Supply Chain Management: An International Journal

Green supply chain management in food retailing: survey-based evidence in Croatia
Kristina Petljak, Katrin Zulauf, Ivana Štulec, Stefan Seuring, Ralf Wagner,

Article information:

For Authors

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

Emerald is a global publisher linking research and practice to the benefit of society. The company manages a portfolio of more than 290 journals and over 2,350 books and book series volumes, as well as providing an extensive range of online products and additional customer resources and services.

Emerald is both COUNTER 4 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.

Green supply chain management in food retailing: survey-based evidence in Croatia

Kristina Petljak
Department of Trade, Faculty of Economics and Business Zagreb, University of Zagreb, Zagreb, Croatia

Katrin Zulauf
Dialog Marketing Competence Center, University of Kassel, Kassel, Germany

Ivana Štulec
Department of Trade, Faculty of Economics and Business Zagreb, University of Zagreb, Zagreb, Croatia

Stefan Seuring
Chair of Supply Chain Management, University of Kassel, Kassel, Germany, and

Ralf Wagner
Dialog Marketing Competence Center, University of Kassel, Kassel, Germany

Abstract

Purpose – Green supply chain management (GSCM) research is so far dominated by studies focusing on manufacturing companies, while research on retailers is missing. The purpose of this study is to assess the interaction between green in-store activities (environment-related infrastructure and retail in-store processes), GSCM and environmental and economic performance outcomes.

Design/methodology/approach – The paper builds on empirical evidence gathered from 190 responses by Croatian food retailers to a self-administered survey. The identified relationships in the conceptual model are tested using partial least squares structural equation modeling.

Findings – The results reveal a positive relation between green in-store activities and GSCM in food retailing regarding environmental and economic performance. The relevance of these relationships accrues from the positive association between GSCM and food retailers' environmental performance, which in turn drives economic performance. It is noteworthy that green supply chain practices drive environmental and then also economic performance.

Research limitations/implications – The study extends the application of GSCM to retailing and, therefore, broadens its scope. However, the data collected are based on one country and, thus, should be extended to assess the impact of green retailing practices in the supply chain on environmental and economic performance in other countries.

Originality/value – This study, to the best of the authors' knowledge, is the first empirical analysis on the relationship between green in-store activities and GSCM in the context of food retail. This important link to customers has rarely been explored. Further, the representative sample of food retailers in Croatia is unique as generally data from Central and Eastern European countries are still rare. Finally, the operationalization of GSCM practices into three constructs as green logistics, green purchasing and cooperation with suppliers' offers conceptual contributions to the GSCM field.

Keywords Retailing, Croatia, Operational performance, Supply chain management, Food industry, Green supply chains

Paper type Research Paper

1. Introduction

Retailers have been identified as one of the most important actors who contribute to changes in consumer consumption patterns (Lehner, 2015). However, a majority of green supply chain management (GSCM) studies has examined samples of manufacturing companies (Golicic and Smith, 2013; Liu *et al.*, 2016; Balasubramanian and Shukla, 2017). Notably, operations research approaches have already been applied various times in retailing contexts achieving considerable progress (for an overview, see Akkerman *et al.*, 2010) and documenting relevance. As evident from sectors listed in related literature (Seuring and Müller, 2008; Ashby *et al.*, 2012; Winter and Knemeyer, 2013; Wong *et al.*, 2015; Darkow *et al.*, 2015), retailers and downstream distribution channels have been addressed less often in empirical research than other

members of the supply chain (SC). This is surprising given that retailers play an important role in the SC because they offer customer contact and experience (Kolk *et al.*, 2010). Research concerning green retailing tends to focus on customer interactions (Lai *et al.*, 2010; Lehner, 2015). Despite retailers' importance in the SC (Ganesan *et al.*, 2009), research on green and sustainability aspects in retailing remains an emerging domain (Erol *et al.*, 2009; Kotzab *et al.*, 2011; Chkanikova and Mont, 2015; Wilson, 2015; Fuentes and Fredriksson, 2016). It appears that the traditional measures of retailers' competitive advantage (e.g. price, quality, service and store location) have been amended by the influence of retail activities on the environment and society (Wilson, 2015), which also impacts consumers' purchasing behavior (Kolk *et al.*, 2010). In line with pressure placed on companies and their supply chains (Mollenkopf *et al.*, 2010; Wong *et al.*, 2015), retailers are expected to identify the environmental impact of their processes (Chkanikova and Mont, 2015).

In addition to environmentally responsible actions at the store level, retailers must also take responsibility for processes in the SCs (Jones *et al.*, 2005; Kirchoff *et al.*, 2016). This responsibility not only drives environmental awareness along the SCs but also leads to an improvement of SCs' environmental performance and sustainability in general (Styles *et al.*, 2012). Presenting a detailed overview of sustainability research in retailing, Wiese *et al.* (2012) state that, to date, much research has focused on the individual aspects of sustainability, such as corporate social responsibility (CSR) in retailing, whereas potential research opportunities lie in more cross-functional analyses that rather account for an integrated or holistic approach to GSCM (Winter and Knemeyer, 2013). Considering the recent discussion of retailing's sustainability, the domain of food retaining is one of the most critical because of time pressure due to perishability, the need for cooling and the related waste management challenge. Consequently, this study addresses the following research question:

RQ. How are green in-store processes related to GSCM and performance outcomes in a food retail setting?

The contributions of the study are as follows: it links retail operations-based antecedents (green in-store processes) to green SC processes and environmental and economic performance outcomes. Furthermore, it presents empirical data from an emerging country, which are rarely studied in the literature. There is a growing interest and understanding of the importance of retail supply chain-oriented research, which is gaining momentum in Croatia. Renko (2008) focuses on investigating how the process of internationalization enhances the sustainability of the Croatian retailing. Also, Renko *et al.* (2010) analyzed environmental responsibility of the Croatian retailing, while Petljak *et al.* (2016) focused more on green transportation issues in the food retail supply chain management (SCM).

Our research contribution can be seen in the shift in focus from the store level to the SC level. While the former is associated with the retail business operations, the latter includes the retailers' involvement in their suppliers' environmental activities and the environmental impact of the retail SC. Moreover, we connect the SC and store levels,

thereby presenting a showcase for the implementation of the GSCM concept in the food retail industry.

