food supply chains for sustainability risks and performance requires the use of tools that assist in the controlling and auditing process (Yakovleva *et al.*, 2009). Environmental management systems such as the ISO 14001 can be used to achieve

the minimum necessary performance on these issues, however on the social front the use of formal approaches like the SA 8000 or codes of conduct are still not widely adopted (Seuring & Müller, 2008). Supplier evaluation schemes that establish minimum environmental and social standards have also become more common and support goals for both risk reduction and performance enhancement, which are often positively correlated (*ibid*). Quality standards are particularly important in food chains (Trienekens, 2011), and "if farmers are the immediate suppliers for food businesses, there is an opportunity to incorporate higher-level sustainable agriculture criteria into supply contracts" (Smith, 2007, p.855).

However while use of standards benefits efforts to increase environmental and social responsibility in the supply chain, special attention should be paid to how they are defined and implemented such that suppliers can actually adopt them (Perez-Aleman and Sandilands (2008). While an organization's global goals are the starting point, including local producers, government and the public in the process of defining and implementing standards, "allows for modification based on local information, and for a design that is adapted to local circumstances" (Perez-Aleman & Sandilands, 2008, p.40). It is also important to provide incentives, since "uncertainty regarding the benefits of upgrading can be a problem" for suppliers who need to invest time and bear the costs of changes practices to meet higher environmental and social standards (*ibid*, p.41). Price premiums and longer-term contracts can help suppliers deal with the higher costs and uncertainty by providing additional security (*ibid*).

Companies may also take proactive measures to support use of standards involving communication and training targeting their own purchasing staff and the staff of their suppliers, thereby leading to improved relations and performance for both sides (Seuring & Müller, 2008). Carter & Rogers (2008, p.374) agree and suggest that, "the learning that results between buyers and suppliers concerning environmental and social activities can have a strong positive influence on supplier performance and reduced operating costs in supply chain relationships." A collaborative approach further supports SSCM as it increases transparency and communication, thereby reducing monitoring costs associated with the threat of opportunistic behaviour, which is particularly relevant when sourcing products with specific production claims regarding environmental and social performance (Carter & Rogers, 2008; Carter & Easton, 2011).

2.4.2 Governance for sustainable products

The second category of SSC governance as portrayed in Figure 6, involves managing the supply chain for the production of sustainable products, which are "products that have or aim at an improved environmental and social quality, which can be related back to the already mentioned implementation of environmental and social standards" (Seuring & Müller, 2008, p.1705). With the aim of this governance model being to "satisfy customers and gain competitive advantage in the market," ensuring product quality and therefore also the operational process is key (*ibid*). As such, it is necessary to integrate the "supply chain from raw materials to final customers" and supplier collaboration becomes even more important (*ibid*).

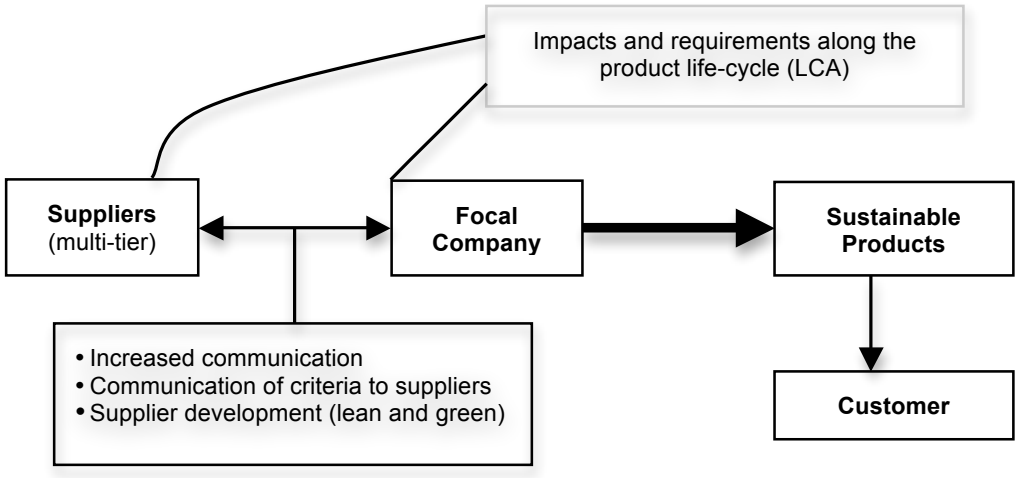

Figure 6. Supplier Management for "sustainable" products (Seuring & Müller, 2008, p.1706).

While certain environmental performance criteria may be tested in the final product, e.g. being free of harmful chemicals, similar end product tests are not available for verifying the environmental impact of the system used to produce the inputs or related social performance (Seuring & Müller, 2008). As such, supply chain governance for sustainable products must also rely on "the use of environmental and social standards" (*ibid*, p.1705).

In cases where the sustainability demands exceed the abilities of potential suppliers, focal firms may need to invest in developing these skills and providing technology before the products can be produced (Seuring & Müller, 2008; Aleman & Sandilands, 2008). Smith's (2007) research shows that these practices also apply in the food industry, where companies aiming to improve sustainability in their supply chains may need to develop and make available, agricultural technology such as land-management methods. In order to make this technology accessible, food companies may also "provide credit or long-term loans at preferential rates to farmers or invest directly in agronomic advice, farmer training, better growing material, inputs or capital equipment" (Smith, 2007, p.856).

These practices reflect a notion that Pagell *et al.* (2010, p.63) describe as "supply-base continuity which aims to ensure that all members of the chain not only stay in business, but also that they do so in a manner that allows them to thrive, reinvest, innovate and grow". A high value is given to social and environmental performance of suppliers throughout the entire chain (*ibid*). As such, deeper information sharing is necessary for suppliers to develop an understanding of following stages in the supply chain, and help them to understand the need for the environmental and social performance enhancements (Seuring & Müller, 2008).

Hofstede *et al.* (2010) and Fritz and Fischer (2007) suggest that the quality of the communication, the perception of the partner's competence and the outcomes of the collaboration experience will contribute to the development of trust. In addition to being the foundation for collaboration, trust is also important to the firm's governance of the supply chain as it may reduce efforts and costs associated with control and monitoring (Fritz & Fischer, 2007; Hofstede *et al.*, 2010).

2.4.3 A stakeholder network view of governance

Vurro *et al.*'s (2009, p.610-611) view of managing sustainability in supply chains builds on the concepts of collaborative governance introduced in the previous two sections, maintaining that success is based on "long-term cooperation, shared knowledge, and joint development of competence both upstream and downstream." However, given the differences that can be observed in the depth of collaboration and the extent to which efforts to address environmental and social performance benefit all players, the authors suggest the need to consider network structure in the supply chain which "dictates constraints and opportunities that must be considered in evaluating the feasibility and appropriateness of a given SSC governance model" (Vurro *et al.*, 2009, p. 616).

Analysis of network structure under Vurro *et al.*'s (2009, p.611) proposed approach is conducted on the basis of "network density, defined as the degree of completeness of ties between the actors in the network" and "the degree of centrality, that is, the extent to which an organization occupies a central position in the network." Network density is seen as contributing to an organization's ability to address sustainability performance as it "affects the ease of communication and efficiency of information flow across actors in the network," while centrality influences how much attention is paid to stakeholder's sustainability concerns and interest in engaging in activities that address them (*ibid*). Network structure is therefore described on the basis of density, that reflects interconnectedness, and centrality, which measures power distribution to produce four models for SSC governance as found in Figure 7 (Vurro *et al.*, 2009).

		Centrality of the Focal Organization	
		Low	High
Supply Chain Density	Low	Transactional SSCG	Dictatorial SSCG
	High	Acquiescent SSCG	Participative SSCG

Figure 7. Network determinants of sustainable supply chain governance models (Vurro et al., 2009, p.613).

Transactional SSC governance is the first of four models and occurs when focal firms have limited influence and the structure of the supply chain is so fragmented that connections between nodes are hindered (Vurro *et al.*, 2009). In such a situation, environmental and social performance may go unnoticed and given the high costs of controlling a dispersed supply chain, there is little to motivate a firm to pursue a deeply committed sustainability strategy (*ibid*). Therefore short-term sustainability initiatives primarily aimed at protecting reputation are the most likely and "traditional arm's length transactions will prevail" (*ibid*, p.613).

On the other hand, a dictatorial SSC governance model develops when the focal firm occupies a central position within a disjointed supply chain (Vurro *et al.*, 2009). Given the power wielded in the chain, the focal firm has a high level of control over collaborative activities and is free to establish and impose sustainability practices according to its own interests and vision (*ibid*). However enforcement of top-down standards can be costly and dictatorial governance may not provide a long-term

sustainable solution (*ibid*).

Firms that occupy a peripheral position in a densely connected supply chain are likely to pursue an acquiescent model of SSC governance (Vurro *et al.*, 2009). In this situation, network density enables information flow, forcing the peripheral firm to comply with the requirements set by more powerful players upstream in the supply chain (*ibid*). Success under these conditions will however require the firm to possess the necessary resources and competences (*ibid*).

In the last of the four models introduced by Vurro *et al.* (2009), focal firms at the centre of densely connected supply chains govern using a participative approach to achieving sustainability that highlights joint activities with actors in both the upstream and downstream (*ibid*). The ability to balance the needs of influential stakeholders and remain flexible and adaptable "to multiple voices and needs" are key to success for firms pursuing this model and can lead to joint innovation and value creation (Vurro *et al.*, 2009, p.616).

2.5 The role of partnerships

Collaborative approaches to supply chain governance emphasize the importance of partnerships, which in some cases extend to outside parties such as NGOs, government, academics or even competitors (Vurro *et al.*, 2009; Smith, 2007; Perez-Aleman & Sandilands, 2008; Trienekens, 2011). While research has shown that the search for external legitimacy is one key motivator, a number of factors related to the practical implementation of SSC have also been observed (Perez-Aleman & Sandilands, 2008).

2.5.1 Access to resources and expertise

Developing a SSC is a process that takes time and may require extensive resources and knowledge related to environmental and social issues (Linton *et al.*, 2007; Vurro *et al.*, 2009). Therefore working with outside partners can expedite the implementation by giving a firm "access to expertise that it cannot grow fast internally" (Prokesch, 2010, p.71). Significant value in this respect can be derived from engaging an independent certification organization to monitor performance related to environmental and social issues (Perez-Aleman and Sandilands, 2008).

Multi-stakeholder initiatives in which firms engage non-chain actors may also provide complementary skills and networks of contacts that enable greater benefits than possible if tackled individually (Smith, 2007; Trienekens, 2011). For example, NGOs may bring skills in establishing local networks and training, while academics or government agencies may have expert knowledge of specific environmental and social issues (Perez-Aleman & Sandilands, 2008). Government may also be instrumental in developing policy, infrastructure and programs to subsidize or provide credit for necessary investments (*ibid*).

2.5.2 An inclusive approach to sustainability

Vurro *et al.*, (2009, p.610) highlight another important reason for collaborating with partners outside the supply chain, in terms of helping to "overcome the limitations of top-down approaches toward promoting sustainability." Collaboration with NGOs, governmental organizations and local communities promotes a wider perspective and

helps to ensure the effectiveness and relevance sustainability initiatives for the individuals and environment involved (*ibid*).

Developing economies and small suppliers in particular, face unique challenges "to change their practices to comply with the higher social and environmental sustainability norms" (Perez-Aleman & Sandilands, 2008, p.27). Involving small producers and outside partners familiar with their circumstances in the development of standards and initiatives to support their ability to achieve them, can result in sustainability initiatives that "bring benefits and competitive advantage to low-income groups and to MNCs involved in the value chain" (Perez-Aleman & Sandilands, 2008, p.26).

2.5.3 Raising the sustainability baseline

Smith (2007, p.856) suggests that while individual food businesses, in particular those operating in niche markets may succeed in adding value tied to (more) sustainable production, they "will never have the power to transform agricultural systems or improve the sustainability of mainstream near-commodity and commodity supply chains." As such, multi-stakeholder initiatives are imperative if there is to be a hope of raising the sustainability baseline in commodity supply chains (Smith, 2007). "The Round Table for Sustainable Palm Oil (RSPO) is a prime example" of such an initiative (*ibid*, p.859). Initiated by "Unilever, Migros, Sainsbury's, the WWF and the Malaysian Palm Oil Association" the movement now has in excess of 100 business and NGO members tackling environmental and social issues arising in the supply chain of what has traditionally been a mainstream commodity (Smith, 2007, p.859).

This form of collaborative initiative, where large-scale food businesses (that represent a significant share of the market for a commodity) "work together with farmers, academics, innovators, governments and NGOs" to reach agreement on appropriate baseline standards, can lead to improved sustainability of mainstream agriculture and greater overall gains (*ibid*). Senge *et al.* (2010, p.14) note that companies that have engaged in these multi-stakeholder initiatives have used the experience to begin establishing goals and implementing practices in their value chains and "a common framework for sustainability is now emerging".

3 Theory

The review of literature in Chapter Two raises a number of theoretical frameworks and approaches that have been applied in the analysis and discussion of sustainable supply chains. Seuring and Müller (2008) and Carter and Easton (2011) highlight the general lack of a theoretical background as one of the limitations of existing research in their recent reviews of SSC literature. Both papers also raise the point that while transaction cost economics (TCE) is among the less commonly used theories, it offers a valid option for obtaining a wider perspective on SSCM (Seuring & Müller, 2008; Carter & Easton, 2011). It may therefore be particularly useful in an exploratory study of this field, which is relatively new to the agri-food industry and the China market. The research therefore draws on their findings and seeks to use Transaction Cost Economics (TCE) and Pagell *et al.*'s (2010) Sustainable Purchasing Portfolio (SPP) in the context of a framework for SSCM. Other theoretical models including Stakeholder Theory (ST) and Corporate Responsibility (CR) have been considered but not employed, as discussed under delimitations in section 4.5.

3.1 SSCM framework

Carter and Rogers' (2008) SSCM framework, as introduced in Chapter Two, provides an understanding of the concepts under discussion and establishes a foundation for further theoretical analysis. Elkington's (1998) Triple Bottom Line (TBL) approach is central to this framework, which sees sustainability as "the intersection of environmental, social and economic performance" (Carter & Easton, 2011, p.48), and supported by consideration of these three areas in long-term strategy development (Carter & Rogers, 2008). However the TBL is also clear on economic sustainability as a base requirement for SSC initiatives that aim to achieve improved environmental and social performance (Carter & Easton, 2011; Carter & Rogers, 2008; Pagell & Wu, 2009). Therefore, while a supply chain achieving true sustainability would produce an extended period of profitability and at worst not damage the future potential of environmental and social systems, most SSC today can only aspire to that goal and are in fact "(more) sustainable than others in their industry" (Pagell & Wu, 2009, p.38). Towards that end, studies on SSC widely agree on the importance of collaborative governance for improving environmental and social performance in the supply chain (Carter & Easton, 2011; Pagell & Wu, 2009; Seuring & Müller, 2008; Smith, 2007; Vurro *et al.*, 2009; Yakovleva *et al.,* 2009).

3.2 Transaction cost economics (TCE)

Transaction costs (TC) are "costs that are unexplained by simple market dynamics of supply and demand, even for commodities" (Pagell *et al.*, 2010, p.65), and include "the negotiating, monitoring, and enforcement costs that have to be borne to allow an exchange between two parties to take place" (Jones & Hill, 1988, p.160). Carter and Rogers (2008, p.375) suggest that in addition to direct relationship management costs, TC may also include "potential opportunity costs of making poor governance decisions." TCE therefore focuses on the transaction as the primary unit of analysis in the decision to make-or-buy, recommending governance structure with the overall goal of economizing transaction costs (Williamson, 2008).

3.2.1 Assumptions regarding human behaviour

Two aspects of human nature are seen as relevant to the understanding of TCE including "cognition and self-interest" (Williamson, 2008, p.6). In terms of cognition, bounded rationality, which stems from communication and information processing limits, contributes to the incomplete nature of complex contracts, arising in the form of gaps and errors (*ibid*). Furthermore, the tendency towards human self-interest raises the potential for opportunistic behaviour, seen as "efforts to mislead, disguise, obfuscate, and confuse" (Williamson, 2005, p.139). Bounded rationality, especially when caused by insufficient transparency, can increase the risk of opportunistic behaviour, thereby increasing monitoring costs (Carter & Easton, 2011). Such costs are particularly relevant when sourcing products with specific production claims regarding environmental and social performance (Carter & Rogers, 2008; Carter & Easton, 2011). Such attributes can be difficult to measure and therefore increase the potential for the supplier to cut corners (Han *et al.*, 2006).

The realities of bounded rationality and opportunistic behaviour are therefore important to consider in an evaluation of feasible modes of contracting or governance structure in the supply chain (Williamson, 2005; Williamson, 2008). Assuming it is beneficial for the exchange under consideration to be ongoing, coordinated forms of governance that preserve order and encourage trust can help to reduce related costs (Williamson, 2008).

3.2.2 TC determinants – asset specificity, uncertainty and frequency

Having established the relevance of human behaviour to TC, Williamson (2008, p.8) highlights the impact of key transaction attributes including "asset specificity, uncertainty and frequency" and the role they play in determining governance structure (Williamson, 2008, p. 8). Asset specificity is seen as particularly important as it explains both the presence and lack of bilateral dependency in an exchange relationship (*ibid*). It takes various forms including site or location specificity, specificity of physical assets such as the machines or equipment used in a process, human specificity in the form of skills required, and dedicated specificity, which evolves when it is necessary to adapt the production process to the needs of a single exchange partner (Williamson, 1985). Since assets of these kinds have a lower value if used in alternative production processes or exchange relationships, "continuity preserving governance for such transactions is important" (Williamson, 2008, p.8).

