Sustainability performance in retail supply chain: a comparative study of national and international food retailers

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Abstract

This paper aims to explore and compare national and international food retailers in terms of analyzing and examining linkages between innovation and sustainability performance at three levels: actor, dyad and network in order to better evaluate food supply chains. The research applies a comparative study across those food retailers. Qualitative multiple cases are applied to provide a more holistic view of what drives similarities and differences in innovation in food supply chains and how they are linked to sustainability performance. The research reveals key themes of innovation that are implemented to support focal retail firms at the three levels and how these innovation are linked to sustainability performance.

Keywords: Sustainability Performance, Retail Supply Chain, Food Industry

Introduction

The importance of enhancing sustainability in supply chains has escalated significantly over the last decade (Petljak et al., 2018). As organizations face challenges concerning sustainability and global competitiveness, they come across increasing demands to reduce costs, improve customer service, reducing harmful environmental influences, to ensure the continuity of supply chains (Barnes and Liao, 2012). There is a need to understand the similarities and differences between national and international food retailers linking innovation and sustainability performance and evaluating it at the three levels of focal actor, dyadic relationship and chain networks.

In this study's empirical context, the Jordanian food supply chain, the retail sector is increasing due to high demand for food supplied by large and well-established retailers (MoA, 2018) and the population growing rapidly, especially in urban areas within the country and also having several nationalities who have moved from neighboring countries (DoS, 2018). Therefore, international food retailers are establishing branches across Jordan.

In prior research, there is limited theoretical understanding of the link between innovation and sustainability performance in retail supply chain at the actor, dyad and network levels (Yakovleva and Flynn; 2004; Esfahbodi et al., 2016). Therefore, it is important to understand the innovation in supply chains and its link to economic, social and environmental sustainability challenges that retailers face (Awaysheh and Klassen, 2010) at international and national levels. Moreover, the implementation of innovative practices and activities require both types of firms to effectively manage innovation and any barriers from their dyads and networks (Petljak et al., 2018). Thus, the research aims at examining the linkages between innovation and sustainability performance at international and national retailers at the actor, dyadic and network levels, to better evaluate food supply chains. Hence, the following research questions are addressed:

1) What are the contextual dimensions for innovation in a food supply chain?
2) How do international and national retailers implement innovation dimensions and technologies at actor, dyad and network level to enhance sustainability?

Literature Review

Innovation Perspective

Innovation in supply chains is *"the creation of new combinations. These new combinations can be a new product, a new technology for an existing application, a new application of a technology, the development, or opening of new markets, or the introduction of new organizational forms or strategies to improve results. This means that an innovation can be not only a new product, but a new production process, a far-reaching re-organization of production and distribution, […]" (Omta, 2002, p. 73).* Food supply chains induce innovation by means of technology, either adapted or invented, including product technology, information technology, process technology, transportation technology, standards and systems (Trienekens et al., 2003; Rueda et al., 2017). An effective way to generate sustainable practices with technology in the food supply chain does not build on a completely "new" set of skills (Shah et al., 2017). To understand the innovation perspective, three components, product, process and organizational innovation, are explained in order to explore and compare how retailers implement innovation to enhance sustainability performance.

Product innovation is concerned with "*developing new products, staying competitive and seizing market opportunities, responding to external demands, competing in niche markets, capabilities and competencies, and engaging in ecopreneurship*" (Klewitz and Hansen, 2014). It involves the replacement of raw materials with sustainable materials, as well as energy saving properties or sustainable product characteristics that respond to customer, buyer, or future developments (e.g. Behnam et al., 2018). Enterprises can utilize their uniqueness to compete in niche markets, for instance their ability and flexibility to respond swiftly to different demands in

the market (Jenkins, 2009). Enterprises are capable of taking hold of market opportunities with environmental product innovation, for example via product differentiation (e.g. Martín-Tapia et al., 2010; Bellamy et al., 2014).