The remainder of this paper is organized as follows: In Section 2, the literature on green in-store processes, GSCM, sustainability and environmental initiatives in retailing is reviewed. This allows us to design a structural model and to formulate research hypotheses in Section 3. Next, we describe the scales used to measure each construct of the structural model. In Section 4, we present details concerning the data collected in the survey and the method of partial least squares structural equation modeling to test the proposed model. Section 5 is reserved to relating the results regarding the model to the current knowledge in the field. Sections 6 and 7 conclude with emphases on the main theoretical and managerial contributions as well as the limitations of the research and future research proposals.

2. Literature review

Green retailing constitutes a well-elaborated stream of research that explores a range of divergent aspects and issues, from retail sustainability challenges (Iles, 2007; Erol *et al.*, 2009), consumer's perception of environmental retailing performance to sustainable consumer behavior (Ytterhus *et al.*, 1999). A core aspect of research on retailing is the link between in-store activities and logistics (Lai *et al.*, 2010). This has been affirmed by Youn *et al.* (2017), who provide a list of measures for sustainable retailing, as well as Erol *et al.* (2009), who were among the first ones to develop sustainability indicators in the retailing industry. By closely examining measures provided by Youn *et al.* (2017) and connecting them to the wider body of green in-store literature, a focus on energy, waste and water management at retailing sites can be detected (Chkanikova and Mont, 2015) and serves as a basis for related environmental engagement (Jones *et al.*, 2005; Erol *et al.*, 2009; Lai *et al.*, 2010; McKinnon, 2010). Such activities offer a sound starting point to conceptualize related antecedents driving the conceptual model. In contrast to the aforementioned emphasis on green logistics (Lai *et al.*, 2010), the links to the wider supply chain processes are not well established yet. This will be explained in the next section, while we turn to green in-store processes first.

2.1 Green in-store processes

Kotzab and Teller (2005) consider in-store logistics as a "hot-topic" due to the dominance of store-based retailing. While Reiner *et al.* (2013) identify ways of improving in-store logistics processes for handling dairy products, from the incoming dock to the shelves of supermarkets and hypermarkets, Holweg *et al.* (2016) focus more on in-store logistics beyond the point of sale with respect to the economic, ecological and social benefits for retailers, as well as other stakeholder and focus more on prevention of wastage of supply chain resources.

Arguments regarding greening in-store processes require companies to appropriately manage their own resources and processes before demanding related actions from their suppliers or customers (Vachon and Klassen, 2006). A growing number of food retailers are concerned about the impact of their business activities on the environment (Piacentini *et al.*, 2000). The retailers implement environmentally responsible

activities, mainly at the company level, which are then extended to stores (Jones *et al.*, 2005). Lehner (2015) argues that retail stores are significant contributors to the operationalization of sustainable consumption.

Environmental practices that retailers pursue in store include energy efficiency, waste reduction and the use of renewable energy (Lai *et al.*, 2010). As for the assortment, retailers introduce fair trade and organic food products in their stores and communicate their environmentally responsible activities to the consumers (Jones *et al.*, 2005). Overall, retailers tend to focus on direct environmental impacts at the point of sale, which they can observe, and measure, take responsibility for and control (Jones *et al.*, 2007). In addition, much of the previous research on retailers' environmental issues centers on internal operational practices and environmental process improvements in stores, such as product assortment (Chkanikova and Mont, 2015), waste management and eco-efficiency (Lai *et al.*, 2010), store construction, waste generation and energy efficiency (Iles, 2007). In general, common green in-store practices by retailers are water and energy efficiency (Jones *et al.*, 2005; Erol *et al.*, 2009; Lai *et al.*, 2010; McKinnon, 2010) and waste management (Jones *et al.*, 2005; Erol *et al.*, 2009; Lai *et al.*, 2010; Kaipia *et al.*, 2013). These practices are relevant both at a distribution warehouse as well as within the single retail facility.

2.1.1 Water and energy management at the store level

Retailers do not consider water management as a major area of concern when analyzing environmental initiatives; rather, they prioritize water management by monitoring and reducing water usage within stores (Jones *et al.*, 2005; Chkanikova and Mont, 2015). Water management is particularly relevant e.g. in areas where fresh meat is handled and hygiene standards have to be met accordingly.

Energy efficiency is a common activity area for European food retailers given the associated cost savings and legislative requirements. The energy performance of food retailers is characterized by a high energy demand. In case of food retailers, typically, 50 per cent of the energy is consumed by products that demand temperature-controlled facilities, i.e. frozen and chilled food. For food retailers, lighting generally consumes less than 30 per cent of energy, while heating, ventilation and air conditioning account for 15-20 per cent (Styles *et al.*, 2012).

2.1.1. 1 Operationalizing water and energy management. In our empirical research, *water and energy management* (*WEM*) is measured on a three-item scale compiled and adapted from previous research (Jones *et al.*, 2005; Erol *et al.*, 2009; McKinnon, 2010) and covering the following items: reducing energy consumption (WEM_1), using energy-saving lamps (WEM_2) and regularly checking water consumption using water meters (WEM_3), thus avoiding unexplained increases in water use. The use of energy-saving lamps might be subordinate to reducing overall energy consumption.

2.1.2 Waste management at the store level

Waste collection and management emerged as the most popular methods adopted by a large number of companies, particularly for packaging waste (Kovács, 2008). Waste sorting in stores and distribution centers or warehouses is a common activity for European retailers given the requirements outlined by the European Union waste legislation. Some retailers take further action to reduce volumes of in-store generated waste or use waste to produce biogas (Chkanikova and Mont, 2015).

Because the issue of plastic shopping bags has been widely communicated in various media, customers are becoming increasingly aware of it. Also, reducing packaging size and weight is popular in the retail environment, as it is directly linked to economic savings associated with material efficiency and logistics optimization (Kaipia *et al.*, 2013).

2.1.2.1 Operationalizing waste management. Further on, *waste management* (*WM*) is measured on a three-item scale from explorative research (Jones *et al.*, 2005; Erol *et al.*, 2009; Kaipia *et al.*, 2013) including the following items: collecting packaging waste separately by material type (primary/secondary packaging) (WM_1), monitoring composition (types) of packaging waste (WM_2) and offering reusable bags to customers (WM_3).