However it is the presence of uncertainty and the need for exchange partners to address unanticipated disturbances that makes asset specificity a challenge, since the potential for contract gaps under static conditions is less likely (Williamson, 2008). Carter and Rogers (2008) suggest that supply chain uncertainty arises out of dynamic market conditions and complexity of the exchange. Looking at a developing market context, Trienekens (2011) proposes that business relationships can be subject to uncertainties related to poor infrastructure, weak institutions, unbalanced exchange relationships and adverse social or political conditions. Therefore as uncertainty in the exchange environment increases, information and monitoring costs may rise, increasing the likelihood of vertically coordinated governance structures (Carter & Rogers, 2008; Han *et al.*, 2006). However Han *et al.* (2006, p.4) remind us that in situations involving low asset specificity firms will prefer low levels of coordination or market governance, no matter what the level of uncertainty is, "since continuity

matters little and new transaction arrangements can easily be arranged by both parties if necessary."

The third factor Williamson (2008) considers as a determinant of transaction costs is the frequency of exchange. The reality of "set-up costs associated with specialized governance structures" suggests that only in the case of recurrent transactions can this investment be justified (Williamson, 1979, p. 246).

3.2.3 Supply chain governance structures

Williamson (2008) suggests that governance structures are organized along a continuum, with markets and hierarchies representing the extremes and hybrid forms of governance between them exhibiting characteristics of both. Differing forms of structure represent different combinations of coordination and control (*ibid*). Where exchange is governed by markets price is the sole determining factor (Zhang & Aramyan, 2009). Hybrid models of governance found in the middle can take the form of "contracts, strategic alliances and joint ventures", while hierarchies exist when there is complete vertical integration, such that all transactions are carried out in-house (*ibid, p.139*). In this manner, TCE matches differing transactions with the governance structure that will "accomplish a transaction cost economizing result" (Williamson, 2008, p.9).

An in-depth study on supply chain governance by Peterson *et al.* (2001) produced a categorization of governance structures aligned with concepts introduced by TCE as displayed in Figure 8 (Zhang & Aramyan, 2009).

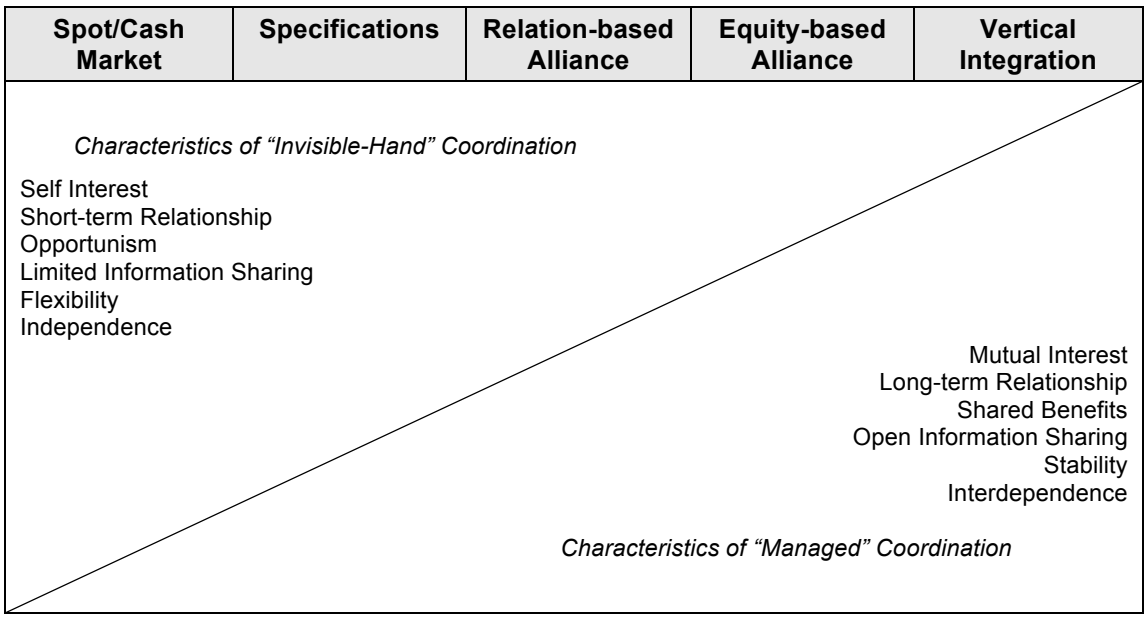

Figure 8. Vertical coordination continuum (Peterson et al., 2001, p.151).

Moving along the continuum from market governance on the left to vertical integration on the right, coordination levels increase along with a trade-off of factors linked to TC determinants (Zhang & Aramyan, 2009). However it is important to remember that vertical coordination is only a function of governance structure and the primary role of governance structure is actually to protect the investment in the transaction (Han *et al.*, 2006).

3.2.4 Limitations of TCE

With the goal of simplifying the framework for TC analysis, TCE generally assumes "that property rights are well defined and reliably enforced by the courts" (Williamson, 2008, p.8). As a result, the theory may not be capable of explaining all issues in business environments like China that do not fully align with this assumption. Furthermore, while TCE does not facilitate the measurement of transaction costs or dynamic explanations, it serves as a useful tool for conceptual analysis in understanding the conditions for SSC development in China's food processing sector (Williamson, 1985; Williamson, 2008). In light of these limitations, this study will further make use of Pagell *et al.*'s (2010, p.71) Sustainable Purchasing Portfolio, which considers dynamic market conditions and "is directed at the transition to sustainable supply chains."

3.3 A sustainable purchasing portfolio framework

Pagell *et al.*'s (2010, p.60) Sustainable Purchasing Portfolio (SPP), which is an adaptation of Kraljic's (1983) model, can be used to expand on TCE analysis as it is used to address the "real economic and environmental change" that is occurring in the market due to changing stakeholder expectations. Their study of the sourcing practices of leaders in SSCM highlighted that a number of these firms were "buying what would traditionally be l*everaged commodities* in a manner more appropriate for *strategic suppliers*", thereby supporting supply-base continuity (Pagell *et al.*, 2010, p.57). The aim is not only to see supply chain members stay in business, but also facilitate their ability to "thrive, reinvest, innovate and grow" (*ibid*, p.63). Behaviours associated with this phenomenon included, use of long-term contracts and above market prices for commodity inputs, provision of training, supplier risk mitigation and increased transparency (Pagell *et al.*, 2010). Using perspectives from TCE, Resource-Based View (RBV) and Stakeholder Theory (ST) the authors developed a hybrid explanation with "significant implications for the purchasing portfolio theory" (*ibid*, p.67).

A few attributes are central to Pagell *et al.*'s (2010) SPP model. First of all, based in a TBL approach it recognizes the importance of performance in all three areas of economic, environmental and social performance (*ibid*). Secondly, it acknowledges the likelihood of a transitional period when stakeholder expectations and the importance they attach to the new attributes change significantly (*ibid*). The authors suggest that the treatment of suppliers of commodity goods as strategic suppliers is likely short-term and driven by the need to address information asymmetries (*ibid*). As information is shared and suppliers develop the skills and systems required for improved sustainability, buyers will return to using a leverage or less coordinated model of governance since the baseline will have been raised and "suppliers will generally be undifferentiated on all but one aspect of the TBL" (*ibid*, p.71).

The last attribute of the adapted portfolio model is clearly counter-intuitive in that it contradicts the TCE concept "that one of management's goals is to reduce the risks associated with suppliers" (Pagell *et al.*, 2010, p.71). In cases where the environmental or social performance of suppliers is essentially different, or if these differences can be achieved through investing in supplier relationships, long-term advantages can arise from "investing in relationship-specific assets" (*ibid*, p. 67).

Pagell *et al.*'s (2010) modified SPP model incorporating these three attributes can be found in Figure 9.

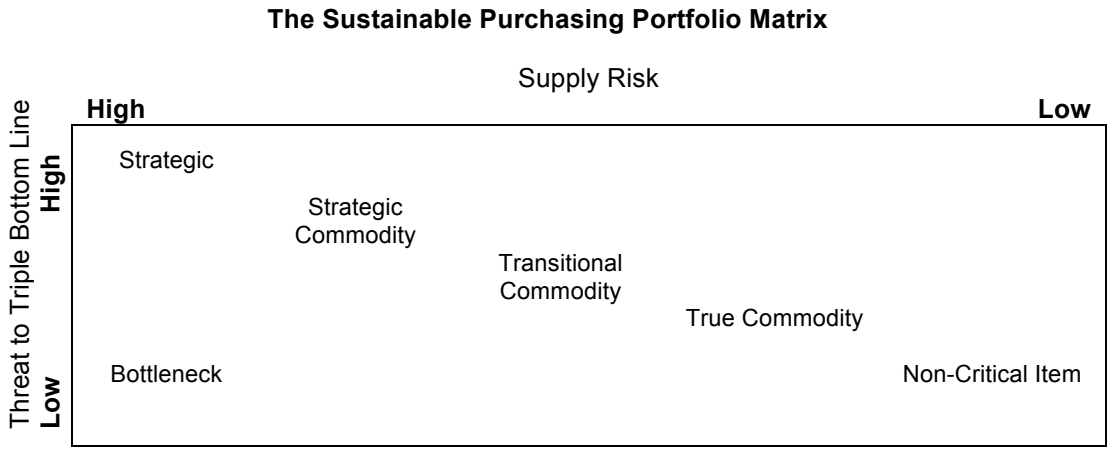

Figure 9. The Sustainable Purchasing Portfolio Matrix (Pagell et al., 2010, p.68).

The dynamic characteristics of this model are evident above with the shift in supply chain optimization from profit performance to TBL performance represented in the various transitional categories (Pagell *et al.*, 2010). A description of each position and its implications is provided in Table 1.

Table 1. Explanation of Sustainable Purchasing Portfolio Categories (Adapted from Pagell et al., 2010, p. 59 & 68-69)

Sustainable Purchasing Portfolio Categories			
Category	**Supply Risk**	**Risk to Profits, the Environment and/or Society**	**Short-Term State ?**
Strategic Strategic inputs purchased from small number of suppliers with whom buyer has a close, trusting, long-term relationship. Selection based on TBL performance.	High	At least one is high	No
Bottleneck Non-strategic inputs. TBL risk is low but supply risk is high as only available from one supplier – sourcing risk reduction is key focus.	High	All low	No
Strategic Commodity A critical commodity with environmental and/or social attributes that form basis for long-term competitive advantage. Increased asset specificity through buyer's investment in true or transitional commodities targets improved performance in multiple dimensions of TBL.	Buyer moves from low to high	At least one is high	No
Transitional Commodity Short-term information asymmetry forces buyers to invest in asset specificity for commodity inputs, as they would with strategic suppliers. As asymmetry decreases and base of suppliers with required sustainable performance grows, a new baseline is established and purchases return to the true commodity category.	Presently high due to information asymmetry – will return to low	One is high, others low	Yes
True Commodity Commodities for which there are multiple suppliers who are easy to replace. Differentiation on basis of one criterion – traditionally price, but in SSC may also be environmental or social performance.	Low	One is high, others low	No
Noncritical Item Non-strategic inputs sourced from many suppliers. As all risks are low – sourced for efficiency and low TC.	Low	All low	No

The benefit of this model for companies considering how to develop SSC activities is clear whether dealing with commodity input suppliers that require a short-term transition towards sustainability caused by information asymmetry or strategic inputs from suppliers who fundamentally differ in terms of environmental and social performance (Pagell *et al.*, 2010). As such, it not only recognizes opportunities for the reduction of risk and corresponding transaction costs, but also identifies prospects for creating "new and potentially valuable capabilities" (*ibid*, p.71). However its use requires management to first of all correctly identify which of the two situations applies and secondly, pay close attention to evolving market changes (*ibid*). Identifying the transitional stage is key to avoiding risks that make it necessary for buyers to invest in asset specificity for traditional commodities, and likewise unnecessary costs when asymmetry decreases and the input returns to being a true commodity (*ibid*).

4 Method

This chapter describes the choice of research design and methods that have been made in this study. Background to the study's general research approach is followed by a discussion of decisions made regarding units of analysis in terms of market, unit level and case subjects. After that, the reader is guided through the processes of data collection that involved an extensive literature review, followed by empirical data gathering during a research trip to China. In the last two sections, consideration is given to factors that impact the analysis and scope of the report.

4.1 Qualitative research

Studies by Carter and Rogers (2008) and Seuring and Müller (2008) highlight the relative newness of the topic of sustainable supply chain management (SSCM), pointing out that most earlier research took a standalone approach to environmental or social issues, rather than a truly sustainable perspective based on the TBL. This novelty is particularly apparent in the food sector, where in recent years global players have begun to recognize that securing a sustainable supply of inputs makes it necessary to control the supply chain's environmental, social and economic performance (www, Food Navigator, 2011, 1; Hamprecht *et al.*, 2005). In the context of increasingly global markets and supply chains, this already complex topic becomes even more complicated when considering a developing market context like China, with its unique economic, social and political factors (Roth *et al.*, 2008; Trienekens, 2011). Consideration of this complexity and the newness of the research topic therefore points towards the value of an approach that is more qualitative than quantitative as suggested by the model in Figure 10.

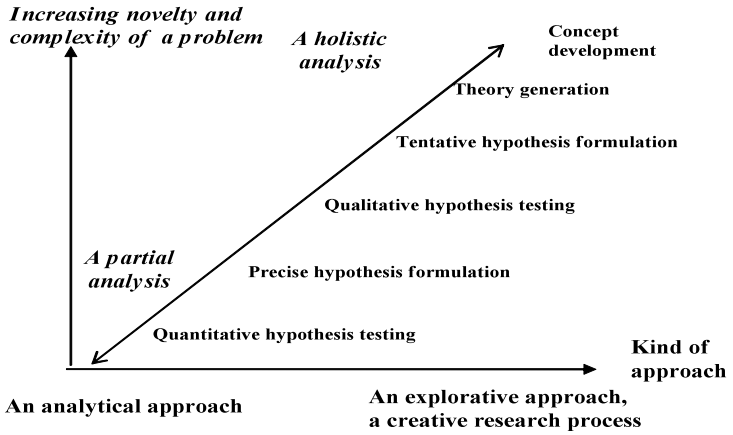

Figure 10. How increasing novelty and complexity of a problem affects the research approach and desired research contribution (Nyström in Mark-Herbert, 2002, p.17).

This observation finds support in other literature, which propose that as an inductive approach, qualitative research emphasizes context, is adept at handling complexity, and provides a holistic view of reality, making it a useful means of studying phenomena, processes and experiences (Gephart, 2004; Gummesson, 2006; Saunders *et al.*, 2007). Therefore a qualitative approach, which offers "more depth and greater

potential for new insights and perspectives", was selected to address this study's exploratory nature (Hofstede *et al.*, 2010, p.678).

4.1.1 Case study approach

According to Yin (2003), a case study involves an empirical investigation of current phenomenon, where the context is deemed highly relevant and boundaries are blurred between the phenomenon and the context. In considering whether to use case study or other approaches such as experiments, surveys, archival analysis or histories, Yin (2003, p.5) suggests it is important to consider "(a) the type of research question posed, (b) the extent of control an investigator has over actual behavioural events, and (c) the degree of focus on contemporary as opposed to historical events." On this basis, case studies is deemed appropriate when "a 'how' or 'why' question is being asked about a contemporary set of events, over which the investigator has little or no control" (*ibid*, p.9).

This study investigates the conditions for SSCM in China's food processing sector, placing importance on the market context and matching the above three criteria closely, therefore indicating the fit of the case study approach. Literature reviewed, agrees on the value of case study as one of multiple methodologies that should be used to gather empirical research in this field (Carter & Easton, 2011; Linton *et al.*, 2007; Seuring & Müller, 2008).

Baxter and Jack (2008) advise that the next decision, regarding case study type, should be guided by consideration of the purpose of the study and whether it is intended to describe, explore or make comparisons between cases. While a number of classifications have been put forth in case study literature, well-established terms have been developed by Yin (2003) and Stake (1995).

Yin (2003) proposes case studies can be categorized according to their ability to explain, describe, illustrate, explore or do a meta-evaluation. He further describes two variations of case study design including "single- and multiple- case studies" (*ibid*, p.14). Highlighting that "multiple-case study approaches are generally considered to be more robust", he further recommends that when the option presents itself, a multiple-case study, even one with as few as two cases, is preferable to a single-case approach (*ibid*, p.46).

Stake (1995) on the other hand suggests case study classifications including intrinsic, instrumental and collective. Intrinsic case studies are used when the researcher has the "need to learn about a particular case" rather than a desire to understand other cases or a general problem. In contrast, Stake (1995) suggests the purpose of an instrumental case study is to investigate a general issue, more so than the case itself. Lastly, collective case studies involve the use of multiple case subjects with each being instrumental to understanding the issue (*ibid*).

On the basis of terms developed by Yin (2003) and Stake (1995), this research consists of an exploratory or instrumental case study, which is used to investigate the conditions for sustainable supply chains in China. Furthermore a collective or multiple case study design is used to increase the robustness of the findings (Yin, 2003). Choices relating to the identification and selection of units of analysis for this multiple-case study are described in the following section.