Process innovation consists of the subtopics of "*economic benefits, response to external pressures and anticipation of regulatory changes, adoption of new technologies, pollution prevention/recycling/waste management/resource efficiency as well as capabilities and competencies*" (Klewitz and Hansen, 2014). In that way, enterprises attain economic benefits through cost saving in their production processes, among others (e.g. Behnam et al., 2018). From external pressure or expectation of regulatory alterations, enterprises benefit from innovations in their procedures, whereby they minimize material usage, consumption of energy and waste, generally, moving in the direction of cleaner and more eco-efficient production. Enterprises improve their environmental performance, gain economic benefits, and engage in pollution prevention through eco-efficient practices. Eco-efficiency can even aid towards further radical process and ultimately product innovations (Michelsen and Fet, 2010).

Organizational innovation is commonly known as a firm-level style of innovation in management initiatives (Anzola-Román et al., 2018). Organizational innovation "means the implementation of a new organizational method in the undertaking's business practices, workplace organization or external relations. Changes in business practices, workplace organization or external relations that are based on organizational methods already in use in the undertaking. As well as changes in management strategy, mergers and acquisitions, ceasing to use a process, simple capital replacement or extension, changes resulting purely from changes in factor prices, customization, regular seasonal and other cyclical changes" (Union, E., 2006). Organizational innovation improves creativity enhance enables the development of technological innovations (Mothe and Nguyen, 2010). Organizational innovation is recognized as a source of competitive advantage and supports technological innovation in a context of enhancing sustainability and increasing competition (Sapprasert and Clausen, 2012; Anzola-Román et al., 2018).

Food Supply Chains

"*Supply Chain Management (SCM) is 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*" (Global Supply Chain Forum in (Lambert and Cooper, 2000, p. 66). SCM as encompassing four distinct echelons: internal supply chain, the dyadic, the chain and the network (Harland, 1996). SCM emphasizes in the ways by which firms make use of their suppliers' processes, technology, and capability to enhance competitive advantage. Most food supply chains tend to involve the following stages: origin of the resource, agricultural production, primary processing, further processing, final manufacturing, wholesale, retail, food service and domestic consumption (Hugos, 2018). According to Revoredo-Giha et al. (2012), a supply chain is seen as a network of organizations or actors that have economic and social relationships that allow the working of the supply chain to produce goods and services. This shows that there are three different levels of supply chain: actors, dyadic relationships and network, helping enterprises

(e.g. focal firms) link innovation orientation and sustainability orientation in a food supply chain (e.g. Gómez-Cedeño et al., 2015).

A focal firm can be defined as the one that is responsible for the direct link with the end-customers; at the same time it has direct and indirect links with different actors across the supply chain such as wholesalers, retailers, packaging providers and distributors (Hugos, 2018). As actors change their roles across the supply chain levels, they may face opportunities and/or risks (Beske and Seuring, 2014). The major focus of the focal firm is based on how to link the supply and demand, focusing on the product value (Aarikka-Stenroos et al., 2014). In this study, the retailer of meat supply chain is the focal actor.