2.2 Green supply chain management

The integration of environmental concerns within SCM has itself evolved into a separate and growing field of GSCM (Sarkis, 2012). Pressure from stakeholders causes retail companies to shift their focus from internal to external activities (Ytterhus *et al.*, 1999). Maloni and Brown (2006) argue that food retailers must be prepared to not only offer environment-friendly products to consumers but also to demonstrate responsible environmental practices in their SCs. They are required to manage upstream activities by integrating environmental criteria and targets in supplier and purchasing policies and influence downstream activities aimed at consumers (Ytterhus *et al.*, 1999). Wiese *et al.* (2012) report a research gap regarding the role of retailers in implementing sustainability along SCs and the need to focus on sustainability in the context of retail and supply chain management. However, their work "provides added value for retail and SC research by linking sustainability considerations in retail research with retail practice and other research areas and industries along the supply chain" (Wiese *et al.*, 2012, p. 332).

Given that the body of research on GSCM has grown tremendously in recent years (Ashby *et al.*, 2012; Wong *et al.*, 2015), alongside the development of different measurement scales, an increasing number of constructs have already been used to measure GSCM (Golicic and Smith, 2013; Kirchoff *et al.*, 2016). From the viewpoint of green retailing, retailing-related processes link in-store activities to SC-related processes well beyond logistical processes (Akkerman *et al.*, 2010). Ganesan *et al.* (2009) use purchasing measures as a key process, which complements operational logistical processes at a more tactical level. The same is true for purchasing processes, which have received much research attention in the sustainability domain (Miemczyk *et al.*, 2012). Thus, it seems justified to take up green purchasing as a second supply chain process that retailers must implement.

Retailers' SC activities at an operational level strongly focus on logistics and purchasing. Logistics ensure the frequent and swift supply of products and provide an operational foundation. Purchasing establishes contact and contracts with suppliers, which is, therefore, at a more tactical level. It implements strategic decisions made in assortment planning, thereby ensuring that the right products will be available on time.

Achieving related environmental goals often requires cooperation with suppliers, adding the more strategic level. Overall, these three constructs comprehensively explain retailers' SC-related processes and have major implications for greening-related processes.

2.2.1 Green logistics

Before considering SC practices in large, retailing must first ensure day-to-day operations, within which retailers' central logistics activities are transportation and warehousing (Björklund *et al.*, 2016). Green logistics cover all activities related to the selection of the best transportation means, load carriers and transportation routes to reduce the environmental impact of the whole SC (Murphy and Poist, 2000; Abukhader and Jönson, 2004). The food retail sector is logistics intensive (Fernie *et al.*, 2000), which justifies green logistics as a SC process-related construct. Because transportation tends to have the highest environmental impact in the logistics system (Abukhader and Jönson, 2004), retailers are taking the initiative to make their SCs more environment friendly, for example, by reducing transportation distances and optimizing warehouse locations (Murphy and Poist, 2000; McKinnon, 2010).

2.2.1.1 Operationalizing green logistics Green logistics (GL) is measured using a two-item scale based on Murphy and Poist (2000) and McKinnon (2010), which covers two items: item one refers to choosing the location of the warehouse/distribution center while accounting for emission reduction and renewable energy usage in the center (GL_1). This is related to the second item, that is, using renewable energy energy-efficient lightning, such as sensor lamps and energy-saving lamps, solar power on the roofs, etc.) in the warehouse distribution center (GL_2). In this context, carbon dioxide emissions are frequently cited as a detrimental effect of logistical activities (Abukhader and Jönson, 2004; Wong *et al.*, 2015). While the first indicator is more strategic in nature and points to the impact of logistics on the environment, the second is operational and relates to day-to-day operations. Together, they allow a meaningful assessment of green logistics constructs.

2.2.2 Green purchasing

According to Min and Galle (2001), green purchasing is the practice of making environmentally aware purchases by considering waste reduction and promoting the recycling and reuse of materials. Purchasing determines product assortments in retailing. To reduce the environmental footprint (Jensen, 2012) of their operations and SCs, retailers are promoting environmentally sustainable sourcing and production of products to have a lower impact on the environment (Zsidisin and Siferd, 2001). Companies are increasingly managing their suppliers' environmental performance to ensure that their products are produced and supplied in an environment-friendly manner (Seuring and Müller, 2008).

2.2.2.1 Operationalizing green purchasing. Green purchasing (GP) is measured on a two-item scale based on Min and Galle (2001) and Zsidisin and Siferd (2001). It includes the evaluating the suppliers' environmental practices (GP_1) and collaborating with suppliers to reduce packaging or packaging waste (GP_2) (Beske *et al.*, 2008). While the former item

demonstrates a link between cooperation and suppliers, the latter is more operational.

2.2.3 Cooperation with suppliers

A central element of GSCM is cooperation and collaboration with suppliers (Zhu and Sarkis, 2004; Miemczyk *et al.*, 2012; Beske and Seuring, 2014). It offers a more strategic perspective and complements green logistics and purchasing constructs. Taken together, the three constructs offer a sound conceptualization of SC activities in the retailing sector, comprising an operational, tactical and strategic construct each, that represent managerial-level decisions (Björklund *et al.*, 2012).

Collaboration with suppliers is the most strategic construct at the SC practices level. There are numerous factors motivating retailers to engage their suppliers in sustainability issues; for example, the need to satisfy increasing stakeholder pressure, to reduce SC risk, to identify new collaboration opportunities and to ensure long-term SC resilience (Hübner *et al.*, 2016). Retailers have an extensive supplier selection and this is the reason why collaboration and assessment of the suppliers' performance is of importance. Collaboration with suppliers includes interaction between organizations in the SC, including aspects such as setting environmental goals, environmental planning and reduction of environmental impact (Vachon and Klassen, 2006). Environmental collaboration in the SC entails the direct involvement of an organization with its suppliers or customers to jointly develop environmental solutions (Walton *et al.*, 1998; Kaipia *et al.*, 2013).

2.2.3.1 Operationalizing cooperation with suppliers. Cooperation with suppliers (COOP) is measured on a five-item scale developed by Walton *et al.* (1998), Humphreys *et al.* (2003) and Bai and Sarkis (2010). It covers the following items: collaborating with suppliers to design environmentally friendly packaging (COOP_1), conducting seminars/workshops for suppliers related to environmental protection (COOP_2), attending suppliers' seminars/workshops related to environmental protection (COOP_3), encouraging suppliers to establish their own environmental programs (COOP_4) and encouraging active cooperation with suppliers to reduce the impact of business activities on the environment (COOP_5), which is consistent with the GSCM literature. The reduction of packaging and related waste management is an item included in the green purchasing construct, while in cooperation with suppliers, the focus is on improving the environmental friendliness of the packaging. Seminars and workshops by both retailers and suppliers allow for a mutual exchange of information. This is also seen as an enabler of mutual cooperation, which drives suppliers' environmental programs and joint product- and process-related initiatives (Tachizawa *et al.*, 2015). This closes a gap in related research, as these constructs have not been analyzed jointly yet. They have also not been assessed in the context of retailing.