4.2 Units of analysis

This section describes choices made in the selection of units of analysis for study. A brief overview of the choice of market context will be provided first, followed by a discussion of the level of unit of analysis and the selection of case companies.

4.2.1 China as a market context

The decision to select China as a market context for this study was based on a few factors. To begin with, emerging markets like China are increasingly important for MNC food processors, both as a source of inputs (Roth *et al.*, 2008), and as a growing market opportunity, representing up to 70% of sales for some companies within the next decade (www, The Telegraph, 2011, 1). Seuring *et al.*, (2008) confirm this trend and noting the lack of papers written on SSCM in Asia, they encourage more research activity from this region.

Adding to the importance of China for MNC food companies and SSCM research are the significant sustainability challenges the country faces, in particular in its food and agriculture sectors (Roth *et al.*, 2008; Tan, 2007; Yang, 2006). As home to nearly 1.4 billion of the world's population, sustainability in China, which has per capita land and water resources equivalent to only 45% and 25% (respectively) of the world average, is an issue of relevance to all (www, Reuters, 1; Yang, 2006, p. 28).

4.2.2 Firm-level unit of analysis

This study aims to understand the conditions for sustainable supply chain initiatives among food processors in China and how suppliers can be engaged in the process. Therefore the units of analysis are the food processing firms and data gathering targeted individuals or teams with responsibilities or in depth knowledge of supply chain management activities. A focus on the firm as the unit of analysis is consistent with the majority of SSCM studies reviewed in Carter & Easton (2011), although the authors note some have studied an influential individual, the buying group or in small but increasing numbers, the supply chain itself.

4.2.3 Case subjects

According to Yin (2003), the choice of case subjects should be driven by theory and link to the research questions that the study aims to answer. Furthermore, when conducting a multiple case study, Yin (2003, p.47) advises the need to apply replication logic, with case subjects selected according to their ability to produce similar results or "contrasting results but for predictable reasons." With this in mind, research requests were sent to a total of eight MNC food processors with business activities in China that span a range of product categories and therefore also represent supply chains with transaction cost determinant similarities and differences.

To address baseline sustainable supply chain capabilities, all potential respondents had made public statements on corporate websites or in the media concerning the priority placed on this issue. Furthermore some potential respondents were recognized by third parties such as the Dow Jones Sustainability Listing or belong to industry organizations that tackle sustainability in the food sector such as the SAI Platform or Sustainable Food Lab (Pagell & Wu, 2009). Focus was put on larger firms that would be more likely to have the resources required to make sustainability investments and brands that have greater potential to recognize value-adding through these activities

(*ibid*). Closs *et al.* (2011) also connect international scope of business with experience in dealing with contextual differences that may impact sustainability initiatives.

Despite multiple attempts to secure research approval using both official channels and networks of personal contacts, these efforts eventually led to only two confirmed case subjects as outlined in Table 2. A further two companies initially indicated the research request had been passed to the responsible department but failed to respond further, while the remaining parties gave no response. Names of these six entities have not been included to avoid any potential negative inference on companies with solid reputations for sustainable practices. Interested parties may contact the researcher with further inquiries.

Table 2. Case company details

Company	Summary	Outcome
Hormel China	Multinational manufacturer of branded meat products.	Interview with GM of Hormel China – March 18, 2011, 9:00 to 10:00.
McCain Foods China	A global leader in the production of French fry and potato products.	Interview with Senior Agriculture Manager – April 3, 2011, 9:00 to 11:00.

Although various factors may have contributed to this low response rate, Perry (1998) references the general challenge researchers may face in securing interviews in Asia. In order to address the limited number of case subjects, Perry's (1998) advice to gather data from industry experts familiar with the general research context was followed and interviews were secured with the organizations and individuals listed in Table 3.

Table 3. Industry expert interviews

Organization/Individual	Summary	Outcome
China Agricultural University	Department of Economics of one of China's primary agricultural universities.	Interview with two Associate Professors with knowledge of the SSC field – March 21, 2011.
Swedish Trade Council China, Shanghai Branch	Swedish Sustainable Business (SSB) Project, aimed at developing sustainable business in the Swedish-Chinese trade.	Interview with Shanghai Director for SSB Project – March 7, 2011.
Industry Expert A	Wholesale meat trader in Shanghai.	Interview with Associate Director – March 4, 2011.
Industry Expert B	Venture capital firm with investments in food and agriculture firms in China.	Interview with investment consultant – March 13, 2011.
Industry Expert C	Professional consultancy engaged in research for development projects across China.	Interview with General Manager – March 15, 2011.
Industry Expert D	Market entry consultancy supporting investments in China's agriculture sector.	Interview with consultant – March 22, 2011.

The insights gathered from these sources broadens the perspective on the phenomenon of sustainability in China's food processing supply chain and supports the process of triangulation which Yin (2003) advises is an important process for

ensuring the reliability of data in case studies. Due to the nature of their business as service providers to the agri-food sector or related organizations, Industry Experts A to D requested to remain anonymous.

4.3 Collection of data

When facing the challenge of securing sufficient case subjects, Perry (1998) further advises that a more thorough literature review may help the researcher to develop a better set of probe questions, which can increase the richness of the data and the resulting analysis. Therefore an extensive literature review was conducted before proceeding with the collection of empirical data.

4.3.1 Literature review

The search for literature to be reviewed for this study was conducted in multiple stages. To begin with, keyword searches were conducted in the following databases: Ag Econ, Cambridge Journals, Econlit, Electronic Journals Service (EBSCO), Emerald, Epsilon, Informaworld Online, JSTOR, Oxford Journals, SAGE Journals, Science Direct, Scopus, Springerlink and Web of Science. Initial search terms including "sustainable" and its various forms in conjunction with "supply chain" produced a range of potentially relevant literature, which was then scanned to ensure only related studies were kept. The initial search produced a few literature reviews on the topic of sustainable supply chain management and citation search methods of these and other literature from the first round produced additional important sources.

Since SSCM was described as a relatively recent phenomenon (Carter & Rogers, 2008; Seuring & Müller, 2008), the search was initially kept broad to ensure no important sources would be missed. However in light of this study's specific interest in the food sector and China as a geographic context, the search was repeated with the addition of terms such as "food", "agricultural", "China" and "emerging market" (in their various forms). At this level, specific interest was given to articles written by authors with close ties to the food industry and/or the China market. Furthermore, in light of the rapid rate of change occurring in China and its food sector following product recalls of tainted pet food in 2007 and dairy products in 2008 (Roth *et al.*, 2008), studies written in the wake of those incidents were given extra attention.

4.3.2 Empirical data collection

Interviews are seen as one of the most commonly applied data collection methods employed in case studies (Eisenhardt, 1989). The newness of the SSC topic further highlights the benefits with using a more flexible method such as interviews, which also face less cultural resistance and logistical challenges than surveys (Yeung, 1995). Yeung (1995, p.330) further points out that qualitative interviews "allow a more comprehensive and detailed elucidation of the interplay among strategy, history and circumstances" and therefore may increase the accuracy and validity of research results. As such, primary empirical data was collected via face-to-face interviews with case companies and industry experts during a research trip to China in March and April 2011. To support any remaining information gaps, database and Internet searches were used to collect secondary data, with attention given to the reliability of the source and corresponding accuracy.

Saunders *et al.* (2007) support Yeung's (1995) view of interviews as a reliable data collection method and put forth three forms ranging from structured interviews in which questions are very standardized and applied uniformly to all respondents, to unstructured interviews where the researcher has a clear understanding of the framework to be explored, but does not formulate interview questions in advance. A hybrid version of these approaches, (which Saunders *et al.* (2007) refer to as a semi-structured interview), involves the preparation of questions as a guide and permits selective use or reformulation according to the needs of the interviewer.

The exploratory nature of this research, combined with the recognition of benefits to drawing on previous research findings, led to the use of semi-structured interviews. In preparation for these, efforts were also made to address factors that Flick (2006) suggests may impact the quality of the interview data, such as researcher training and cultural or language use differences. Although the researcher's eight years of work experience in China helped to alleviate some of these issues, the draft question guide was revised on the basis of advisor's comments and the results of trial interviews with professional contacts in China.

Following Pickard's (2007) advice aimed at improving interview data accuracy and validity, key interviews were recorded with the consent of respondents and transcribed as quickly as possible in order to avoid loss of detail or nuances as time passes. In this way, it was also possible to incorporate any new learning into following interviews. Data collected was then written up in an interview report, with respondents given the opportunity to review for accuracy before the reports were used for analysis and discussion. Furthermore, data gathered through discussions with knowledgeable industry experts and secondary sources was used to validate interview findings.

Finally, in light of the potentially sensitive nature of the data requested, Perry (1998) advises the need for ethical considerations including transparent interaction with interviewees and responsible handling of confidential information. To this end, interview requests included a detailed introduction to the research topic and interviewees were again briefed on the study prior to the interview being started. At that time, interviewees were also assured that any information deemed confidential by the company would be dealt with accordingly, while participants uncomfortable with being publically quoted were offered anonymity.

4.4 Analysis

Case study analysis involves a process of examining and interpreting individual occurrences appearing in the data and aggregating these into categories that support an understanding of the study's initial propositions (Stake, 1995; Yin, 2003). Stake (1995, p.77) suggests that categorization of data is particularly important for instrumental case studies, which seek to "understand a phenomena or relationships within." However Stake (1995) and Yin (2003) also recommend that analysis begin from the outset of the study as it builds on the research questions prepared and the process followed for data gathering.

4.4.1 Analytical strategy

An analytical strategy that defines priorities "for what to analyze and why" is advised by Yin (2003, p.109) and may involve "relying on theoretical propositions, setting up a framework based on rival explanations, and developing case descriptions." Although this study is exploratory and therefore inductive in nature, prior theory and understanding of sustainability in supply chains have contributed to its design and are also important to the analysis of its findings (Perry, 1998). As such theoretical propositions are relied on and guide the analysis of this case (Yin, 2003).

4.4.2 Internal and external validity

In addition to general analytical strategies, Yin (2003) introduces a number of techniques that can help the researcher to address the challenges case studies face in developing internal validity (determining causal relationships) and external validity (establishing a domain that results can be generalized to). Of these, pattern-matching logic and cross-case synthesis have been used in the analysis of this study.

Pattern-matching logic involves comparing patterns found in the empirics with theoretical propositions, whereby the presence of coinciding patterns can help to strengthen the internal validity of a case (*ibid*). Use of cross-case synthesis requires data to be considered in many different ways and can therefore improve external validity (*ibid*). Data is divided by type across the cases and patterns are compared, such that corroborating evidence increases the strength of the finding and conflicting evidence spurs deeper investigation to reach an understanding of the cause (*ibid*). Stake (1995) suggests that while studies with a small number of cases have limited ability to support generalizations, findings including context specific insights, can be generalized to and contribute to the broader theory (Yin, 2003).

In the course of the research a few additional factors arose and have been considered for the impact they may have on the analysis and validity of the findings. First of all, developing a SSC is by nature a long-term process involving many players (Carter and Rogers, 2008; pers. com., Wang, 2011). Therefore, although efforts were made to secure interviews with the manager with the greatest responsibility for and knowledge of this process, findings based on interviews with a single senior figure in each case firm may not present the full picture and thereby may impact the analysis possible. Furthermore, as the researcher was also unable to secure interviews with respondents in similar functional positions (across the two case companies) the data may reflect somewhat different perspectives and functional biases. Lastly, since both case companies are producing products primarily for China's domestic market, findings may not necessarily speak to the conditions for sustainable supply chain development by food processors that source in China and produce for export.

4.5 Delimitations

Numerous decisions were made in the course of planning and developing this research project that have effectively limited its scope. The following includes a brief discussion of these decisions and their impact on this study.

To begin with, this research investigates the conditions for sustainable supply chain development in China's food processing sector. While this study may be approached from multiple perspectives, frameworks that see Elkington's (1998) TBL approach as

the central concept for operationalizing sustainability (Carter & Rogers, 2008; Pagell *et al.*, 2010) were chosen, while the corporate responsibility viewpoint has not been considered. Although the concepts of sustainability and corporate responsibility (CR) share common core elements (consideration for economic, social and environmental performance), Closs *et al.* (2011, p.105) suggest the fields have quite different views on the relationship between these dimensions with sustainability scholars seeing them as highly interconnected and CR treating them as "independent dimensions that may or may not be connected." Furthermore, the CR perspective considers related actions as closely connected to a firm's ethical values (Mark-Herbert *et al.*, 2010), analysis of which are beyond the scope of the data and the abilities of the researcher, given gaps in expertise and cultural background.

Another theory commonly applied in sustainability studies is the stakeholder approach; however the close similarity of the two case company's key stakeholders eliminates this as an independent variable. Furthermore reliable data on all stakeholder interests that would be required to make this analysis was difficult to obtain. Therefore, while stakeholder theory contributes to Pagell *et al.*'s (2010) SPP model and thus forms a component of the analysis, the view is not central to this study. In addition, while the China market is clearly made up of consumer segments that vary widely on multiple dimensions (www, McKinsey, 2006, 2), data limitations have prevented a detailed analysis from this perspective.

In selecting units of analysis, this study chose to focus on MNC food processors operating in China. The inclusion of food companies in China who process for export or Chinese-owned MNC food processors among case subjects may have provided additional analytical insights, however these dimensions were not feasible since interviews with firms of these types could not be secured. Interview constraints also played a role in the researcher's decision to focus on the firm as the unit of analysis rather than the supply chain, which would have required contact with numerous additional actors both up and downstream in the chain.

The investigation of case companies and the conditions for sustainability development in their supply chains focuses on the upstream source of key inputs, where the greatest challenges lie (www, WEF, 2011, 1) and only touches on the downstream stages towards the consumer. The study looks at conditions and initiatives in the existing supply chains of the case companies and does not attempt to address the relative big-picture sustainability of one particular food item versus another.

Furthermore, preliminary investigation to support the selection of potential respondents was conducted with the aim of identifying companies with a common general standard of sustainability performance and capabilities. As such the focus of the study is to understand the conditions for sustainability development in China supply chains and the investigation does not attempt to analyze factors that contribute to similarities or differences between the parent and its China subsidiary, beyond those of the market. In addition, the difference in ownership structure of the two case companies may also play a role in the approach to developing supply chain sustainability; however a lack of data from the perspective of Hormel China's joint venture partners prevents analysis from this perspective.

Finally, contextual factors relating to the economy, politics and culture have been shown to influence the development of supply chains and should therefore be taken into account when looking at processes for upgrading them (Osinga & Hofstede, 2005; Trienekens, 2011). Such contextual factors have therefore been considered in this study, although they are not the main focus of the research, and consequently coverage is limited to the contribution they make to understanding conditions for SSCM.

5 Background Empirics

According to Trienekens (2011), understanding the business environment is critical as context can both support and impede the process of value chain upgrades such as efforts to increase sustainability in the supply chain. Furthermore, the value placed on a product characteristic like sustainability will differ according to the environment and how it affects "human perception of value-based transactions" (Feller *et al.*, 2006, p.6). This chapter therefore provides a brief overview of some of the unique characteristics of the China market and its food sector.

5.1 A unique market context

With the world's largest population and an economy growing at an average rate of 9.7% per year over the last three decades, China has become a market of great interest for companies in the global food-processing sector (www, The Telegraph, 2011, 1; www, TWB, 2011, 1). Pursuit of opportunities represented by such a large market is however not without challenges, given the rapid rate of change and resulting growing pains (Roth *et al.*, 2008). Food processing companies considering the implementation of sustainable supply chain initiatives must pay attention to contextual factors relating to the economic, political and cultural environment and the impact they have on the food sector.

5.1.1 Economic environment

Since reforms that began in 1979, China has made the transition from a centrally planned economy to a more market based system (www, TWB, 2011, 1). The dramatic growth that has occurred since has contributed to a market with retail sales of $1 trillion a year that are growing at a rate of approximately 18% annually (www, The Economist, 2011, 1). This rapid expansion is evident in the retail food sector with supermarkets and convenience stores experiencing double-digit growth over the last decade and fast-food chains such as KFC growing to over 3,000 stores as the company opens a new restaurant every day (www, HBS, 2011, 1; www, McKinsey, 2010, 1).

Rapid urbanization[1] of the country's 1.4 billion people has supported this growth, but despite the impressive rate of development, the gap between the middle class in China and its counterparts in developed countries remains sizeable with only 1.4% of urban households making above $15,000 a year, and 11% making between $5,000 and 15,000 (www, The Economist, 2011, 1). Furthermore, China's rising consumer price index (CPI), which was expected to reach 6.2% in June (www, China Economic Review, 2011, 1), has contributed to it having "the second largest number of consumption-poor in the world after India," making poverty reduction a continued challenge for the country (www, TWB, 2011, 1). As food prices comprise 30% of the CPI, such increases are a big concern for urban consumers who spend an average of 35.7%[2] of their income on food (www, China Daily, 2011, 1; www, The Economist,

[1] The CIA World Fact Book (2010, 1) estimates China's urban population at 47% of the total and rising at a rate of 2.3%/year between 2010 and 2015.

[2] In contrast, the poorest 10% of the population in the UK spend an average of 15% of their income on food (Defra, 2008, p.19).