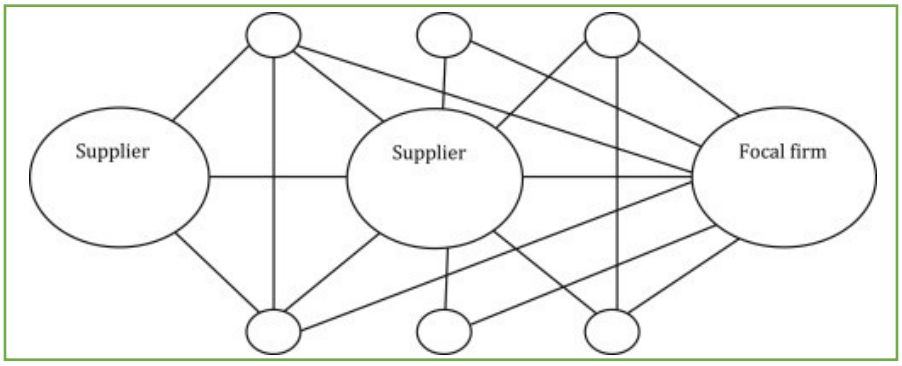

*Figure 1- Focal Actor (**Source**: Frostenson and Prenkert, 2015).*

Dyadic relationships can be defined as the interactions of actors amongst each other to create a more collaborative dynamic and facilitate innovation (Wilson, 1995; Michalski et al., 2018). The relationships developed between the retailer as a focal actor and other actors have become a high priority, as they are either vertical or horizontal relationships (Petljak et al., 2018). In these relationships, "*Issues of trust and risk can be significantly more important in supply chain relationships, because supply chain relationships often involve a higher degree of interdependency between companies*" (La Londe, 2002, p. 10). Omta (2002, p. 75) defines a network as "*all of the actors within one industrial sector, or between related industrial sectors, which can (potentially) cooperate to add value for the consumer.*" In fact, there is a lack of research on SCM from the perspective of retailers (Petljak et al., 2018). Retailers are acknowledged as an important actor in the supply chain that contributes to change (Lehner, 2015). Addressing retailing's innovation and sustainability, the *"...food retailing is very important because of time pressure due to perishability, the need of cooling and the related waste management challenge"* (Petljak et al., 2018, p. 2). Several authors (e.g. Lambert et al., 1998; Michalski et al., 2018) have suggested fundamental aspects for how and why channels are structured and created. Hence, the supply chain structure is the network of actors that forms relationships between members of the supply chain (Michalski et al., 2018) to facilitate innovation in food supply chains.

Research Methodology

Research Design

This is a qualitative case study and evaluates socially constructed dynamic reality (Creswell, 2007). Through an in-depth, comparative study of two food retailers (international and national), this study is to understand the linkages between innovation and sustainability performance at the actor, dyadic and network levels, to better evaluate food supply chain chains (Yin, 2018). After reviewing literature, a multiple case study strategy is applied since rich findings are needed to maximize reliability and validity. Triangulation and replication using propositions are also used to examine the topic (Yin, 2014). As a comparative study, case studies were conducted and later compared the findings. Several sources of secondary data were analyzed such as retailers' websites, sustainability projects and related past surveys. For the primary data collection, multiple cases of interviews and observations were compiled during January 2019. A method of analytic generalization is followed, where a prior developed theory of innovation perspective is utilized as a template to compare the empirical findings (Bryman and Bell, 2015). The unit of analysis is the meat supply chain of retailers, specifically beef products.

Sampling, Data Collection and Analysis

Multiple cases of two large food retailers, where R1 is an international retailer and R2 is a national retailer. For each case, five face-to-face semi-structured interviews were conducted, giving 10 interviews in total. The cases followed a snowball sampling, where mangers recommended several different relevant managers from the retailers (Patton, 2015). Those managers were supply chain managers, hygiene and safety managers, fresh food managers, product development managers and managers of sustainable sourcing. The multiple case strategy was conducted to understand similarities and differences in the themes (Yin, 2018) between international and national retailers from the innovation perspective in food SCM at the actor, dyad and network levels. This is to explore and explain their links to innovative technologies and in turn to sustainability performance. Each interview of 60 minutes was conducted voluntarily, voice recorded and later transcribed. For each case, three observations of 60 minutes were performed (Yin, 2014), where the researcher attended one meeting combined with field tours as a non-participant at both retailers, including the actor level (the retailer), the dyad level (retailers with a direct relationship) and the network level (retailers with an indirect relationship). These actors were chosen to be observed to create multiple sources of evidence to support the interviews' findings (Aarikka-Stenroos et al., 2014). The slaughterhouse, beef distributor, beef packaging and a government body, were chosen to be observed based on a convenient sample.

Ethical consideration was applied throughout this study. Thematic analysis was followed to group themes and indicate contextual dimensions from the collected data in order to enhance the thoughts and provide meaningful findings (Miles et al., 2014). NVivo was used to organize, store and retrieve the research data (Bazeley and Jackson, 2013).