2.3 Environmental and economic performance

Supply chain processes drive related environmental and economic performance (Zhu and Sarkis, 2004; Zhu *et al.*, 2007). The link between environmental and economic performance has been explored several times, where typically,

the former drives the latter (Hervani et al., 2005; Wong et al., 2015).

Measuring green performance by separating environmental and economic performance construct has become somewhat standard in the related research (Zhu and Sarkis, 2004; Hervani et al., 2005; Zhu et al., 2007). While there are different forms of conceptualizing interrelations between environmental and economic performance, we follow the arguments by Seuring and Müller (2008), who propose that environmental (and social) performance criteria often serve as order qualifiers that have to be fulfilled. Considering the economic performance is also required as a company not making profits will not exist in the long run. Accordingly, it is expected that environmental performance will drive economic performance.

2.3.1 Environmental performance

Environmental performance (ENV) is measured on a five-item scale adapted from Zhu and Sarkis (2004), Hervani et al. (2005), Zhu et al. (2007) and Tachizawa et al. (2015). It includes items related to green performance in food retail SCM: reducing greenhouse gas emissions (ENV_1), reducing waste water (ENV_2), reducing solid waste (ENV_3), reducing use of dangerous/hazardous/toxic materials (ENV_4) and cooperation with suppliers in terms of environmental protection (ENV_5).

2.3.2 Economic performance

Economic performance (ECON) is measured on a three-item scale adapted from Zhu and Sarkis (2004), Hervani et al. (2005) and Zhu et al. (2007) and it covers items related to reducing transportation cost (ECON_1), reducing warehousing cost (ECON_2) and decreasing reverse logistics costs (ECON_3). The economic performance measures in this study are, therefore, directly related to environmental aspects, which can be measured by means of accounting. This is a narrower logic than, for example, management accounting-based measures that are frequently suggested (Golicic and Smith, 2013), yet such operational measures are appropriate for the present study. Emphasis is placed on cost reduction since in retail much of the competition is cost based. The

reduction of transportation, storage and reverse logistics costs are typical win–win measures that are appropriate in the context of an emerging country, where retailers are still working toward improving their operational processes.

3. Hypothesis development

Many empirical studies have been conducted on the relationship among antecedents, GSCM practices and company performance (Golicic and Smith, 2013; Wong et al., 2015); however, none of these works were in the context of service supply chains. According to Zhu et al. (2007), a more detailed study analyzing the relationship between individual GSCM practices and individual factors in performance is needed to help managers identify GSCM practices that best enforce activities and require improvement. To this effect, our study is expected to make valuable contributions to the GSCM as well as food retail literature.

The structural equation model (SEM) follows the dominant logic in the field: it begins with antecedents, followed by an analysis of practices and an evaluation of impact on the performance outcomes (Golicic and Smith, 2013).

The antecedents of the structural model are green in-store processes: water and energy management and waste management. They motivate the implementation of further-reaching SC management practices, where green logistics, green purchasing and cooperation with suppliers form the central constructs. These practices along the green SC processes affect the environmental and economic performance. The conceptual model is illustrated in Figure 1. Subsequently, we introduce each construct and measurement item used for the empirical study (Appendix Table AI). Furthermore, references are provided for the construct measurement to justify the overall model.

We reiterate that without a sound internal conduct, convincing suppliers (or customers) to implement related measures will be difficult (Vachon and Klassen, 2006). Therefore, in-store activities are antecedents of supply chain processes. This holds for logistical processes, purchasing and for more strategic collaboration. The core objective of the

Figure 1 Conceptual model for GSCM in food retailing
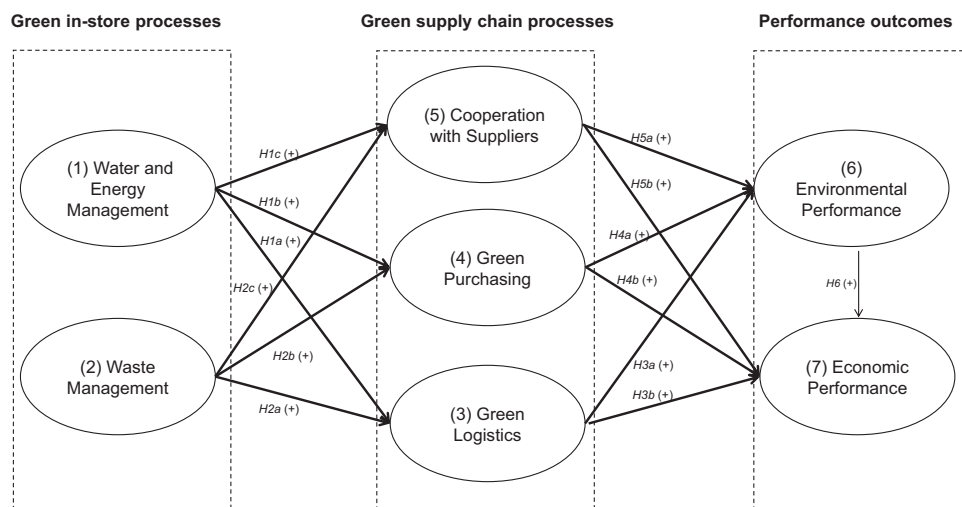
structural model is to outline a sound comprehensive approach that links the three parts of the framework. In particular, energy-related indicators of energy management and green logistics constructs are directly related to each other. Such a clear link is more difficult to establish for waste management and, for example, warehouse locations. Nevertheless, waste management options are often based on related logistical solutions and even warehouse locations, so that causality exists for these indicators too. Similarly, waste management and green purchasing indicators are directly related to each other, and in the related literature they can be observed in cooperation with supplier constructs. Waste and water measures are present in environmental performance constructs, while transportation and logistics have relevance for the economic performance constructs.

Therefore, internal measures drive the greening of SC processes, which substantiate Hypotheses 1 and 2:

H1a.　Water and energy management positively influence green logistics.

H1b.　Water and energy management positively influence green purchasing.