2011, 1). Given this situation, price is an important purchasing factor, particularly as consumers are "relatively new to the idea of paying for attributes that do not have immediate and concretely perceivable impact" (Roth *et al.*, 2008, p. 29). Combined with a general business environment characterized by intense competition, companies constantly face the risk of competitors undercutting their price and making a profit is a challenge (*ibid*).

5.1.2 Political and institutional environment

The gaps in development between coastal and inland regions and urban and rural settings pose an ongoing challenge to the Chinese government's efforts to promote stable, economic growth and development for the country as a whole (www, China Net, 2005, 1). The government's most recent five-year plan places significant emphasis on tackling these disparities and also aims to improve living standards through a more sustainable development path (www, Xinhuanet, 2011, 1). In light of the sizeable low-income population and the significance of food as a proportion of overall expenditures, the food and agriculture sectors are a particular focus in this regards (www, China Daily, 2011, 1; www, The Economist, 2011, 1). Concern for sustainability issues is greatest in the context of these and other issues that are important to government, such as improving safety and quality of production (pers. com., Jonsson, 2011).

High inflation in food and a string of food contamination scandals have presented a huge challenge for China's government in recent years (www, China Economic Review, 2011, 1; www, China Daily, 2011, 1 & 2). In the wake of the 2008 melamine milk crisis that caused the death of six infants and serious kidney ailments of 300,000 children, quality supervision authorities stepped up inspection routines and "more than a third of the country's 1,176 nationally registered dairies faced permanent closure" (www, China Daily, 2011, 1). Another major food safety scare involving the clenbuterol contamination of pork in the supply chain of China's largest meat processor caused the illness of more than 300 people, prompting further investigations and renewed concerns over standards governing quality and safety in the food processing sector (www, China Daily, 2011, 2).

A report by CSR Asia (www, 2011, 1) cited results of a China Youth Daily survey showing 97.4% of people believe "government agencies should take charge of food safety problems". However in spite of new laws that came into effect in 2009, the report further highlighted survey results from the southern city of Guangzhou, which found that 80% of consumers worry about food safety. These figures support statements by Tan (2007) suggesting a general lack of trust in food safety, product quality and governmental certifications. The development of a trusted, official framework for distinguishing quality differences is considered to be a necessary incentive for supply chain actors to pursue improvements, since without it consumers will continue to purchase only on the basis of price (pers. com., Industry Expert A, 2011).

While the Chinese government is clearly stepping up efforts, establishing a regulatory infrastructure capable of nurturing free enterprise takes time to balance all elements and the country's legal system is still under development (Roth *et al.*, 2008). A lack of traceability infrastructure and the difficulty firms face in taking legal action has contributed to an environment in which exchange partners may face few short-term

consequences for opportunistic behaviour (Johnson & Hofman, 2004; Roth *et al.*, 2008).

5.1.3 Culture and customs

China is a country with a long history, entrenched culture and complex set of rules and customs (Roth *et al.*, 2008). Informal relationships play an important role is this culture (Cai & Yang, 2008). As such, the trust that develops through these relationships may be a more effective means of ensuring commitments are met than contracts, as individual farmers may lack a clear sense of the law (pers. com., Mi, 2011; pers. com., Industry Expert D, 2011). Low, income levels and uncertainty stemming from the current economic and political environment may also contribute to opportunistic behaviour and establishing trust with suppliers can be a difficult and time-consuming process (Roth *et al.*, 2008).

Like consumers, many producers still may be not understand the concept of or need for intangible attributes such as sustainability (Roth *et al.*, 2008). Therefore helping producers to see the benefit to their business is important for securing this interest (pers. com., Chen, 2011; pers. com., Jonsson, 2011). Training including technology transfer and assistance is also needed to bridge the gap in understanding (Roth *et al.*, 2008). However, in light of the complexity of social and economic factors that impact the decisions of players throughout the chain, training alone may not be sufficient and government intervention, along with reliable regulatory enforcement are also necessary to support change (Roth *et al.*, 2008).

Whereas media and non-governmental organizations (NGOs) have contributed to this change in some markets, their role is relatively less influential in raising awareness of and contributing to solutions for issues of food safety and sustainability in China (Enderwick, 2009). The resulting lack of independent information sources further contributes to gaps in understanding of product quality and overall price sensitivity (*ibid*).

5.1.4 China's agri-food sector

Having touched on the impact of economic, political and cultural factors, it is also worth briefly considering unique characteristics of China's agri-food sector itself. While facing a significant development curve, China has a long established history of permanent agriculture (Yang, 2006). In spite of significant challenges to agricultural productivity[3] resulting from a "lack of arable land, air pollution and acid rain, rapidly deteriorating freshwater and poor soil quality due in part to industrialization and population growth" (Roth *et al.*, 2008, p.35), China is to be commended for having largely achieved self-sufficiency in food (Yang, 2006).

China's agri-food chain has few large farms and is composed largely of small-scale farmers with more than four-fifths of the country's 675 million rural residents working on plots that average 0.66 hectares (Chen *et al.*, 2010, p. 4; www, The Economist, 2011, 1). Only 30 years ago, government planned and operated the entire agri-food supply chain, and as a result, small producers "are not well structured or

[3] In 2006, China's arable land per capita was only 0.1 hectare, or 45% of the world average (Yang, 2006). Water resources that are equivalent to only one quarter of the world average per capita and 75% of grain is grown on irrigated land (www, Reuters, 2010, 1; www, FAO, 2011, 1).

organized in the supply chain" (Zhang & Aramyan, 2009, p.137). The period of centrally planned agriculture, disrupted farming traditions and today many small producers are not engaged as a profession but rather as a means of earning extra income on the side (pers. com., Industry Expert C, 2011; pers. com., Mi, 2011). Production decisions are therefore often short-term focused and there is a lack of concern for reputation regarding product quality (*ibid*).

However as in China's other sectors, the agri-food industry and supply chain are experiencing rapid change (Zhang & Aramyan, 2009). Government is encouraging the development of "Enterprise + Farmer" models that reduce the number of links between farmers and processors in order to reduce unnecessary costs added by middlemen, thereby increasing profits for farmers and enabling lower prices to end consumers (pers. com., Industry Expert B, 2011; pers. com., Mi, 2011). With companies encouraged to guide production inputs and methods, this model is also seen as an approach to increasing quality and productivity on the farm and stability for processors' supply (pers. com., Mi, 2011; Tan, 2007).

To date this model represents approximately 5% of agriculture production and is more prevalent in the supply chain for plant products than meat products (pers. com., Mi, 2011; Tan, 2007). Larger food processing companies under state ownership have also been quicker to adopt these practices than private firms (*ibid*). However an updated version of the model described as "Enterprise + Cooperative" is also receiving increasing attention from government, which is offering subsidies for cooperative registration loans (*ibid*). This approach is seen as having potential for addressing contract violation rates and may also tackle challenges related to fragmentation as it reduces the number of independent, small farmers (pers. com., Mi, 2011).

6 The empirical study

This chapter presents empirical findings on the topic of SSC initiatives in China's food processing sector in the context of two case companies including McCain Foods Limited China and Hormel Foods International Corporation.

6.1 Hormel Foods International Corporation in China

US based Hormel Foods manufactures and markets high quality, brand name food and meat products internationally (www, Hormel, 2011, 1). Processed meat products such as ham, bacon and sausages are among the items distributed through retail, foodservice and wholesale operations (*ibid*). With 120 years history, the company is still defined by the values, on which it was built – "integrity, an uninterrupted quest for quality and innovation, a respect for each other and commitment to community" (www, Hormel, 2011, 2).

Numerous awards for quality, safety and environmental performance support these claims. In 2010, the company's entry to the Dow Jones Sustainability Index (DJSI World) saw Hormel recognized "among the world's top 10 percent most sustainable companies based on economic, environmental and social criteria" (www, Hormel, 2011, 3). According to a September, 2010 press release, this listing was largely supported by key corporate responsibility initiatives including the establishment of a web-based environmental management system, a packaging minimization initiative and "efforts to establish corporate responsibility standards for suppliers in addition to existing quality and safety standards" (*ibid*).

Hormel's China business is operated by Hormel Foods International Corporation (HFIC), which is a wholly owned subsidiary of Hormel Foods that has established international joint venture (JV) and license agreements in a number of countries including "Australia, China, Denmark, England, Japan, Korea, Mexico, Panama, the Philippines and other nations" (www, Hormel, 2011, 1). HFIC arrived in China in 1997 and established two JVs including one with Sanyuan Group (China's biggest dairy company) in Beijing, and another in Shanghai with a subsidiary of the Jinjiang Hotel Group, China's largest hotel operator (pers. com., Guo, 2011). Although the two JVs are independent legal entities, Hormel's ownership in both is controlled by HFIC, and so for the purpose of this case they are referred to collectively as "Hormel China".

Hormel China's Shanghai JV focuses on processing and product development in an R&D centre that was opened in 2008, while its Beijing JV does processing and can also handle slaughtering on a small scale (pers. com., Guo, 2011). Products similar to those produced by its parent company are sold directly to consumers through modern retailers such as Carrefour and Metro, while food industry customers include hotels and quick service restaurants such as KFC, Pizza Hut and McDonald's (*ibid*). Hormel China sees itself as a niche market player, since most Chinese consumers are not yet accustomed to 'western' processed meats (pers. com., Guo, 2011).

6.1.1 Hormel China's pork supply chain

Nearly 95% of Hormel China's raw materials are purchased domestically and pork makes up 60% of these, with the remainder being spices and various other ingredients. Although some hogs are purchased from its Beijing JV partner (and slaughtered in the Beijing unit), the majority of Hormel China's meat inputs are sourced from other slaughtering plants in China.

Food safety is of critical importance to Hormel China's restaurant and food service customers and given the fragmented situation and all the resulting safety challenges in China's meat industry, product safety and quality are the company's primary concerns (pers. com., Guo, 2011). Hormel China has established standards for its suppliers governing food safety and the safety of working conditions for employees. These standards are monitored through annual audits and regular product testing in both the suppliers' and Hormel's own facilities (pers. com., Guo, 2011), which is the most common approach in the modern, commercial meat business (pers. com., Industry Expect A, 2011). The company remains focused on these issues and to date has not implemented supply chain sustainability initiatives outside of its own facilities where it has taken measures to achieve reductions in packaging, water and power use.

Fragmentation presents a challenge to safety and supply chain value upgrades at all levels of the meat industry from the producer up to the processing industry. The majority of China's hogs are raised by backyard producers, (with an estimated five to ten hogs) who engage in the activity as a means of earning extra money and do not have much knowledge of modern farming practices, let alone awareness of efficiency or environmental issues (pers. com., Guo, 2011; www, WATT, 2010, 1). With varying estimates of up to 80% of hogs still coming from backyard farms (Han *et al.*, 2006, p.3; Osinga *et al.*, 2010, p.6), quality is difficult to control as there is no system for monitoring small producers and traceability is further challenged as the animals make their way to slaughterhouses via deals with travelling traders that gather hogs from small households and consolidate them into larger lots.

Hormel China believes fragmentation in the upstream market for hogs is further complicated by a lack of market information at the level of the small farm producer (pers. com., Guo, 2011). The dealers who travel village-to-village, buying hogs are better informed about market prices but are not motivated to share this information. As a result, farmers are limited in their ability to plan for the future, making them focus on short-term profit maximization and prone to enter or exit the market at short notice (*ibid*). Osinga *et al.* (2010, p.6) point out that a lack of systems to support checks and the absence of severe consequences for taking "a way around" rules has also contributed to self-interested behaviour.

The slaughtering end of the business also suffers from challenges related to fragmentation (pers.com, Guo, 2011). According to China Business News (www, 2010, 1), there are approximately 3,700 modern slaughterhouses in China, which together account for only 18% of the total market. The remaining 82% of the market is "served by slaughterhouses with manual and semi-mechanized operations" (www, China Business News, 2011, 1). Adding a dimension of scale to this picture, a study by Osinga *et al.* (2010, p.9) found that in two of China's main hog producing provinces, slaughterhouses that process more than 100 hogs per day made up only 24% of the main hog buyers.

Although there are many factors that support this structure, Guo (pers. com., 2011) considers the Chinese consumer's preference for meat that is freshly slaughtered and sold the same day to be a key issue. As pork is the most widely consumed meat in China (www, People's Daily Online, 2011, 1), these consumption habits create opportunities for the many small farmers to sell into the supply chain for small-scale (often rudimentary) slaughtering operations that sell through open-air, local food markets (pers. com., Guo, 2011; pers. com., Industry Expert A, 2011).

At the processing level, the country's top 10 processors control less than a 10% share of the market (www, China Business News, 2010, 1). Therefore in light of the fragmentation at so many levels and the heavy competition this environment creates, Guo (pers. com., 2011) suggests individual processors are limited in their ability to affect change and must focus on achieving economies of scale and capturing market share in order to be able to compete. Manufacturers think at the current stage of the market that the government needs to take the majority of responsibility for implementing changes that help to control food safety and sustainability.

6.1.2 Hormel China's Perspective on the potential for SSC Initiatives

Given current market conditions, Hormel sees committed, commercial hog production as a system with the potential to address product safety issues and support a more long-term, sustainable focus (pers. com., Guo, 2011). China's government has reached a similar conclusion and is implementing policies and offering subsidies to encourage more large-scale, capital-intensive production and slaughtering operations as a means of tackling fragmentation and facilitating greater efficiency, food safety and sustainability initiatives (pers. com., Guo, 2011; www, Meat Trade News Daily, 2011, 1). Fabiosa *et al.* (2005) suggest the growth of commercial hog production and slaughtering has also been spurred by dramatic growth in the retail supermarket sector and they expect this trend to continue. Large industry players have taken note and are investing more in their brands to build up the market for chilled meats (pers. com., Guo, 2011).

At the same time, scale and modernization are not enough to guarantee safety as is demonstrated by the March 2011 clenbuterol-tainted pork scandal caused by Shuanghui, (China's largest and most modern hog slaughtering and processing company) and new inspection, safety policies and penalties are being addressed as well (pers. com., Guo, 2011; www, Xinhuanet, 2011, 2). However, while food safety and sustainability are critical concerns for government, it must simultaneously consider the need to ensure an affordable food supply for as much of the population as possible as well as the income needs of the millions of backyard producers (pers. com., Guo, 2011; pers. com., Industry Expert C, 2011; www, WSJ, 2011, 1). Together these act as a balance affecting the pace of change targeting increased food safety and sustainability (*ibid*).

Such scandals are very damaging to the entire meat industry and food safety is a priority for processors as well as government (pers. com, Guo, 2011). The government would like processors to take greater responsibility in implementing food safety mechanisms and have promoted an "Enterprise Plus Farmer" model that encourages closer integration of food companies and their suppliers with the company supplying and/or controlling the inputs and processes used (pers. com., Chen, 2011; pers. com., Guo, 2011; pers. com., Mi, 2011; pers. com., Industry Expert C, 2011). To

date, adoption of this model has been limited as food processors lack the necessary capabilities and resources (pers. com., Guo, 2011). Academics in China have also encouraged a modified "Enterprise + Cooperative" model as more appropriate since it may offer a more balanced power sharing environment for small producers (pers. com., Chen, 2011; pers. com., Mi, 2011).

Hormel believes that China's meat processing industry is beginning to acknowledge the importance of sustainability, however the fragmented nature of the market, present safety issues and intense competition make it challenging for firms to focus sufficient resources on related initiatives (pers. com., Guo, 2011). While foreign companies may bring greater awareness, large domestic processors have much greater scale and are therefore better positioned to affect change (*ibid*). Clear and uniformly enforced standards will also support processors in making these changes and improved consumer information on these will further guide the public in its purchasing decisions (*ibid*).

6.2 McCain Foods Limited China

McCain is one of Canada's most famous brands and is a leader in the global frozen food sector producing from 53 facilities worldwide (www, McCain, 2011, 1). In addition to its well-known French fry and potato products, the company produces a wide range of frozen vegetable, appetizer and other food products. Targeting food service and retail customers, McCain's products can be found in restaurants and supermarkets in more than 130 countries (www, McCain, 2011, 1 & 2).

As a member of the SAI Platform[4], McCain is committed to the development of sustainable agriculture worldwide (www, McCain, 2009, 5). While good ethics and sustainable practices have been at the core of McCain's business approach since it was founded (www, McCain, 2011, 6) the company's Fiscal 2009 Global CSR Report announced formal plans "to develop a Supplier Code of Conduct in 2010 that commits vendors to a relationship built on a shared commitment to quality, safety, fair labour conditions, responsible environmental practices and ethical business conduct" (*ibid*, p.36).

The company's China operations were established when McCain Foods China (McCain China) opened its first sales office in 1997 to serve customers such as KFC and McDonald's, which have the need to provide the same high-quality standard of product in their restaurants worldwide. As demand grew, McCain China began feasibility studies aimed at determining optimal locations for growing potatoes and constructing its processing facility. In 2005, McCain China established its most modern processing facility in Harbin, the capital city of Heilongjiang Province and "has since grown rapidly to become the largest producer of both domestically produced and imported frozen potato and appetizer products in China" (www, McCain, 2011, 3).

[4] SAI (Sustainable Agriculture Initiative) Platform "is an organization created by the food industry to communicate and to actively support the development of sustainable agriculture involving stakeholders of the food chain" (www, SAI Platform, 2011, 1).