Findings and Discussion

Several key dimensions emerged during data analysis in association to the key themes of innovation in relation to enhancing sustainability performance at the actor, dyadic and network levels, to better evaluate food supply chain. This is in line with prior research that emphasized the significance of innovation at their retailer in order to be successful and overcoming any challenges

(Omta, 2002; Bellamy et al., 2014). As supported by R1, Product Development Manager, *"I believe that our innovative ideas are what keeps us thriving in our competitive market and seizing market opportunities."* This is also supported by the observations conducted at R1 and R2. Table 1 represents the key dimensions for the innovation themes that emerged. These were clustered into three key themes, product, process and organizational innovation.

Table 1 – Key innovation themes to manage meat supply chain.

Themes	Dimensions	Respondents Quotation
Product Innovation	- Staying competitive - Engaging in environmental aspects	*"[…] I believe our meat product differentiation is innovative as not all our competitors have a huge variety of meat like us, we have local beef and we import from six countries […] We offer these products at an acceptable price and this in return we support our suppliers for their implementation to be environmentally friendly."* **R1, Head of Sustainable Sourcing**
	- Responding to external demands	*"[…] With everything going on in our economy and our competitive market, we are pressured from the supply chain to improve our environmental performance through product innovation, for example, product design […]".* **R2, Product Development Manager**
Process Innovation	-Attain economic benefits -Improve their environmental performance	*"We always try to be up-to-date with all the new trends and technologies locally and internationally. […] I believe adopting new innovative technologies, such as the solar panels we just installed was a great decision as we improved our environmental performance as well as cut our costs."* **R2, Hygiene and Safety Manager**
	- Response to external pressures and regulatory changes	*"When there are external pressures we try to respond quickly, wisely and innovatively.[…] When we receive regulations from government bodies we need to begin the process of implementing them."* **R1, Fresh Food Managers**
Organizational Innovation	- Engaging employees in developing a sustainable business	*"Last week we had trainings discussing different things we have in our organization for sustainability and how important it is. These types of trainings are provided regularly for all employees and during the trainings they motivate us to come up with something innovative that would help our environment or even cut our costs and in return they give us a reward."* **R2, Supply Chain Manager**
	- Health and safety issues	*"Our organization structures regulations on health and safety issues. […] As an international retailer we have regulations on health and safety issues from both the Jordanian government bodies and our international HQ."* **R1, Hygiene and Safety Manager**

Contextual dimensions leading to perceive innovation at actor, dyadic and network level in the supply chain were identified (Table 2). Previous research highlighted the importance of innovation in an organization, at the actor level, but there was a lack of research at the dyad and network level

in order to have a greater involvement of all the members across the supply chain and enhance social, economic and environmental sustainability in SCM (Bellamy et al., 2014; Behnam et al., 2018).

Table 2 demonstrates the level of innovation implementation at the actor, dyadic and network level, in relation to achieving sustainability in SCM. R2, Product Development Manager highlighted, *"We believe for our retailer to be successful in achieving sustainability we need to be differentiated in our competitive market and be as innovative as possible".* Though it was identified that at the actor level, innovation is applied well, at the network level is lower. R1, Supply Chain Manager explained, *"Our company has tried many times to collaborate with the government with several ideas and programs such as hygiene issues, recycling, and certificates; however very rare cases have been applied with very little resources. I believe that if more joint programs are implemented between us this will encourage us to be more innovative and sustainable."* Therefore, the results revealed enhancing sustainability performance in SCM is achieved when innovation is successfully implemented at actor, dyadic and network level. Based on the results of this study a comparison between Retailer 1 and Retailer 2 was conducted. It was found that Retailer 1 implements innovation more than Retailer 2, as it is an international organization that adopts and adapts international ideas and concepts hence has a wider opportunity to implement them in a developing country.

Table 2 – Contextual dimensions leading to perceive innovation at actor, dyadic and network level.