H1c.　Water and energy management positively influence cooperation with suppliers.

H2a.　Waste management positively influences green logistics.

H2b.　Waste management positively influences green purchasing.

H2c.　Waste management positively influences cooperation with suppliers.

This argument linking antecedents to SC processes is then extended to outcome constructs which follows the conventional logic in the field (Zhu and Sarkis, 2004; Zhu et al., 2007). Green logistics, green purchasing and cooperation with suppliers should all lead to performance improvements in both environmental and economic dimensions. Due to that, Hypotheses 3, 4 and 5 are formulated as follows:

H3a.　Green logistics positively influences environmental performance.

H3b.　Green logistics positively influences economic performance.

H4a.　Green purchasing positively influences environmental performance.

H4b.　Green purchasing positively influences economic performance.

H5a.　Cooperation with suppliers positively influences environmental performance.

H5b.　Cooperation with suppliers positively influences economic performance.

Finally, we argue the interrelation between environmental and economic performance. We follow a win–win logic (Seuring

and Müller, 2008), where better environmental performance helps to improve the economic performance. Usually, economic performance is modeled as the overarching outcome, as firms need to make a profit in the medium to long run for staying competitive. Hence, we formulate Hypothesis 6 as follows:

H6.　Environmental performance positively influences economic performance.

4. Research design

4.1 Research setting and data collection

The empirical analysis aims to test the hypothesized relationships. Owing to its economic importance and dominance in the retail market (Darkow et al., 2015), we chose food retailing as the application context of our study. First, explorative research was conducted by six expert interviews with retailers of different business sizes (two small, two medium-sized and two large retailers) in Croatia. The aim of the explorative research was to identify environment-related activities that food retailers consider in stores and SC. As research instrument, a semi-structured interview, similar to the ones by Piacentini et al. (2000) and Marques et al. (2010), was performed. The semi-structured nature of interviews provided an excellent opportunity to explore the breadth of environmental initiatives that food retailers implement in store and, consequently, SCs. Thereafter, drawing on the existing scales and new knowledge received from the practitioners, we developed a questionnaire about GSCM in food retailing. Before conducting the field research, the questionnaire was pre-tested with the same expert interviewees and was slightly modified, as our respondents have different roles ranging from retail store owners to SC managers, so that the questionnaire was pre-tested to assure that respondents were confident with answering the questions and to assure measures are valid.

The questionnaire consists of two parts. In the first part, data characterizing retailers' operational processes und business performance were collected and in the second, respondents were asked to assess the implementation of environmentally responsible activities in retail stores, followed by GSCM activities and environmental and economic performance. Respondents' perceptions of greening in-store activities, GSCM and performance measurement were examined using a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The food retailers' demographics are presented in Appendix Table AII.

While a total of 1,050 surveys were sent out, the sample in our study comprised 210 retailers from Croatia, accounting for a response rate of 18.1 per cent. From these, 190 were completed and eligible for further analysis applying the partial least square algorithm for fitting a SEM (Parwoll and Wagner, 2012). Validating the sample characteristics with the company demographics of the Croatian populations of retailers (Armstrong and Overton, 1977) leads to the conclusion that sample is not subject to a non-response bias and provides us with information representative for the basic population. The respondents included retail store owners, retail directors, logistics directors and SC managers/executives. The information about the retailers was taken from BIZNET, a

register for business entities under the Croatian Chamber of Economy. Furthermore, representativeness of the sample was crosschecked with data obtained from Gesellschaft für Konsumforschung Consumer Panel Services, household panel. Data were gathered from April to September 2013.

Because it was the aim to address the respondents' knowledge about the topic, we targeted owners, directors and managers in companies with the following NACE code classification and used codes related to food retailing: sale in non-specialized stores with food, beverages or tobacco predominating (G47.11); other retail sale in non-specialized stores (G47.19) and retail sale of food, beverages and tobacco in specialized stores (G47.2). The vast majority of retailers in the sample (41.1 per cent) mentioned that the proportion of revenue from food product sales in total revenue was 50-75 per cent, and 27.9 per cent of the retailers in the sample mentioned more than 75 per cent food sales in 2012. Additionally, the sample consisted of retailers whose revenue proportion from food products sales in total revenue was 25-50 per cent (17.4 per cent) and less than 25 per cent (13.7 per cent) in 2012. Retailers working with up to 50 food suppliers (65.3 per cent) were highest in number, followed by those conducting business with 50-100 food suppliers (15.8 per cent) and more than 100 suppliers (18.9 per cent). Food retailers who participated in the study predominantly operated convenience stores (55.8 per cent), since a majority of food retailers in Croatia are small, independent retailers even though market concentration appears to be growing. These are followed by retailers predominantly operating supermarkets (10.0 per cent) and hypermarkets (4.7 per cent) and 29.5 per cent of the retailers operated in different retail formats, for example, supermarkets and hypermarkets (Appendix Table AIII).

4.2 Measures and their consistency

All measurement scales used in our survey are reflective, multi-item constructs and adapted from existing items and scales, where possible. To ensure the correct meaning of the items, the questions were translated and then re-translated. We used a five-point Likert scale (1 = strongly disagree and 5 = strongly agree). The questionnaire was pretested, which resulted in minor changes in the wordings. The constructs and their internal consistency are presented in Table I. Considering the results in Table I, we conclude that all common quality standards are met.

4.3 Reliability

We conducted an exploratory factor analysis to purify the used scales. Items with communalities ≤0.4 were deleted. In addition, items with loadings ≤0.5 and those with a low variance were deleted. We checked the indicator reliability following Hulland (1999) and used standardized indicator loadings ≥0.7 and checked loadings ≥0.4. All measures meet the recommended levels for Cronbach's α; composite reliability and average variance extracted (AVE) provide evidence on the internal consistency reliability and convergent validity. Discriminant validity is checked using the Fornell–Larcker criterion (Fornell and Larcker, 1981). Each construct's AVE is higher than its squared correlation with any other construct (Hair *et al.*, 2012). We also checked for cross-loadings. According to Hu and Bentler (1999), the standardized root

Table I Constructs and internal consistency of measures

Construct	Items	Cronbach's α	Composite reliability	Average variance extracted (AVE)
Water and energy management (WEM)	3	0.755	0.860	0.673
Waste management (WM)	3	0.764	0.864	0.680
Green logistics (GL)	2	0.761	0.893	0.807
Green purchasing (GP)	2	0.721	0.877	0.781
Cooperation with suppliers (COOP)	5	0.904	0.929	0.723
Environmental performance (ENV)	5	0.875	0.910	0.670
Economic performance (ECON)	3	0.856	0.912	0.775

Notes: Thresholds: Cronbach's α = 0.7 (Nunnally, 1978); composite reliability ≥ 0.7 (Bagozzi and Yi, 1988); AVE ≥ 0.5 (Bagozzi and Yi, 1988)

mean square residual is a badness-of-fit index with a threshold ≤ 0.08. With 0.061 (0.074) for the composite (common factor) model, we meet the criteria.