6.2.1 McCain China's potato supply chain

The need to provide multinational customers with the same product, according to the same high standards worldwide is behind the significant investment McCain China makes in facilities, equipment, training and developing its potato growers. French fries and other potato products that McCain prepares for its commercial food customers require the use of a special variety of potatoes, grown for quality characteristics including uniformity of shape, colour, thickness of the skin and taste. As this type of potato was not among those traditionally grown when McCain entered the China market, plans to begin processing in the country made it necessary to introduce both the new variety and the modern practices involved in growing it.

Automated potato farming requires scale and McCain's growers typically farm plots ranging from 20 to 500 hectares (pers. com., Wang, 2011). As China's average farm size is only 0.66 hectares (Chen *et al.*, 2010, p. 4), Heilongjiang's state-owned farming past and the fact that some of its larger (formerly state-owned) farm units are still operational made it easier to initially find potential growers in this region. Typical farm holdings are also significantly larger than in many parts of the country with individual families having rights to plots of between one and a half and three hectares (pers. com., Wang, 2011). As such it was also foreseeable that other growers would be able to rent land from groups of individual farm families in order to achieve the required scale.

When McCain first started to investigate conditions for growing its potatoes in Heilongjiang, agricultural infrastructure was limited and many growers were still planting and harvesting by hand or with the aid of animals and small tractors. In an effort to understand the local environment and farming system, McCain China spent a couple of years working with growers and their existing methods. Hardpan soil developed through years of shallow cultivation, restricted efficient use of water and nutrients. Furthermore, small-scale farming, basic methods and traditional seed varieties all contributed to the production of inconsistent quality and yields. Under these conditions the cost of potato inputs was much higher than other places in the world and McCain saw it would be necessary to introduce new farming practices and technology.

Recognizing the need to demonstrate the new technology and convince Chinese growers of its value, McCain China first developed a trial farm project. Tractors and ploughs were brought in to deal with the hardpan and automate the planting and harvest. In light of the region's dry conditions, the introduction of modern irrigation systems was also important and demonstrated the water-saving benefits over the furrow (flooding) irrigation previously used. Figures 11 and 12 show this equipment in use on the farms of McCain China's growers in Heilongjiang Province.

Figure 11. Tractors and potato harvesters introduced to facilitate improved soil management practices and efficiency (www, McCain China, 2011, 3).

Figure 12. Water-saving irrigation systems replaced inefficient furrow methods (www, McCain China, 2011, 3).

Furthermore, a seed multiplier unit was established at the Harbin facility and the company's global agriculture team helped to introduce varieties best suited to the specific growing conditions. Heilongjiang growers initially watched the practices at the trial farm and thought, "these foreigners are crazy" (pers. com., Wang, 2011). But disbelief turned to interest as they observed the yield and quality of the potatoes harvested at the end of the first season.

In the first few years of operations, McCain China's demonstration farm was not only instrumental in introducing modern potato growing practices and technology, but also provided most of the supply of potatoes required in the company's processing operations. As McCain began to develop its grower base, production activities at the demonstration farm were scaled back and the company began to use it as a training ground for growers and their employees who needed to develop the skills necessary for becoming machine operators, technicians and agronomists.

In 2007, McCain China expanded its supply base to the neighbouring province of Inner Mongolia - a move made possible by rural development initiatives under the central government's "Go West" campaign[5]. Modern highways and power lines were constructed in areas that were previously difficult to access making timely transport for processing feasible. Furthermore, government investment in agricultural infrastructure including irrigation wells and modern equipment transformed agriculture, facilitating numerous opportunities for development in the province. The addition of growers in Inner Mongolia was a good match for McCain's existing base in Heilongjiang, not only satisfying the growing demand for potato inputs, but also providing earlier varieties (due to a shorter growing season) that allowed the processing period to be extended. A map of China places the company's supply base and processing facilities in Figure 13.

5 A campaign by China's central government intended to tackle disparities between wealthy coastal provinces in the east and China's central and western regions through investments in infrastructure, communications and environmental protection (www, China Net, 2005).

Figure 13. McCain China's supply and processing base (Modification of China map, www, OUHK, 2011, 1).

Despite having established grower bases in two regions, McCain faces an ongoing challenge to develop and maintain long-term growers. In addition to the sizeable investment and steep learning curve required, growers also face rapidly rising land rental costs[6] and price volatility of inputs such as diesel, fertilizer and chemicals. The capital and business acumen needed to flourish in this kind of environment has meant that many of McCain's growers have not been traditional farmers but rather business people from cities like Shanghai or Beijing who have money to invest and see potential in agriculture. While better positioned to manage the financial requirements of large-scale potato farming, these growers also tend to put more emphasis on short-term earnings. The risk of them giving up farming if they are not able to generate satisfactory profits in the first few years is therefore another challenge that McCain and potato processors in the market in general face.

6.2.2 McCain China's strategy for developing a sustainable supply chain

According to Wang (pers. com., 2011), development of a SSC in China is contingent on first securing factors that provide the foundation for long-term operational viability including committed growers, land for them to grow on, capital to support their development and a qualified workforce. Once these are in place, you can begin to address the farming practices, use of inputs and the resulting product quality, safety and sustainability.

[6] Although farmland was relatively easy to rent in 2005, inflation in China's food commodity markets has increased demand significantly and nearly tripled rental prices in the time since to a rate of 7,600 CNY/hectare today (pers. com., Wang, 2011). At time of writing, SEK to CNY exchange rate is approximately 1:1.

6.2.2.1 Establishing a foundation for SSC initiatives

Grower commitment stems largely from confidence in their ability to operate a viable business and McCain believes in creating opportunities that are mutually beneficial for the company and its suppliers (pers. com., Wang, 2011). With land rents increasing rapidly, growers have experienced difficulties in securing long-term leases. Furthermore, the financing necessary to develop their businesses is also a challenge to secure. Funds available through the rural development loan programs of major banks are small relative to the investment growers require and are only available to resident farmers from the region that are able to secure required guarantees by the village council and adjacent neighbours. Therefore many growers, in particular investor growers from other regions, do not qualify. While government subsidy programs have filled some of the gap, supporting adoption of new technology, financial support from McCain is essential to achieve the long-term scale and efficiency necessary for both the growers and the company.

The support provided by McCain China comes in a number of forms. First of all, the company commits to long-term purchasing contracts with growers who demonstrate a dedication to this business, offering stability and the financial reassurance necessary to take on long-term land leases and other costly commitments. Growers also receive price premiums for growing according to McCain's production standards that support profitability. Furthermore, to assist with volatility and rising prices of inputs such as fertilizer and chemicals, McCain also assists long-term growers by providing loans that can be repaid at the end of the season when payment is received. Taking a long-term perspective, this situation is seen to offer advantages for both parties and supports the stability necessary for McCain to be able to tackle sustainable growing practices.

Another challenge to the sustainability of McCain's supply chain is the growers' ability to attract and retain talent. Growers who wish to follow the agricultural practices introduced by McCain have difficulty to find employees with experience in these methods and in operating modern farming equipment. Therefore to help fill this gap, McCain hires employees ranging from machine operators to technicians and agronomists, and provides training for up to three years on its demonstration farm. Growers with a long-term outlook on the business are happy to be able to employ fully trained and capable employees who will contribute to the stable growth of their business. Employees also benefit from the career opportunities the work experience provides and as McCain pays competitive salaries, growers must offer at least equal or better compensation. From McCain's standpoint, the company not only supports the necessary expansion of its grower base, but also provides an opportunity to train growers' employees according to the company's strict agricultural standards.

6.2.2.2 McCain's Good Agricultural Practices (GAP) Program

McCain's global environment policy and principles of integrity, quality, safety and social and environmental responsibility, establish the framework for managing the company's business and sustainable growth (www, McCain, 2011, 4 & 5). Legal compliance is regarded as a minimum standard to be achieved, and McCain aims to "continuously improve environmental performance by finding effective ways to reduce the adverse impacts of its business from farm to fork" (*ibid*, p.11). Agricultural practices are managed by McCain's Global Food Safety & Environmental Sustainability Working Group and "governed by the company's Good Agriculture

Practices (GAP) program" (*ibid*).

McCain recognizes that each environment it operates in has its unique characteristics and a company policy of "drinking the local wine" (pers. com., Wang, 2011) acknowledges the need to approach things accordingly. In China the company works closely with suppliers to ensure they meet the global standards, but has not yet implemented a formalized supplier code of conduct as the group of growers is still relatively small and differs a fair bit in scale and experience. The framework applied in China is that prescribed under McCain's global GAP program and although implementation may take a longer time in China, McCain China's agricultural team works towards the same goals, applying the same standards and the same methods of auditing them.

The company's GAP program not only trains farmers how to grow potatoes, but also how to grow them wisely and with respect for the environment and people. The core issue addressed by the program is food safety, ensuring the raw materials are safe and that all steps in the process from farm to the customer's table meet McCain's strict standards. Protecting the safety of the people involved in the growing process is also a key concern. Standards and training related to environmental management (soil, water and air) as well as the storage and handling of potatoes support both of these objectives.

Chemical application is one area of particular focus in the guidance and training growers receive. First and foremost, McCain aims to ensure that the chemicals its growers use are on the company's approved list and not toxic substitutes purchased from small dealers. McCain follows European standards for food safety and therefore tests for residues of more than 300 restricted chemicals that may exist in the environment, even when not directly used by the grower (pers. com., Wang, 2011). McCain's global agriculture team is constantly working to update this list and the company's standards far exceed those of local authorities, which only require tests for the presence of eight restricted pesticides. In addition to ensuring the safety of chemical inputs, by controlling the chemicals and the channels through which they are sourced, growers also benefit economically since they can take advantage of the McCain's global relationships and buying power.

The conditions under which chemicals are applied are another issue of great importance to the safety of the growers and their employees. McCain recognized from the outset that the added cost of safety gear may deter growers from following guidelines regarding its use and therefore has taken the initiative to provide all necessary attire and the training to those who use it. Doing so has not only benefitted employees working for McCain's growers, but also others in the region who have learned of the safety hazards and pressed for similar support.

6.2.2.3 Transition to a SSC

In the early years of production, McCain China had to work hard to attract new growers and develop their skills and practices in order to secure product that met company standards. By 2008 a stable grower base had been developed and McCain China was able to begin implementing the company's global best practices guidelines for grower selection. These look at a grower's capabilities related to growing potatoes, long-term business intentions and available resources including land,

equipment and financing. Contracts signed with new growers provide a written outline of these requirements and the standards for sustainable farming practices established by McCain. However training and frequent communication between McCain China's agriculture team and growers is key to the success of the program as they are more receptive to explanations in the field than paperwork.

Although now in a position to be more selective, at least half of new growers added still have gaps that require support from McCain to tackle. In light of the continuing need for development of most new growers, knowledge and ability to implement sustainability objectives are addressed more through GAP training than the company's selection process.

McCain China's agriculture team works closely with growers to train in all functions from planting to harvest, after which audits are conducted at key stages to identify gaps, which are then dealt with through further training. In addition to individually focused training and assistance, McCain China organizes group-training sessions each year that take place before, during and after the season ends. These events not only serve an educational function, but are also used to acknowledge grower performance in terms of yield and success in implementing GAP program standards via four levels of awards. These public awards not only reinforce positive performance but also provide incentive for growers who aim to not be outdone by their neighbours. This is an ongoing process as new growers are added each year and new issues are constantly arising. However McCain China believes the majority of growers are performing well and awareness of sustainability issues, which was non-existent when the program began, has also begun to develop over the last few years.

6.2.2.4 McCain China's SSC initiatives and TBL performance

McCain China sees the benefits of practicing sustainability in its supply chain as directly supporting the economic sustainability of the business (pers. com., Wang, 2011). A stable base of growers and resources are necessary for the company to be able to expand and meet the growing demand of the market. The supplier retention necessary to achieve this kind of stability requires mutually beneficial business development and a holistic approach to managing all factors.

In spite of the relative stability McCain China has achieved, the potential for large growers to leave the business is an ongoing risk to its supply chain. Growers may lose the land they are leasing and not be able to secure sufficient new plots or they may decide there are more attractive investment opportunities in other sectors. Growers may lease land for 10 or 20-year periods, but in most cases rent is paid annually, making exit from the market relatively easy for those who decide they have had enough of the business.

Furthermore, although McCain had to develop a unique supply chain for the potatoes it uses (as this species is not among those traditionally consumed in China), dynamic market conditions and inflation have brought about changes that present a potential threat to the stability of this supply. In 2010, China's agricultural commodity prices rose dramatically over a short period of time, pushing market prices for commodity table potatoes over contract rates for McCain's specialty potatoes for the first time. Faced with a sudden price advantage, retailers and consumers were willing to try the specialty potatoes (despite strong preferences for traditional varieties), and in doing so realized the quality they offer. These conditions have therefore presented growers

with an alternate market, not previously accessible and the growing retail demand now presents a new challenge for supply chains of potato processors.

Although McCain's growers produce on contract, higher prices in 2010 tempted some to sell part of their committed crop into this new market. With legal enforcement being costly, time consuming, unpredictable and likely to damage the company's reputation more than the perpetrator's, termination of long-term agreements is the only viable option for dealing with growers who break contract terms. Therefore avoiding this type of situation is a better solution and the fact that the majority of growers chose to honour their contracts is attributed at least in part to sustainability initiatives and the resulting mutually beneficial relationships that have developed (pers. com., Wang, 2011).

The economic sustainability experienced by McCain China is also visible in the performance of its growers who have expanded along with the company. Approximately 85% of the growers who began supplying McCain in 2005 are still with the company and some who started out with 20 hectares are now operating 500 hectares only six years later (pers. com., Wang, 2011). McCain China understands that this kind of growth is only possible when growers are secure in their ability to earn a profit and therefore feel comfortable planning and investing long-term (*ibid*).

Wang (pers. com., 2011) suggests the company's growers have also recognized clear links between profitability and the quality provided. Growers know processors will not accept product that has not been produced according to the GAP standards, and simultaneously the premiums paid provide an incentive to invest in meeting these. Growers have also witnessed the benefits of following the prescribed environmental practices, as soil management has a big impact on the quality, yield and therefore profitability of their crops. Those who are able to secure long-term leases have even more incentive, since investments in improving land quality take place in the first few years but pay off over an even longer period.

Lastly, facing the difficulty of attracting sufficient talent, growers are happy to be able to employ the capable employees that are trained by McCain China (pers. com., Wang, 2011). Solid career opportunities, safe working conditions and competitive salaries are important to improving the social prospects among this group. Furthermore, local landholders who lease property to the growers also benefit from McCain China's business and the standards its growers must follow. Rents received are typically equivalent to the income a small-hold farmer could earn growing his/her own crop and yet leave the family free to pursue other employment, thereby improving the family's economic situation (*ibid*). At the same time, crop rotation and land quality improvements due to Mc China's GAP practices often mean land is returned to owners in better condition, thereby also improving future growing potential.

6.2.3 McCain China's SSC and the role of partners

McCain China is at the centre of the supply chain connecting growers with its customers and recognizes the importance of working closely with these partners (pers. com., Wang, 2011). Although the company takes the lead and responsibility for developing SSC initiatives, input is sought from both ends and is jointly analyzed to ensure outcomes are beneficial for all parties. The company understands that

introducing and trying to impose new standards from overseas is not an effective approach as growers who are newly exposed to sustainability concepts need to understand and be convinced of the benefits that sustainable practices bring for their business and the supply chain as a whole (*ibid*).

Outside of collaboration with direct business partners, Wang (pers. com., 2011) advises that McCain may operate a bit differently in China than in other countries where some public partners play a more important role. Although McCain China may sponsor research related to specific problems, involvement with academic institutions is limited as they are seen to have more interest in government-funded projects. Others such as grower associations also have limited partner potential as a history of poorly executed initiatives has diminished grower trust and encouraged them to become much more independent (*ibid*).

Partnerships with government are however seen to have had a positive impact on the sustainable development of McCain China's potato supply chain. Although the company's in-house agricultural expertise is highly advanced, collaboration with government departments on agriculture extension has been mutually beneficial (pers. com., Wang, 2011). Recognizing the advantages of the new soil management techniques and more efficient irrigation practices introduced by McCain, extension officers helped to spread these methods throughout the province and government subsidy programs helped growers to fund them. The company further acknowledges the important role that government policy and infrastructure projects have played in the development of Inner Mongolia as the productive potato-growing region it is today (*ibid*).

7 Analysis

This chapter seeks to develop insights into the conditions for sustainable supply chain initiatives in China's food processing sector by analyzing the empirical findings, as guided by the theoretical frameworks introduced in Chapter Three. The chapter begins with a brief reminder of the key concepts of SSCM, establishing parameters relevant for the analysis of how the conditions impact the development of SSC in China's food processing sector, using TCE. Pagell *et al.*'s (2010) SPP framework is then used to analyze how a SSC can be developed. The role that partners play in this process is not addressed specifically by either of the theories; however a discussion of empirical findings and literature seeks to shed light on this point in the following chapter.

7.1 Conditions for SSCM

Carter and Rogers (2008, p.368) see SSCM as taking a strategic, transparent and coordinated approach to managing "an organization's social, environmental and economic goals" in interorganizational business processes. Centred on Elkington's (1998) TBL approach, true sustainability is to be found at the intersection of performance in these three areas, however long-term economic sustainability is a base requirement for SSC initiatives pursuing improved environmental and social performance (Carter & Easton, 2011; Carter & Rogers, 2008).