		Retailer 1			**Retailer 2**		
		Actor Level	Dyadic Level	Network Level	Actor Level	Dyadic Level	Network Level
Product Innovation	Staying competitive	**H**	**H**	**L**	**H**	**M**	**L**
	Engaging in environmental aspects	**H**	**M**	**L**	**M**	**M**	**L**
	Responding to external demands	**M**	**M**	**M**	**M**	**L**	**M**
	Aggregate	**H**	**M**	**L**	**M**	**M**	**L**
Process Innovation	Attain economic benefits	**M**	**M**	**L**	**H**	**M**	**L**
	Improve their environmental performance	**H**	**M**	**L**	**M**	**M**	**L**
	Response to external pressures and regulatory changes	**M**	**M**	**M**	**M**	**L**	**M**
	Aggregate	**M**	**M**	**L**	**M**	**M**	**L**
Organizational Innovat	Engaging employees in developing a sustainable business	**H**	**H**	**M**	**H**	**M**	**L**
	Health and safety issues	**H**	**H**	**M**	**H**	**M**	**L**
	Aggregate	**H**	**H**	**M**	**H**	**M**	**L**

*H= High, M= Medium, L= Low (These are measured on a three-point scale (high, medium and low). Based on the level of implementation of innovation at actor, dyadic and network level. Further information is available upon request).

Retailers implement innovative technologies at actor, dyad, and network levels to achieve sustainability in food supply chain. This study has illustrated that some actors across the supply chain implement more than others depending on their implementation of innovation; they integrate more dimensions. R1, Head of Sustainable Sourcing explained, "*We always work to be a part of the whole supply chain as this will bring sustainable benefits for all of us. For example, we are not computer connected via ERP between the Food and Drug Association, hence delaying inspections, trainings, etc. So it would be great if someone came up with an innovative idea to overcome this challenge."* In addition R2, Hygiene and Safety Manager highlighted, *"Our transportation vehicles between us and the meat suppliers are very innovative. The vehicles are refrigerators and have a cooling tracking device which track the temperature of the refrigerator as the meat is being transported. This allows us to make sure that the temperature is in the appropriate range."* R1, Supply Chain Manager explained, *"Our retailer and the other actors in our supply chain are concerned with the economic situation in Jordan. We have a variety of prices for meat and other products, we try our best to be innovative even with cost."* This is supported by the observations conducted at R1 and R2. Table 3 demonstrates that actors across the supply chain implement innovation more than others, where Retailer 1 compared to Retailer 2 implements innovation more.

Table 3 – Innovative technologies applied at international and national retailers.

		Innovative Technologies			**Sustainability Performance**
		Transportation Technology	*Standards & Systems*	*Information Technology*	
Retailer 1	Actor Level	**H**	**H**	**H**	*Environmental + Economic + Social*
	Dyadic Level	**M**	**M**	**H**	*Environmental + Economic*
	Network Level	**L**	**L**	**M**	*Environmental+ Economic*
Retailer 2	Actor Level	**H**	**M**	**M**	*Environmental + Economic*
	Dyadic Level	**M**	**M**	**M**	*Environmental + Social*
	Network Level	**M**	**L**	**L**	*Environmental + Economic*

*H= High, M= Medium, L= Low (These are measured on a three-point scale (high, medium and low). Based on the level of implementation of innovation at actor, dyadic and network level. Further information is available upon request).

Conclusion

The interest of sustainability in food SCM in research is growing especially in the innovation perspective (Behnam et al., 2018). This study concluded the significance of implementing innovation, either product, process and organizational innovation, in order to enhance sustainability performance at the actor, dyad and network level. Key contributions to knowledge

will be a theoretical association to understand how to enhance innovation in SCM from the perspective of innovation. Key implications made for retailers are to support their employees to be innovative and to understand the different types of innovation technologies that they can adopt or adapt at different levels in order to enhance sustainability. From the empirical context view, this research contributes to critically evaluate the food supply chain context in a developing country, Jordan, and in a retailing industry. A limitation to this study is conducting interviews only with the retailers; a suggestion for future research is to conduct interviews with all the actors across the supply chain to gain a more holistic picture of how to enhance sustainability in SCM at all three levels from the perspective of innovation**.**

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