5. Results

The results of our SEM analyzed with SmartPLS 3 (Ringle *et al.*, 2015) show the path coefficients (Table II) and total effect size (Table III). SEM has become a quasi-standard in business research when it comes to analyzing the cause–effect relations between latent constructs (Hair *et al.*, 2011). This is also supported by the increasing number of studies in SCM using SEM (Green *et al.*, 2012; Lee, 2015; Eng, 2016; Vanpoucke *et al.*, 2016). The desire to test concepts or even complete theories is one of the major reasons authors conducting business research are using SEM (Steenkamp and Baumgartner, 2000; Henseler *et al.*, 2009).

Furthermore, we tested for moderating effects that turned out to be neither substantial nor significant computing 5,000 bootstrap draws.

We hypothesized that water and energy management is significantly and positively associated with all three observed GSCM practices: cooperation with suppliers, green purchasing and green logistics (*H1a*, *H1b*, *H1c*). The internal management of these resources drives retailers to focus on their relationships with suppliers. Waste management is not significantly linked to green logistics (*H2a*) but positively linked to green purchasing (*H2b*) and cooperation with suppliers (*H2c*). While purchasing and the management of cooperation determine how much waste should be created in operational activities, logistics must also play a role but not decide on waste management issues, which is in line with other research linking related operations processes (Zhu *et al.*, 2007).

Table II Path coefficients of SEM

Hypothesis	Original sample (O)	Bootstrap sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	p values
H1a: water and energy management → green logistics	0.538	0.539	0.062	8.629	<0.001***
H1b: water and energy management → green purchasing	0.377	0.377	0.068	5.541	<0.001***
H1c: water and energy management → cooperation with suppliers	0.409	0.409	0.070	5.813	<0.001***
H2a: waste management → green logistics	0.099	0.102	0.066	1.505	0.133
H2b: waste management → green purchasing	0.270	0.272	0.064	4.231	<0.001***
H2c: waste management → cooperation with suppliers	0.130	0.135	0.069	1.867	0.062*
H3a: green logistics → environmental performance	0.150	0.148	0.084	1.779	0.075*
H3b: green logistics → economic performance	0.002	0.001	0.105	0.017	0.986
H4a: green purchasing → environmental performance	0.221	0.222	0.092	2.395	0.017**
H4b: green purchasing → economic performance	0.005	0.001	0.104	0.049	0.961
H5a: cooperation with suppliers → environmental performance	0.271	0.277	0.102	2.661	0.008***
H5b: cooperation with suppliers → economic performance	−0.058	−0.056	0.115	0.505	0.614
H 6: environmental performance → economic performance	0.362	0.367	0.088	4.139	<0.001***

Notes: *$p < 0.1$; **$p < 0.005$; ***$p < 0.001$

Table III Total effect size of SEM

	Hypothesis	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	p values	Hypotheses supported
H1a	Water and energy management → green logistics	0.538[c]	0.539	0.062	8.629	<0.001***	Yes
H1b	Water and energy management → green purchasing	0.377[c]	0.377	0.068	5.541	<0.001***	Yes
H1c	Water and energy management → cooperation with suppliers	0.409[c]	0.409	0.070	5.813	<0.001***	Yes
H2a	Waste management → green logistics	0.099[a]	0.102	0.066	1.505	0.133	No
H2b	Waste management → green purchasing	0.270[b]	0.272	0.064	4.231	<0.001***	Yes
H2c	Waste management → cooperation with suppliers	0.130[b]	0.135	0.069	1.867	0.062*	Yes
H3a	Green logistics → environmental performance	0.150[b]	0.148	0.084	1.779	0.075*	Yes
H3b	Green logistics → economic performance	0.056[a]	0.056	0.111	0.508	0.611	No
H4a	Green purchasing → environmental performance	0.221[b]	0.222	0.092	2.395	0.017*	Yes
H4b	Green purchasing → economic performance	0.085[a]	0.084	0.111	0.770	0.441	No
H5a	Cooperation with suppliers → environmental performance	0.271[b]	0.277	0.102	2.661	0.008**	Yes
H5b	Cooperation with suppliers → economic performance	0.040[a]	0.044	0.125	0.322	0.747	No
H6	Environmental performance → economic performance	0.362[c]	0.367	0.088	4.139	<0.001***	Yes
	Waste management -> perf_ECON	0.034[a]	0.034	0.025	1.340	0.180	
	Waste management -> perf_ENV	0.110[b]	0.116	0.039	2.792	0.005**	
	Water and energy management -> perf_ECON	0.079[a]	0.082	0.041	1.907	0.057*	
	Water and energy management -> perf_ENV	0.275[b]	0.278	0.048	5.761	<0.001***	

Notes: *$p < 0.1$, **$p < 0.005$, ***$p < 0.001$; effect size: $f^2 \geq 0.02$ weak effects[a], $f^2 \geq 0.15$ moderate effects[b], $f^2 \geq 0.35$ strong effects[c]

Noteworthy findings are observed in the link between green supply chain practices and performance (Figure 2). All three GSCM practices are positively related to environmental performance (*H3a*, *H4a*, *H5a*). This is well in line with previous research and confirms the overall positive impact of GSCM on environmental performance (Tachizawa *et al.*, 2015). This can be linked to achieving win–win situations if companies invest in related initiatives, both internally and in supplier relationships (Miemczyk *et al.*, 2012; Beske and Seuring, 2014). In addition, none of the GSCM practices positively affects economic performance (*H3b*, *H4b*, *H5b*). This is surprising and contradictory to existing findings that establish