To understand the conditions for SSCM it is first important to understand the characteristics of a company's supply chain and the impact this may have on the process. Given the baseline requirement for economic sustainability, TCE is used to analyze and determine the TC minimizing governance structure of the typical supply chain (i.e. without consideration for sustainability objectives) for primary inputs used by the two case companies. A comparison is then made between this structure and the governance structure prescribed by the SSCM framework, highlighting the gaps and the potential challenges these represent.

7.1.1 Case company supply chains and TC factors

Hormel China's primary input is pork, which is the most widely eaten meat in China and is predominantly raised in small, backyard farms across the country. A high level of fragmentation found at the producer level is also present at the hog slaughtering stage of the industry therefore Hormel China has many suppliers it may choose from. In contrast, McCain China's primary input is a special variety of potatoes that was not grown in China when the company entered the market. As a result it was necessary for McCain China to establish its own unique supply chain, introducing both the potato variety and the technology for growing it. The impact this difference may have is investigated through an analysis of TC factors including asset specificity, uncertainty and frequency of exchange for the supply chain of each primary input. An overview of this analysis is displayed in Table 4 and expanded upon in the pages following.

Table 4. Transaction cost analysis of typical supply chain for the primary inputs used by case companies

Typical Supply Chain for Hormel China's Pork Inputs	**TC Factors**	**Typical Supply Chain for McCain China's Specialty Potato Inputs**
LOW • Approximately 80% of hogs are raised in backyards of rural families across China. • Hogs are either sold to local, small-scale slaughterhouses or through travelling traders that consolidate hogs for sale to larger regional slaughtering plants.	**Site Specificity**	**HIGH** • Potato growers require large plots of land (20-500 hectares) not easily acquired. Average landholding of < 0.66 hectares in China. • Potatoes are shipped fresh to the processor and as a relatively low-value, bulky product high shipping costs require growers to be in relative proximity to the processing plant.
LOW • Backyard producers rear between 5 and 10 hogs in a rudimentary environment that requires very little investment.	**Physical Asset Specificity**	**HIGH** • Growing specialty potatoes requires modern agricultural practices using specialized planters and harvesters to efficiently achieve product quality.
LOW • Knowledge and skills required by backyard producers who follow simple, traditional practices are limited.	**Human Specificity**	**HIGH** • Growing specialty potatoes requires extensive training related to growing practices, chemical usage and equipment operation. Shortage of skilled labour requires high investment in talent.
LOW to MEDIUM • A highly fragmented pork slaughtering and processing industry that is wide-spread across China, means the majority of hog producers have little dedicated specificity. • Degree of dedicated specificity present in relationship between Hormel China and slaughterhouse suppliers who must meet quality and safety standards.	**Dedicated Specificity**	**MEDIUM to HIGH** • Speciality potatoes are produced according to the stringent quality standards of the processor in exchange for rates above the market price for common potatoes. • Growers have few alternative customers, although rapid inflation of food prices in 2010 created a short-term opportunity to sell into market for common potatoes.
MEDIUM to HIGH • High levels of fragmentation at producer and slaughtering levels increase opportunity for opportunistic behaviour but pork processors source meat products checked for safety and quality at slaughterhouse and processors' facility. Products not meeting required standards are rejected, limiting uncertainty. • Meat safety scandals have however increased uncertainty, as product testing is limited in its ability to keep pace with potential new contaminants. • Price fluctuations affect both parties.	**Uncertainty**	**HIGH** • Producing specialty potatoes that meet the stringent standards is highly complex increasing potential uncertainty of the product quality processors will receive. • Financing needs, complex land rental arrangements, rising costs of agricultural inputs and rent all contribute to increased uncertainty for potato growers. • Investment focus of large growers and dramatic food product inflation that introduced potential new sales channels for growers threaten processor's supply.
LOW • Hog producers are mainly small-scale selling into the open market through local slaughtering houses or travelling traders. Processors like Hormel link into production chains largely fed by random supply making exchange frequency low.	**Frequency of Exchange**	**HIGH** • Unique supply chain established by McCain China links the company with growers of specialty potatoes through long-term purchasing contracts.

7.1.1.1 Asset specificity

The typical supply chain for pork as described by Hormel China and other sources begins largely with millions of backyard producers spread out across the country. These small producers typically raise between five and ten hogs under rudimentary conditions that require very little investment or specialized skills. Hogs are then either sold to local, small-scale slaughterhouses or to travelling traders that consolidate hogs for sale to larger regional or national slaughtering plants. Processors like Hormel with limited slaughtering capabilities purchase most of their pork inputs from outside slaughtering plants that are supplied via this chain. Product quality and safety requirements are addressed through testing in the slaughterhouse and the processors facility. As such, the majority of pork used is produced under conditions that involve a low level of asset specificity. Investment in equipment, facilities and know-how is minimal and exchange relationships are also characterized by limited site specificity. Product quality and safety specifications involve a degree of dedicated specificity between processors and slaughterhouse suppliers, however these are addressed through tests of the meat and not guidance on how animals are raised.

The supply chain for specialty potatoes developed by processors like McCain China looks quite different. Growers must follow modern agricultural practices in order to achieve the product safety, quality and consistency required. These practices require investment in specialized potato planting and harvesting equipment as well as an extended process of learning how to operate the machinery and grow the crop according to the established standards. As such both physical asset and human specificity are high. Furthermore, high site specificity stems from the growers' need to farm large plots of land (20-500 hectares) in order to achieve economies of scale using these techniques. With an average landholding of less than 0.66 hectares among Chinese farmers, such large parcels can only be found in a few areas such as Heilongjiang and Inner Mongolia, where the company has established its grower base. Adding to this, potatoes must be shipped fresh to the processor. As a low-value but bulky product, high shipping costs mean they must be grown in relative proximity to the processing plant. Lastly, although rapid inflation of food prices in 2010 created a short-term opportunity to sell into the market for common table potatoes, growers producing specialty potatoes have few alternative markets. Standards required by processors greatly exceed those of the market for table potatoes and the resulting cost ties growers closely to the processors who offer correspondingly higher contract rates, creating high, dedicated specificity.

7.1.1.2 Uncertainty

While high levels of fragmentation in the pork supply chain increase the potential for opportunistic behaviour at both the producer and slaughtering levels, Hormel China sources pork products that are checked for safety and quality at the slaughtering house and again in its processing facility. Products that do not meet the required standards are rejected, therefore limiting the uncertainty. Recent meat safety scandals have however demonstrated that product testing is limited in its ability to keep pace with potential new contaminants, increasing uncertainty faced by processors. Price fluctuations resulting from limited information flows between the market and producer also add to the uncertainty for all parties.

In the case of McCain China's supply chain for specialty potatoes, growers must produce according to the stringent quality standards of the food service industry. In this context, complexity arises from both the growers' need to learn and follow modern agricultural practices, as well as the significant business acumen they require to manage necessary financing and complex land leasing arrangements. Further adding to the challenge are increasing costs of agricultural inputs, and land rents that have nearly tripled in the last six years. At the same time, the significant resource requirement for this type of farming has primarily attracted growers who are business people, looking for attractive investments. The risk of them leaving the business for more lucrative investments is a constant source of supply uncertainty for the processor. Dramatic inflation in prices of food products has added to this supply uncertainty as it opened the door to a whole new potential sales channel for growers.

7.1.1.3 Frequency of exchange

The majority of hog producers are small-scale and sell into the open market through local slaughtering houses or travelling traders. Processors like Hormel who do not slaughter their own hogs thus link into production chains that are largely fed by random supply making frequency of exchange low.

In contrast, McCain China established a unique supply chain in which the company and its growers are generally linked by long-term purchasing contracts. Due to the nature of the business, the long-term contracts offer stability for both parties, which need to make sizeable investments that are only recouped over a period of years.

7.1.2 TC minimizing governance structures and fit with the SSCM framework

The analysis of TC factors in the above section demonstrates clear differences in the characteristics of the typical supply chain (i.e. without consideration for sustainability objectives) for primary inputs of the two case companies. By using this analysis to determine the TC minimizing governance structure, a comparison can then be made with the coordinated approach prescribed by SSCM (Carter & Rogers, 2008), identifying the gaps and challenges that processors in these industries face if they wish to develop SSC initiatives.

7.1.2.1 Governance structure for a typical pork supply chain

According to Williamson (2008) asset specificity is the key TC factor in determining the presence or lack of bilateral dependency in an exchange relationship. In the case of the typical supply chain for Hormel's pork inputs, all four dimensions of asset specificity including site, physical asset, human and dedicated specificity are low. As such there is little to bind partners together in their exchanges. While uncertainty has been growing as a result of price fluctuations and opportunistic behaviour evident in recent meat safety scandals, low asset specificity means that continuity is of little importance and new exchange partners can easily be secured (Han *et al.,* 2006). The added fact that exchange frequency in this supply chain is low, contributes to the overall conclusion that the TC minimizing governance structure for the typical pork supply chain involves low levels of coordination and is primarily price focused.

7.1.2.2 Governance structure for a typical specialty potato supply chain

By its very nature, the supply chain that McCain China needed to develop for potatoes is characterized by high levels of asset specificity, even before consideration is given to sustainability objectives. Since these potatoes were not previously grown in China,

both the species and the sophisticated system for growing it had to be introduced into the market, creating high asset specificity across all four dimensions. High levels of uncertainty are also present, stemming from the price volatility, complexity of the growing process and business management required, and the investment focus on of larger growers. These factors, combined with a high-level of exchange frequency create an exchange environment in which the TC minimizing governance structure for a typical specialty potato supply chain involves high levels of coordination. As seen in the McCain China case, the initial period of development in fact required complete vertical integration, as introduction required time to demonstrate and convince potential growers of the feasibility and merits of the new product and methods.

7.1.2.3 Comparison between typical and SSC prescribed governance structures

Carter and Rogers' (2008) framework for SSCM recommends the need for a strategic, transparent and coordinated approach to governing interorganizational transactions. Research on SSCM widely agrees on the importance of collaborative governance for improving environmental and social performance in the supply chain (Carter & Easton, 2011; Pagell & Wu, 2009; Seuring & Müller, 2008; Smith, 2007; Vurro *et al.*, 2009; Yakovleva *et al.,* 2009). Comparing this concept with the TC minimizing governance structures for the typical supply chains of key inputs used by Hormel and McCain highlights the gaps that companies considering the pursuit of SSC initiatives must address as seen in Figure 14.

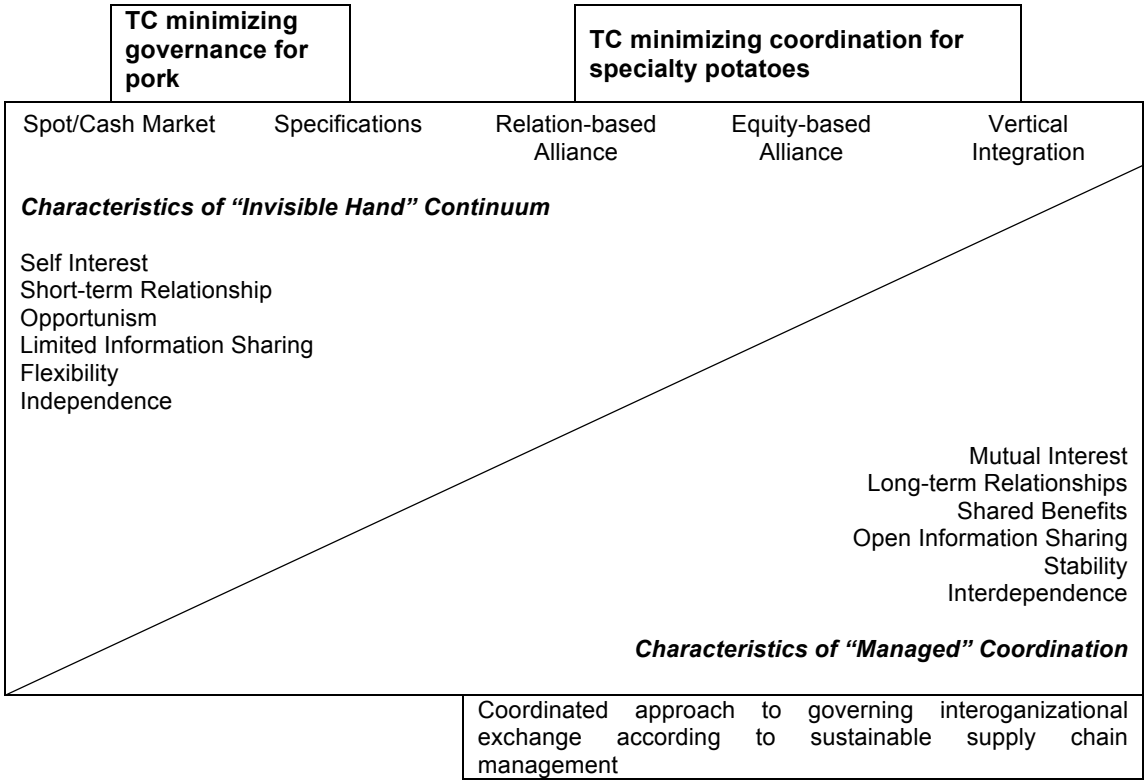

Figure 14. Comparison of typical and sustainable supply chain governance structures for key inputs (Adapted from Peterson et al., 2001, p.151).

From Figure 14 it is apparent that the TC minimizing governance structure of the supply chain for typical pork inputs falls somewhere between market and specifications approaches. Price is clearly a key factor, however product quality and

safety are specified and monitored through tests conducted at both the slaughtering house and Hormel China's processing plant. In either case, pursuit of SSC initiatives would require the company to invest significantly in the development of a more coordinated supply chain management approach, which is a costly and very complicated process given high levels of fragmentation and low development to be found at all stages of the pork supply chain.

Low levels of asset specificity across all dimensions and intense competition suggest any movement towards greater coordination poses a threat to the firm's economic sustainability. As economic sustainability is a prerequisite for the pursuit of environmental and social sustainability (Elkington, 1998), such decisions therefore require careful analysis of the long-term market outlook and potential opportunities for competitive advantage that may arise as stakeholder expectations change.

However the situation is quite different when considering the typical supply chain for the specialty potatoes. The nature of the potato inputs as a specialty product not present when McCain entered the market, made a coordinated governance approach a necessity for introducing it from the start. The sizeable investment required to grow these potatoes, combined with the complete lack of experience in the market made it necessary for McCain China to establish its own farm, initially serving both production and demonstration purposes. As growers have witnessed the potential of this crop, the company has been able to transition from a vertically integrated supply chain to a relation-based alliance with the new suppliers it has developed. In both cases, the TC minimizing governance structure falls within the spectrum of coordinated approaches, even before consideration is given to TBL sustainability objectives.

Under such conditions, the decision for a company like McCain China using speciality inputs to pursue SSCM is relatively less complicated. A coordinated structure is already in place, and environmental and social performance are linked to required product and quality characteristics. SSCM may therefore promote competitive advantage and represents a much smaller risk to economic sustainability than in a supply chain for commodity inputs like pork. However the business environment in China and the food market in particular is very complex and continues to experience rapid change (Enderwick, 2009; Roth *et al.*, 2008). Although the structure required for the typical supply chain of specialty potatoes also supports SSCM, implementing environmental and social performance adjectives in this environment remains a challenge. Understanding how to develop a SSC under these conditions and address ongoing change requires an additional level of analysis, which will be conducted in the following section using Pagell *et al.*'s (2010) SPP framework.

7.2 Developing a sustainable supply chain

Pagell *et al.*'s SPP (2010) considers the potential for changing stakeholder expectations regarding environmental and social performance to produce change in the business environment. Based partially on Elkington's (1998) TBL approach, the framework returns the analysis to a consideration of economic, environmental and social performance and how sustainability can be pursued (Pagell *et al.*, 2010). When a shift in stakeholder expectations regarding sustainability is recognized, the next step

is to consider the supply risk of the inputs sourced, the level of threat posed to the TBL, and whether achieving sustainability involves a short-term correction of information asymmetry or an opportunity to secure long-term competitive advantage.

7.2.1 Stakeholder expectations regarding sustainability of food products in China

In gathering data for this research, one of the criteria for potential case subjects was a public record for acknowledging the importance of, and pursuing SSC initiatives. At this level, corporate headquarters of both Hormel and McCain demonstrate an interest in pursuing SSCM (www, Hormel, 2011, 3; www, McCain, 2011, 5). However, clear expectations for improved TBL performance among other stakeholders in China are less obvious, with the focus instead being on specific issues that are components of economic and social performance.

In the case of both Hormel China and McCain China, consistent quality and safety of key food products are primary concerns for restaurant and food service customers (pers. com., Guo, 2011; pers. com., Wang, 2011). Consumers share these concerns, but with an average of 35.7% of their income spent on food, many cannot ignore the importance of price (www, China Daily, 2011, 3; pers. com., Guo, 2011; Roth *et al.*, 2008). In the wake of multiple food scandals over the last few years, government in China is also keenly focused on improving food product quality and safety (www, Xinhuanet, 2011, 2). These expectations are however simultaneously counterbalanced by a need to ensure the affordability of food and sources of income for rural residents (pers. com., Guo, 2011; pers. com., Industry Expert C, 2011; www, WSJ, 2011, 1).

Therefore, while the interest of owners in both companies in general support pursuit of SSC initiatives, the expectations of stakeholders in the China market are dominated by urgent concerns, which although elements of social and economic performance, may detract from a firm's ability to pursue SSC initiatives in the short-term. Nonetheless, these concerns are a sign that expectations are beginning to change and according to Pagell *et al.*'s (2010) SPP, food processors considering the development of SSC initiatives then need to assess both the supply risk and threat to TBL posed by key inputs.

7.2.2 Supply risk and threat to TBL

Pagell *et al.*'s (2010) SPP has been adopted for its ability to consider the contextual conditions and the potential need to adjust purchasing strategy under dynamic market conditions. While the categories of supply risk and threat to TBL represent a valuable expansion of Kraljic's (1983) original model, analysis of the two case companies requires a degree of judgement to determine the best fit and may therefore indicate the need for further development.

Hormel China's key input is pork, which is the most widely consumed meat product in the country (www, People's Daily Online, 2011, 1). The supply chain is composed largely of millions of backyard hog producers spread across China, that sell into an equally large and fragmented slaughtering industry, where price is used to address high levels of competition (www, China Business News, 2011, 1; Han *et al.*, 2006; pers. com., Industry Expert A, 2011). As such, Hormel China has many suppliers to choose from, making the supply risk of pork inputs low.

Pork sourced by Hormel China is currently treated as an input which Pagell *et al.* (2010) describe as a true commodity, with the company's focus primarily on the dimension of social performance including product quality and safety as well as the safety of slaughtering house employees (pers. com., Guo, 2011). However the presence of environmental issues throughout the chain and challenges to economic performance of producers and slaughterhouses (pers. com., Industry Expert A, 2011; Tan, 2007), are indicative of potentially high threats to TBL performance. Pagell *et al.*'s (2010) SPP therefore suggests potential for Hormel China to gain long-term competitive advantage by dealing with pork inputs as strategic commodities and investing in asset specificity aimed at improving economic, environmental and social performance. This potential is however conditional on changes to stakeholder expectations regarding sustainability performance.

In contrast, McCain China's primary input is specialty potatoes, the supply chain for which had to be developed from the very beginning. Growers following practices introduced by McCain need to make a sizeable investment in leasing land and purchasing specialized equipment required to farm it. The investment focus of larger growers, coupled with rising input costs (land rental, chemicals, fertilizer) and the challenge of securing financing, result in ongoing risk of their departure from the business. High rates of food inflation that opened potential new sales channels into the market for common potatoes have further added to this risk. As the ongoing development of this small group of specialty potato growers is critical to McCain China's own growth potential (pers. com., Wang, 2011), risk of supply for the specialty potatoes used is clearly high.

McCain China's close proximity to its suppliers and the steps it has taken to address sustainability in its supply chain, present a clear picture of the threats to its TBL. Like Hormel, social performance factors including food safety and quality, as well as the safety of growers and their employees are top of mind threats for McCain China. Chemical use is an issue that straddles both social and environmental performance. Ensuring the use of approved chemicals contributes to the safety and quality of food, but also the protection of the environment. Other environmental issues recognized by the company include the need to responsibly use and improve soil that has deteriorated through years of mismanagement, as well as efficient use of scarce water supplies. Rounding out the picture are issues related to the economic sustainability of growers, the landholders, the communities they work alongside and McCain China itself. Together these issues contribute to an overall high level of threat to the company's TBL. Coupled with a high supply risk, specialty potatoes used by McCain China therefore fall within the strategic category described by Pagell *et al.* (2010).

Key factors in the SPP framework including stakeholder expectations regarding sustainability, supply risk, and threat to the TBL have been analyzed in order to determine the appropriate category for each company's primary input. A look at how firm behaviour compares with the activities prescribed by the SPP framework follows next.

7.2.3 Implementing a SSC

When purchasing a true commodity product like pork, the decision to address threats to TBL performance through investment in asset specificity represents a relatively

greater business risk than for a strategic input like specialty potatoes where the supply risk is high. This difference in the two products is apparent in Figure 15 below.

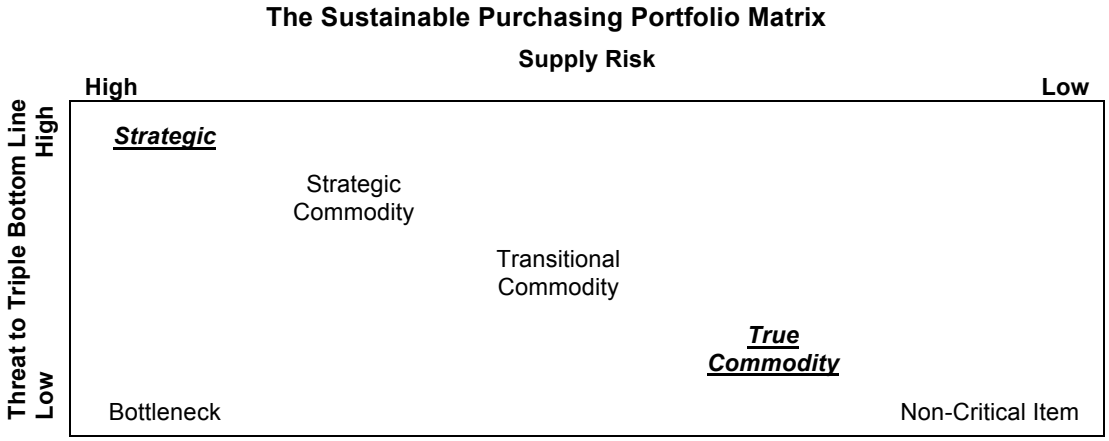

Figure 15. The Sustainable Purchasing Portfolio Matrix (Pagell et al., 2010, p.68).

As such, a level of confidence that stakeholder expectations have evolved to a point where this investment will be rewarded is important to ensure the economic sustainability of the food-processing firm. With a low supply risk and expectations of the majority of stakeholders focused on specific issues considered more urgent than TBL sustainability, it is understandable that Hormel China has chosen to focus on the social performance dimensions of product quality and safety for the time being.

In the case of McCain China, the strategic nature of its specialty potato supply makes investment in asset specificity a requirement from the start. Therefore the additional investment needed to address environmental and social performance represents a relatively lower risk and contributes to a strategy that aligns with the expectations of its investors and the trend in expectations that is becoming visible among stakeholders in China. While creating long-term competitive advantage, these investments also make clear contributions to dealing with immediate concerns regarding food quality and safety.

McCain China recognizes that social performance including food quality and safety are intimately connected to environmental performance factors such as the management of soil and chemical inputs, and ultimately the economic performance of both the growers and the company (pers. com., Wang, 2011). The interplay of these factors is seen in Figure 16 and described further in the paragraph following.

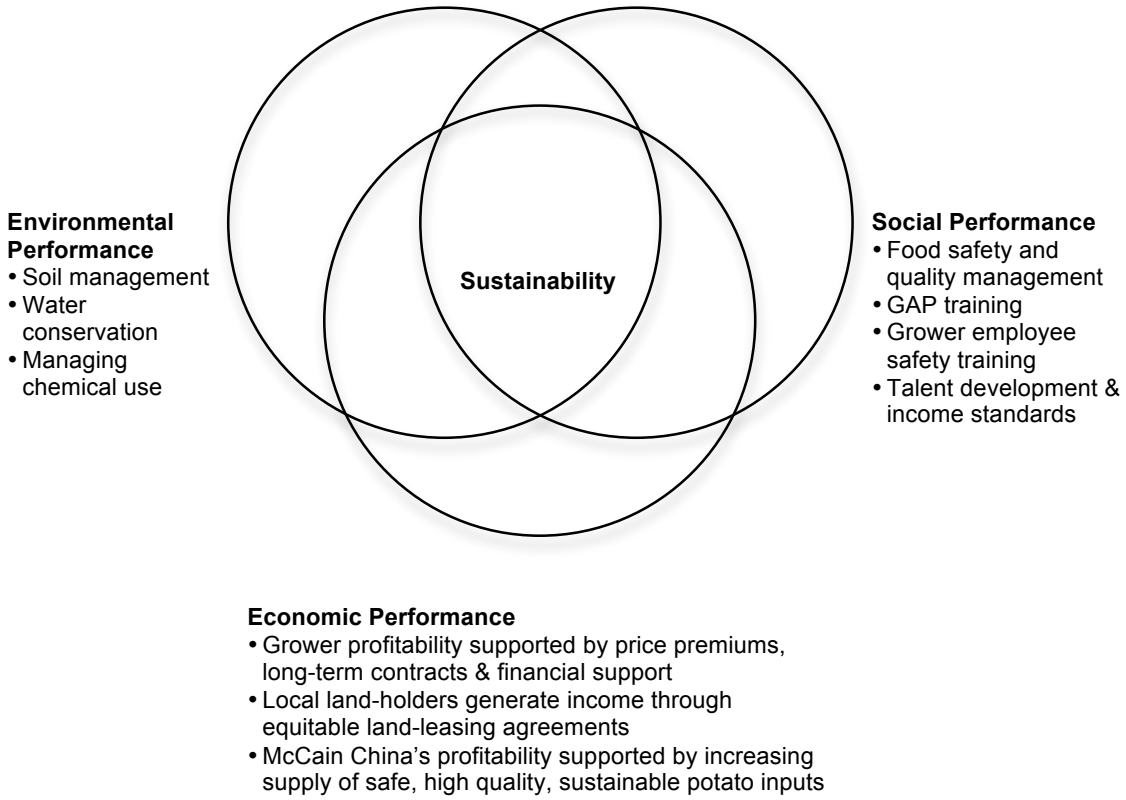

Figure 16. McCain China's Triple Bottom Line approach to Sustainable Supply Chain Management (Adapted from Carter & Rogers, 2008, p.369).

The actions McCain China has taken to support increased sustainability performance in its supply chain for specialty potatoes reflect high levels of coordination and align closely with what Pagell *et al.* (2010) describe as supply-base continuity supporting behaviour. Long-term contracts, price premiums and financial assistance are used to cover the costs and address the financial risks stemming from the sizeable investment required by growers to produce according to McCain's standards. Transparency is promoted through active engagement with growers. Ongoing GAP training also addresses the shortage of skilled labour, supports responsible use of natural resources and chemicals, contributes to the safety and economic well-being of employees, and is vital to the growers' ability to produce safe, high quality products.

McCain China's SSCM strategy aims to develop win-win exchange relationships that benefit growers, ensure the equitable treatment of those who provide labour and land inputs, and promote responsible use of natural resources. In doing so, the company is able to address TBL performance and reduce supply risk, stemming from threats to growers' ability to expand and the temptations of alternative sales channels or investments. The resulting increased supply of potatoes that meet quality standards is key to the profitability and economic sustainability of both McCain China and its growers.

8 Discussion

The following chapter includes a discussion of the research questions posed in the first chapter, with the aim of understanding the conditions for sustainable supply chain development in China's food processing sector and the factors companies pursuing this strategy must consider. This process will include a discussion of empirical findings and analysis from the preceding chapter and how these results compare with the findings of other relevant studies.

8.1 How do conditions in China affect the ability of food processors to develop sustainable supply chains?

In spite of rapid growth and development in China's food sector, factors relating to the economic, political and cultural environment pose a challenge to the development of sustainable supply chains in the country's food processing sector. Overall, China still has a long way to go in tackling poverty reduction, with more than 87 % of urban households earning less than $5,000 per year. High food inflation rates and average food expenditures equal to more than a third of income make food cost a particularly sensitive issue for consumers. Government also pays close attention to this issue as its drive to promote stable development hinges on ensuring the affordability of food and earning potential for rural residents engaged in agricultural production.

However a string of serious food safety incidents, such as the melamine milk and clenbuterol pork scandals described in Chapter Five, have simultaneously raised a number of related issues that need to be addressed. Opportunistic behaviour throughout the chain results from high levels of fragmentation, intense competition, low income-levels, a lack of traceability infrastructure and low perceived risk of short-term consequences. While officials have worked hard to develop new policies, reliable enforcement and a trusted system for certifying quality and safety require further effort.

Under these conditions, consumers with limited disposable income, wavering trust in the system and little understanding of the value of intangible product attributes will continue price-focused consumption. As such, this environment offers limited support or incentive for processors to pursue sustainability upgrades, which require significant investment to deal with high fragmentation and low levels of development that are characteristic of much of China's food sector. Therefore more attention is given to addressing issues of priority social performance including food quality and safety.

Yet within this context, not all food processors are taking the same approach and the two case companies covered in this study demonstrate this contrast. Although the companies have primarily the same set of stakeholders and both pursue SSCM strategies in their home markets, Hormel China is focusing its attention on social performance dimensions (including food quality and safety), while McCain China is following a TBL approach that addresses not only these social issues, but also economic and environmental performance. A closer look at the supply chains of these two companies using TC analysis goes at least part of the way towards explaining the observed differences.

Hormel China's key input is pork, which is one of the most commonly consumed meat products in the country. In spite of relatively high levels of market uncertainty in the supply chain, low asset specificity across all dimensions and low exchange frequency dictate a TC minimizing structure with low levels of coordination. McCain China on the other hand uses a special variety of potatoes that the company had to introduce into the market. The need for sizeable investments in specialized equipment, large tracts of land and an extended learning process creates high asset specificity, which combined with high levels of uncertainty and exchange frequency; suggest a TC minimizing structure with high levels of coordination. As such, Hormel China has a relatively greater gap to bridge in developing a SSC that requires a coordinated governance approach, than McCain China, where the nature of its key input requires it. Therefore food processors in China sourcing non-specialty inputs may face challenges in implementing value-adding initiatives, in particular those related to intrinsic characteristics like sustainability.

This result is in agreement with the findings of Smith (2007) and Trienekens (2011). They conclude that non-commoditized inputs are conducive to SSCM, as they require the processor to develop and maintain close ties with suppliers in order to facilitate advanced capabilities. Processors of commodity products on the other hand, would need to develop a costly parallel supply chain in-house in order to pursue such a strategy (Smith, 2007; Trieneken, 2011). This study shows that beyond the direct costs involved, a lack of related expertise in China and trouble with enforcing standards would contribute to operational challenges and consume management resources needed to grow the market. Given the current competitive environment and difficulty in establishing value for intrinsic characteristics like sustainability, Smith (2007) advises that such an investment represents a huge risk to the economic viability of the firm. While the "Enterprise + Cooperative" model being proposed by Chinese academics may address some of these issues for commodity processors considering investment in SSCM, such a concept is beyond the scope and data of this report and requires further investigation (pers. com., Mi, 2011).

While data limitations also prevented network analysis of case company supply chains, findings by Vurro *et al.* (2009), noting the impact of network centrality on SSCM, may also connect to the results of this study. Given McCain China's central position between growers and food service customers, it can more easily communicate and develop relationships with both parties to support development of SSC initiatives than Hormel China, which has multiple nodes between it and the hog producers. Relationship potential may be particularly important as results from the McCain case show that relationships are more critical to SSCM than contracts, due to enforcement difficulties under the current institutional environment. While Wei and Zhang (2004) and Trienekens (2011) note that effective legal institutions may pose a challenge to implementing SSCM, this example suggests that SSCM and the resulting relationships that evolve, may offer a means of dealing with such institutional limitations. In either case, additional investigation is required to understand these linkages and may offer an opportunity for continued research.

Nonetheless, TC analysis has proven useful in supporting an understanding of factors affecting the relative effort required to close the gaps in pursuing SSCM. While these factors are incorporated in the supply risk aspect of Pagell *et al.*'s (2010) SPP, a detailed TC analysis prior to using the SPP framework offers a clear picture of the

multiple dimensions of asset specificity, uncertainty and frequency of exchange in a given supply chain and environment. As TBL sustainability rests on the baseline of economic sustainability, a comprehensive understanding of the time and resources required to increase coordination, (or specificity) is important when deciding whether to pursue this type of investment.

8.2 How can food processors in China develop a sustainable supply chain?

Pagell *et al.*'s (2010) SPP approach suggests that when a change in stakeholder expectations regarding sustainability is recognized, TBL performance of the supply chain may be addressed by investing in increased asset specificity, thereby facilitating a reduction of related risks and offering potential for long-term competitive advantage. The actions observed in the McCain China case support this hypothesis and align with Pagell *et al.*'s (2010) description of supply-base continuity supporting behaviour. Findings also fit with those of other studies that call for a collaborative or coordinated approach to managing relations with suppliers (Carter & Rogers, 2008; Seuring & Müller; 2008; Smith, 2007; Vurro *et al.*, 2009).

A look at the experiences of McCain China suggests that committed growers (or suppliers) are critical to establishing the foundation for the process of developing a sustainable supply chain (pers. com., Wang, 2011). The sustainable approach introduced by McCain requires not only a sizeable investment of time, resources and capital, but also the use of modern agricultural practices and equipment that were new to the market at the time. Convincing growers to switch and securing their commitment has therefore involved demonstrating the technical feasibility and potential profitability of the proposed approach. In line with the findings from Smith (2007) and Seuring and Müller (2008), assistance in securing key inputs required for growing speciality potatoes (sufficient land, capital and a qualified workforce) has been central to this process as the conditions of the market put these beyond the reach of most growers.

McCain China's actions to secure the foundations for sustainability in its supply chain match Pagell *et al.*'s (2010) description of supply-base continuity supporting behaviour as the company aims to see its growers thrive and expand alongside the company. Long-term contracts, price premiums and loans are among the tools used to help farmers deal with risks and rising costs associated with leasing large plots of land, purchasing specialized equipment, hiring experienced workers and using approved chemicals and other inputs. Furthermore, by using its demonstration farm to train new talent, McCain China helps to fill the talent gap and simultaneously take what Seuring and Müller (2008) describe as a proactive measure to ensure the labour force is trained according to standards established in its GAP program.