Figure 2 Hypotheses test results
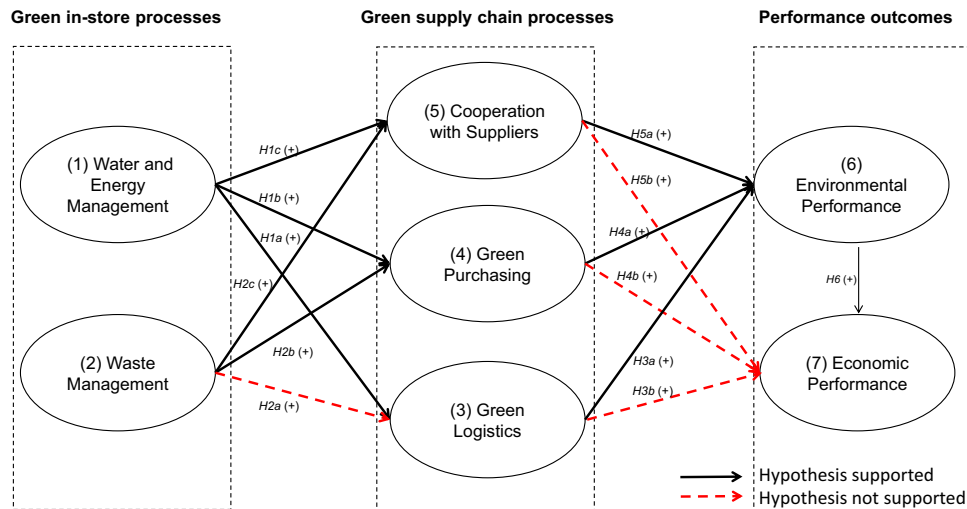
a direct link between GSCM practices and economic performance (Golicic and Smith, 2013). We conclude that this may have resulted from economic performance being mainly based on cost and, therefore, accounting-related measures. In other words, the focus on cost savings might be too narrow as a measure compared to the performance outcomes achieved, which can also be perceived as contributing to a better service. To this effect, GSCM practices are enforced as a result of environmental performance positively impacting economic performance (*H6*). Similar results were observed in Zhu and Sarkis (2004) and Green *et al.* (2012). A wider interpretation would be that retailers who achieve economic performance must accomplish greening their entire supply chain and on all levels: strategic, tactical and operational. Without greening the overall supply chain, one cannot expect to achieve benefits in economic performance.

Complementing the hypotheses, we checked for the total effects among the green in-store processes and performance outcomes. A significant positive total effect is observed for water and energy management driving both environmental and economic performance. A possible explanation is the typical win–win situation, in which a reduction in the use of water and energy decreases environmental impact and cost. In the case of waste management, there is a positive link to environmental performance. While this is straightforward, the missing influence on economic performance can be explained by the fact that waste management often needs additional investment or the sorting and handling of waste, which increases cost and complexity.

6. Discussion and contributions to theory and practice

The contributions of this paper are summarized as follows. To the best of our knowledge, this is the first study on GSCM in food retailing that provides empirical evidence. More specifically, it empirically confirms prior notions that greening in-store activities contributes to the overall greening of SCM practices (Zhu *et al.*, 2007; Golicic and Smith, 2013; Kirchoff

et al., 2016) and in such way, it links downstream with upstream activities in the supply chain. The results also support the proposition that retailers who demonstrate proactive environmental initiatives within stores are more likely to engage in GSCM practices, which in turn leads to improvements in environmental performance. Examining the overall structural model, we extended the well-established GSCM-related research to the context of food retailing and thus, broadened its field of application to the service supply chains, where it has rarely been applied. Owing to the operationalization of a single part of the conceptual model, the overall model offers the first approach to the analysis of GSCM practices and performance outcomes for food retailers.

Second, this study highlights the importance of green in-store processes by means of water and energy management as well as waste management (Lai *et al.*, 2010; Lehner, 2015). While this might only capture a limited set of retailer activities, the two constructs enable a sound and parsimonious comprehension of these activities. Here as well, the constructs and items used are in line with related research on manufacturing companies (Zhu and Sarkis, 2004; Mollenkopf *et al.*, 2010; Golicic and Smith, 2013) but differ in their field of application, that is, service SCM.

Third, a comprehensive conceptualization of retailers' green supply chain practices is offered by introducing the three constructs: green logistics, green purchasing and cooperation with suppliers. This summarizes the analyzed constructs. Zhu and Sarkis (2004) examine operational practices, while Zsidisin and Siferd (2001), for example, have already explored environmental purchasing. Wong *et al.* (2015) analyze aspects of cooperation. Yet, a combination of the three constructs in one empirical study and their interrelation was yet to be presented and further examined. As outlined in the literature review section, these established core processes well represent the operational (logistics), tactical (purchasing) and strategic (cooperation) levels.

Despite its contribution to the GSCM, as well as food retail literature, this study is not free from limitations. Theoretically,

such a study must account for the limited number of constructs. The conceptual model offers a sound comprehension of antecedents, practices and performance outcomes for retailers.

However, the sample size, which is adequate to test the conceptual model, poses certain empirical limitations. Given Croatia's retail industry, a reasonable number of retailers responded allowing generalizing results obtained from this sample. The example of Croatia even might serve as specimen for similar transition economies in the European context, e.g. Serbia or Bosnia-Herzegovina.

The research methodology of using the PLS algorithm for a SEM entails two limitations. First, the analysis is restricted to evaluating prior defined or assumed relationships by testing hypotheses rather than discovering unexpected patterns. However, the explanatory factor analysis does not indicate a structure inherent to the data at hand that is departing from the model. Second, the PLS algorithm emphasizes predictive performance, but is weak in comparing competing theoretical explanations (Hair *et al.*, 2011). However, since our study is exploratory in nature and, so far, there is no competing explanation established in the related literature, the study is not subject to this disadvantage.

Nevertheless, further research by means of empirical theory evaluation using covariance-based algorithms can be hampered by the non-normal distributions of indicators of the measurement models proposed herein. Finally, our research design builds on the assumption that the observations in the data set are drawn from the same distribution. This is justified given that we consider Croatia as a case study that provides retailers with heterogeneous conditions. Studies aiming to replicate such heterogeneous environments could adopt a multi-group analysis or finite-mixture approach.

This brings us to the next limitation of this research, that is, to focus on retailers who predominantly sell food in Croatia, although empirical research in the field of GSCM lacks large samples from emerging countries. Croatia has been labeled as a transition economy. Such countries are characterized by changing price regimes and market structures. The expectation of more mature retail markets with a smaller number of independent actors will further drive efforts for GSCM in (food) retail. To elaborate, we expect waste management to impact economic performance by increasing disposal costs. We argue that these findings are likely to be observed in other transition economies as well, thus allowing for our findings to be generalized beyond Croatia.