When factors forming the base for long-term operational and economic viability have been secured, efforts to address the practices and use of inputs that contribute to sustainability can begin (pers. com., Wang, 2011). While the standards applied are those prescribed under the company's global GAP program, a formalized code of conduct for suppliers has yet to be applied as the group of growers is still relatively small and there is significant variation in scale and experience among them. The

unique implementation process and timeline reflect McCain's policy of "drinking the local wine" (pers. com., Wang, 2011) and is the type of flexibility that Perez-Aleman and Sandilands (2008) suggest is necessary to ensure that suppliers can in fact meet the standards set.

Having achieved a stable grower base by 2008, the company was able to begin implementing its global best practices for grower selection and signing contracts including GAP standards that govern sustainable practices. Nonetheless, given that many growers still require further development, frequent interaction between growers and McCain China's agricultural team is seen as more important to achieving sustainability performance than the selection process. The practice of providing field training at critical points during the growing season, followed by audits and further training to address any identified gaps, meets with Carter and Rogers' (2008) call for transparency through proactive engagement. In addition, group-training sessions and award ceremonies that acknowledge grower yields and success in implementing GAP standards further reinforce positive performance as growers aim not to be outdone by neighbours.

Consideration of McCain China's sustainable supply chain management or governance strategy does not present a clear match with either of the two approaches proposed by Seuring and Müller (2008). The company's SSCM efforts are largely focused on achieving the product quality and safety standards required by its customers, aligning with the "governance for sustainable products" approach (Seuring and Müller's, 2008, p.1705). However an element of the "governance for risks and performance" approach (Seuring and Müller, 2008, p.1704) is also present, since McCain China sees its SSCM strategy as important to mitigating the risk of operational disruptions, stemming from the ongoing potential for large growers to exit the business if more attractive opportunities arise. In this sense, Pagell *et al.*'s (2010) SPP, which focuses on the dimensions of supply risk, TBL threat and the linkages between them, is a good fit and finds support in the case.

McCain China sees a close connection between economic, environmental and social performance dimensions and how they support the overall sustainability of the business. In line with the TBL model (Elkington, 1998), central in much of the SSC literature, economic sustainability is the required baseline for overall sustainability in its supply chain. For McCain China to achieve economic sustainability, it needs to secure a growing supply of potatoes that meets the quality and safety standards of its food service customers. Achieving this means continuous development of its supply chain, which is dependent on the expansion of existing growers and addition of new ones that are capable of producing the potatoes it uses. Realizing this goal is dependent on the company's ability to facilitate a mutually beneficial environment that ensures the economic sustainability of its investment-focused growers.

At the same time, growers have recognized that profitability is dependent on their ability to produce potatoes that meet specified quality and safety requirements, which in turn rely on following prescribed GAP standards that guide environmental and social performance. They have witnessed the impact on quality, yield and therefore profitability, resulting from proper soil management and chemical usage. Knowing the importance of skilled labour to the process, growers also understand the need to

create a safe and equitable work environment. Furthermore, fair treatment of landholders is imperative given that land is at a premium.

Use of Pagell *et al.*'s (2010) SPP framework to understand how food processors in China can develop SSC highlights potential areas for further development through its application in a broader range of cases. While the speciality potatoes used by McCain China are clearly a strategic input, the category description suggests supplier selection is based on TBL performance. However the lack of this product in the market required McCain to develop its own unique supply chain and market conditions make the development of economic, environmental and social performance a slow and ongoing process. As such the model does not fully account for this type of supply situation. McCain China's experience suggests that when a company does not have the option to source according to TBL performance, it may need to judge on the basis of a supplier's resources and commitment to long-term development. Working closely to train, evaluate and further develop skills where necessary is then critical to achieving the required outcome.

Furthermore, a key strength of the SPP framework is its ability to guide management in adjusting to dynamic market conditions (Pagell *et al.*, 2010), however the focus is largely on commodity inputs and how companies should react to avoid risks that require investment in asset specificity, or unnecessary costs as related asymmetry decreases. Here again, there may be potential to expand the framework further to offer more specific guidance for actors in the strategic category. In the McCain China case, we see how rapid inflation in 2010 food prices led to market prices for table potatoes exceeding the company's contract price for specialty potatoes for the first time since the supply chain was founded in 2005. As a result, some suppliers sold into the market, sparking new demand among retailers and consumers who recognized the benefits of this type of potato, thereby increasing the commodity-like nature of the product. On the surface, a shift to the strategic commodity category may appear to be the solution if this trend continues. However it is unclear what this change in the market may mean for the viability of McCain China's SSC strategy as stakeholder expectations in China regarding sustainability in the supply chain are only beginning to reflect interest in TBL sustainability.

Lastly, the SPP framework applied to a company like Hormel China would suggest that under conditions of changing stakeholder expectations regarding TBL performance, potential for competitive advantage may exist if the company shifts its pork purchasing strategy from a true commodity to a strategic commodity focus by investing in increased asset specificity (Pagell *et al.*, 2010). While TCE is one of the three theories on which the framework is built and used to address the phenomenon of short-term asymmetry, only a detailed TC analysis will highlight the extent of the sustainability gap and the scope of investment in asset specificity required to pursue such a strategy.

8.3 Does working with partners influence the development of sustainable supply chains in China's food processing sector and if so, how?

Studies investigating the development of sustainability in the supply chain have raised the importance of collaborating with partners, including those within the chain as well as outside parties including NGOs, academics, government and even competitors (Perez-Aleman & Sandilands, 2008; Prokesch, 2010; Smith, 2007; Trienekens, 2011; Vurro *et al*., 2009). The motivations and benefits described for these partnerships include external legitimacy, access to resources and expertise, the ability to achieve a more inclusive sustainability approach and the potential for raising the sustainability baseline (*ibid*).

While the findings of this study are in line with some of these concepts, not all are supported. In general, NGOs play a minor role in the China market (Enderwick, 2009) and academics tend to engage more closely with government than with private sector food companies (pers. com., Wang, 2011). When it comes to raising the bar for food standards, both the general public and industry players look to government to play a central role (www, CSR Asia, 2011, 1; pers. com., Guo, 2011).

A look at the experiences of McCain China in developing sustainability in its supply chain mirrors these trends. The company has only limited involvement with academic institutes in China and the loss of favour grower associations have experienced among their members has made them ineffective partners as well. However two categories of partners have played a role in the development of McCain China's SSC initiatives, including business partners and government.

In line with recommendations by Vurro *et al*. (2009), the McCain case shows that working together with business partners including growers and food service customers has been necessary to ensure sustainability initiatives are inclusive and bring mutual benefit. A global network of in-house expertise makes resources less of an issue for McCain China than suggested by Linton *et al*. (2007) and Vurro *et al*. (2009), however collaboration with government agricultural extension officers has helped to spread the introduction of better soil management and irrigation practices. Given the shortage of capital and difficulty growers face in securing financing, government programs offering subsidies for investment in new technology have also been vital to improving agricultural practices. On a big picture scale, McCain further acknowledges the importance of government policy and investment in infrastructure projects that have impacted its growing regions as a whole.

In light of the enormous challenge for individual food processing companies that use mainstream commodity products to improve sustainability in the supply chain, Smith (2007, p. 859) highlights the potential of multi-stakeholder initiatives such as "The Round Table for Sustainable Palm Oil (RSPO)" that bring together public and business stakeholders (including competitors) to raise the sustainability performance baseline by jointly tackling environmental and social issues. On the surface, this approach appears to hold potential for companies like Hormel China; however a closer look at the case and China's pork industry raises the following issues that may limit its application.

Unlike the international supply chain for palm oil, which is dominated by large, international food processors that control a significant share of the market, the supply chain for pork in China is highly fragmented and together the country's top 10 processors control less than a 10% share of the market. As such, reaching consensus among key industry players may be excessively challenging. More central to the challenge however are the limitations of the quality monitoring and certification system and the resulting lack of trust among consumers and industry players. Furthermore, government concern over the affordability of pork as a main staple in the Chinese diet, as well as income opportunities for backyard producers may limit the support offered for solutions that pose a challenge for these objectives in the short-term.

9 Conclusions

Leaders in government, NGOs and the food industry have recognized the need for more sustainable food production as the world enters an era of rapidly growing demand for food, declining resource availability and rising volatility. In response, some global food processors have begun to implement strategies targeting improved environmental, social and economic performance throughout their supply chains. With much of the growth occurring in emerging markets like China, MNC food processors must consider the context of the market and the impact this has on the viability of their SSC strategies. This study therefore aims to contribute to existing SSCM literature, offering an understanding of conditions for SSC development in China's food processing sector and factors that companies pursuing this strategy must consider. Conclusions based on the research findings and opportunities for further study are presented in this final chapter.

An investigation of the supply chains of two MNC food processors in China suggests that current conditions in this market may not support widespread adoption of SSC strategies, which require high levels of coordination between exchange partners. Although it is undergoing remarkable change, China's food sector is still characterized by low levels of development and a high degree of fragmentation. Furthermore, intense competition, a lack of traceability infrastructure and the need for more reliable enforcement of official regulations has spurred opportunistic behaviour, threatening basic food quality and safety. Under these conditions, consumers that spend an average of 35.7% of income on food and have little understanding of intangible product attributes (such as sustainability), remain largely price-focused. From a government perspective, the need to promote stable development across the population makes issues of basic food safety, affordability of food for the masses and income opportunities for rural residents, priority concerns over TBL sustainability. As such, the challenges associated with achieving basic food quality and safety makes these top priorities for most food processors as well.

However some MNC food processors have been successful in developing SSC and a look at the supply chain management practices of two companies that have established reputations for SSCM in their home markets as well as similar stakeholders in China, explains some of the observed differences in approach. Use of TCE to analyze the typical (i.e. without consideration for sustainability performance) supply chains of the two case companies has proven useful in understanding these differences. In the case of Hormel China, low asset specificity across all dimensions in the supply chain for commodity pork products suggests a TC minimizing supply chain characterized by low levels of coordination. In contrast, the specialty potatoes used by McCain China require significant collaboration and investment in asset specificity in order to achieve the necessary quality. Therefore as Smith (2007) and Trienekens (2011) suggest, McCain China's unique supply chain for speciality potatoes is conducive to SSCM, which requires high levels of coordination, while achieving sustainability in Hormel China's commodity pork supply chain would require development of a costly parallel chain in house.

Given an environment characterized by intense competition and limited stakeholder expectations regarding sustainability performance, such an investment may prove a

huge risk to Hormel China's economic performance, which is a baseline requirement for TBL sustainability. In the absence of institutional change that will allow trust in product claims to build, processors of commodity products like pork may therefore not feel secure in the ability to recoup investments associated with value-adding enhancements like SSCM.

Although pursuing SSCM appears to fit well with the operations of specialty input processors, conditions in China's food sector nonetheless make it a significant effort. The disruption of farming traditions during the period of centrally planned agriculture contributed to the highly fragmented nature of the industry and lack of experience, knowledge of modern practices and long-term focus required by professional farmers. In addition, small growers struggle to secure financing for investment in new equipment and practices, while larger farms with more resources are often operated by investors who are prone to leave the industry if returns are not satisfactory. In both cases, it is necessary to convince the growers of the viability of the system being introduced and the economic benefit they will receive. Technical demonstration proving the feasibility, financial assistance, support in developing skilled labour and stability through long-term contracts with price premiums may all play a part in securing grower commitment.

McCain China's experience in developing a SSC also suggests that while standards are important, it is necessary to consider the local context when planning how to implement them. Still at an early stage of developing its supply chain, grower knowledge gaps and limited awareness of sustainability practices, and variation in size and experience among them, makes use of a formalized code of conduct unfeasible. Frequent engagement and a process of training, auditing and further training to address performance gaps may therefore be more critical to achieving performance objectives. Given the challenge with enforcing contracts, relationships and trust developed through close collaboration may also be beneficial in limiting supply risk related to departure by investment-focused growers.

As the McCain China case demonstrates, volatility in China's food prices in recent years has further increased the importance of relationships as rapidly rising prices opened new sales channels for growers of this previously unique product. In an environment prone to such rapid change, Pagell *et al.*'s (2010) SPP model proves valuable in addressing the need for companies to keep a close watch on the market in order to avoid risk through increased investment in asset specificity or likewise unnecessary costs as related asymmetry decreases. However a challenge in making a clear fit into the SPP categories for the two case companies suggests the possible need for further empirical testing and development on a wider range of companies.

While support is found for the positive impact working with partners may have on the process of developing a SSC, the McCain China case highlights some potential differences in the China compared with other markets. With NGOs playing a less active role in this sector and academics focused on government led projects, neither was seen as key to helping the company develop its SSC in this market. Instead, the case suggests the importance of working together with growers and food service customers to ensure the sustainability initiatives produce mutual benefits. Furthermore, collaboration with government agricultural extension officers may support the spread of sustainable agricultural practices, while the difficulty growers

have in securing financing makes government infrastructure projects and subsidies for technology investments important as well. Lastly, multi-stakeholder sustainability initiatives that may on the surface appear to offer potential for the meat processing industry and companies like Hormel China, appear limited by high levels of fragmentation at all levels of the supply chain.

Limitations and recommendations for future research

As an exploratory case study investigating the conditions for the development of SSC in China's food processing sector, this research expands the literature on the topic of SSCM that is particularly new in both this industry and geographic location. However the nature of the method and data gathered from only two food processors limits the ability to generalize the findings. As such there is a need for further investigation of a larger sample of firms including a wider range of commodity and speciality input users. The fact that McCain China's primary input was new and had to be introduced into the market made its supply chain exceptionally unique. It would therefore be useful to observe if there are differences for processors using specialty products already in the market.

Future studies including Chinese-owned MNC food processors and MNCs that process in China for export may also provide valuable additional insights, given the wider range of stakeholders and their expectations regarding sustainability. Additionally, a deeper investigation using stakeholder theory may be useful in segmenting not only between stakeholders in China and those in other markets, but also between different segments in the China market itself, which vary widely by region and income group.

Furthermore, this study has focused primarily on the upstream portion of the supply chain and future research including a more detailed investigation of the firm's interaction with downstream actors may offer a deeper understanding of the process of developing a SSC, in particular how the SSCM strategy of food processors is impacted by the strategies of food retailers and the food service sector. Findings from the McCain China case suggest the importance of supply chain relationships and with an expanded view of the entire chain it may also be possible to use Vurro *et al*.'s (2009) network view of SSCM, which considers the impact of network density and the centrality of the firm's position in the chain.

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Appendix 1: Interview guide for case companies

Semi-structured interviews were conducted with the two case companies covered in this study. Interviews were opened with review of the research topic and general questions, followed by a general introduction to the company by the informant. Bold headings indicate the topics covered (where feasible) while sub points were used track and prompt responses as necessary.

Supply-Chain Make-up & the Market for Suppliers in General

1. How would you describe the make-up of your supplier base/supply market in general?

- Primarily small/med/large producers (rough % breakdown)
- Level of sophistication in general business practices
- Geographic location relative to processing centre
- Understanding of sustainability issues

Opportunities/Challenges for SSC Initiatives in China

Describe your company's SSC Initiatives

Public Partners

2. Were partners engaged in this sustainable supply chain (SSC) initiative?

NGO	Academic	Government (lc/pv/cn)	Other

Identifying Sustainability Issues

3. Who is involved in identifying sustainability issues?

Company (HQ, L)	Middle Man	Farmer	Academic	NGO	Government (lc/pv/cn)	Other

4. What were the issues identified?

- Environmental (water/soil degradation/waste handling/GHG/energy/bio-div/others
- Social (hiring/employment/work-conditions/other)
- Economic (supplier/employees/local community/*subject company*)

5. Are these issues unique to this environment (geographic/economic/political)?

6. Are these issues uniform across all your suppliers or do they differ according to size/type?

7. How much autonomy does *(subject company)* have to establish sustainability initiatives that are tailored to the local environment, vs. following a program established by global HQ? Is there any feedback loop?

8. Of the different sustainability perspectives (environmental, social, economic) was there a primary focus in mind for this project? If so, why?

Setting Sustainability Standards

9. Who is involved in establishing sustainability standards/targets?

Company (HQ/L)	Middle Man	Farmer	NGO	Gov (lc/pv/cn)	Other

10. Are these standards achievable among all types/sizes of suppliers?

Implementing Sustainable Supply Chain Initiatives

11. Was there a process of selecting suppliers (farmers) in terms of eligibility to supply into the sustainable supply chain or was the opportunity to participate offered to all?

12. If yes, who was involved in this process and how?

Company (HQ/L)	Middle Man	Farmer	NGO	Gov (lc/pv/cn)	Other

13. How were farmers/other commodity suppliers encouraged to engage in sustainable practices?

- Local ambassador (influential organization or person in the local area) and if so, who?
- Price premiums
- Long-term contracts or purchasing guarantees
- Other forms of support

14. What type of support was offered and by who (Company/Gov/Academic/NGO)?

- Education
- Technical
- Finance
- Other

15. Were the forms of support offered uniform among all suppliers or differing according to the type/size of supplier?

16. Was there a phase-in period and how was it conducted?

Benefits Recognized as a Result of the SSC Initiative

17. What benefits have been recognized as a result of this SSC initiative by:

- *Subject Company:*
- Suppliers:
- Public:
- Other Stakeholders:
- Environment:

18. Is there a mechanism for ongoing evaluation & improvement?