This links into the implications for managers. The results of this study can guide managers in the process of prioritizing the successful implementation of given practices to generate improvements in performance. Without investment into in-store processes, measures on the supply chain level would usually not work. Regarding suppliers, all three processes are of relevance, i.e. green logistics, green purchasing and cooperation with suppliers are all relevant and have to be implemented jointly. This holistic perspective of managing the supply chain will be required to reap related environmental and economic performance improvements.

Future GSCM research in the food industry that includes all actors in the SC, that is, retailers as well as product-centered companies, is needed to complement the SC picture. Given the

specificities of certain product categories, it would be interesting to examine the greening of SCs with respect to alternative product categories and preconditions, such as temperature-controlled chains, as well as to measure and provide the typology of environmental impacts for food retailers. Attention to the green issues related to the process-based and product-based greening of the supply chain is expected in the time of circular and bio economy.

Promising research directions might employ constructs from a dynamic capability perspective (Beske and Seuring, 2014), which are increasingly employed in research on sustainable SCM. This allows a dynamic comprehension of relationships among retailers and the greening of their supply chains. This would include addressing the perspectives of different supply chain members.

A second research direction would cover social aspect, which are also relevant for retailing, such as the working conditions, both of staff members at the retailers such as their suppliers. This would broaden the comprehension on how this impacts economic performance, thereby interlinking with this stream of research.

Third, the blend of online and offline retailing provides new challenges for the in-store logistics integration (Herhausen *et al.*, 2015). Notably, the offline retailing provides an interface enabling the customers to explore and validate the sustainability claims of green retailers. This is of particular relevance not only for retailers in transitions economies because up to now there are no standards and green quality labels established for the in-store logistics.

7. Conclusions

Retailers, especially food retailers, operate one of the most complex SCs. Yet, GSCM research tends to focus on the perspectives of manufacturing companies or secondary data analysis of, for example, green activities that retailers publish on their corporate web pages or in CSR reports. The relationship between internal and external greening of the SC has not been conceptualized or empirically tested in the food retail setting. Therefore, this study aimed to empirically analyze the relationship between green in-store practices, GSCM practices and environmental and economic performance in the food retail industry. To do so, structural equation modeling, was applied, assessing the links among green in-store practices, GSCM practice and SC performance in the food retail context. Given the lack of studies on relationships between greening in-store activities, GSCM practices and overall performance of the food retail SC, this study empirically contributes to the growing discussion on retail sustainability issues from the narrow focus of retailers as focal companies in SCM. This provides the answer to our research question. Green in-store processes serve as antecedents for GSCM-related processes, which are operationalized in the constructs of green logistics, green purchasing and collaboration with suppliers. These constructs drive respective environmental and then also economic outcomes. This opens up further questions on how related resources and capabilities would have be developed in retailing so to further drive GSCM in such service contexts.

References

Abukhader, S.M. and Jönson, G. (2004), "Logistics and the environment: is it an established subject?", *International Journal of Logistics Research and Applications*, Vol. 7 No. 2, pp. 137-149.

Akkerman, R., Farahani, P. and Grunow, M. (2010), "Quality, safety and sustainability in food distribution: a review of quantitative operations management approaches and challenges", *OR Spectrum*, Vol. 32 No. 4, pp. 864-904.

Armstrong, J.S. and Overton, T.S. (1977), "Estimating nonresponse bias in mail surveys", *Journal of Marketing Research*, Vol. 14 No. 3, pp. 396-402.

Ashby, A., Leat, M. and Hudson-Smith, M. (2012), "Making connections: a review of supply chain management and sustainability literature", *Supply Chain Management: An International Journal*, Vol. 17 No. 5, pp. 497-516.

Bagozzi, R.P. and Yi, Y. (1988), "On the evaluation of structural equation models", *Journal of the Academy of Marketing Science*, Vol. 16 No. 1, pp. 74-94.

Bai, C. and Sarkis, J. (2010), "Green supplier development: analytical evaluation using rough set theory", *Journal of Cleaner Production*, Vol. 18 No. 12, pp. 1200-1210.

Balasubramanian, S. and Shukla, V. (2017), "Green supply chain management: an empirical investigation on the construction sector", *Supply Chain Management: An International Journal*, Vol. 22 No. 1, pp. 58-81.

Beske, P. and Seuring, S. (2014), "Putting sustainability into supply chain management", *Supply Chain Management: An International Journal*, Vol. 19 No. 3, pp. 322-331.

Beske, P., Koplin, J. and Seuring, S. (2008), "The use of environmental and social standards by German first-tier suppliers of the Volkswagen AG", *Corporate Social Responsibility and Environmental Management*, Vol. 15 No. 2, pp. 63-75.

Björklund, M., Forslund, H. and Isaksson, M.P. (2016), "Exploring logistics-related environmental sustainability in large retailers", *International Journal of Retail & Distribution Management*, Vol. 44 No. 1, pp. 38-57.

Björklund, M., Martinsen, U. and Abrahamsson, M. (2012), "Performance measurements in the greening of supply chains", *Supply Chain Management: An International Journal*, Vol. 17 No. 1, pp. 29-39.

Chkanikova, O. and Mont, O. (2015), "Corporate supply chain responsibility: drivers and barriers for sustainable food retailing", *Corporate Social Responsibility and Environmental Management*, Vol. 22 No. 2, pp. 65-82.

Darkow, I.-L., Foerster, B. and von der Gracht, H.A. (2015), "Sustainability in food service supply chains: future expectations from European industry experts toward the environmental perspective", *Supply Chain Management: An International Journal*, Vol. 20 No. 2, pp. 163-178.

Eng, T.-Y. (2016), "An empirical study of Chinese SME grocery retailers' distribution capabilities", *Supply Chain Management: An International Journal*, Vol. 21 No. 1, pp. 63-77.

Erol, I., Cakar, N., Erel, D. and Sari, R. (2009), "Sustainability in the Turkish retailing industry", *Sustainable Development*, Vol. 17 No. 1, pp. 49-67.

Fernie, J., Pfab, F. and Marchant, C. (2000), "Retail grocery logistics in the UK", *The International Journal of Logistics Management*, Vol. 11 No. 2, pp. 83-90.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Fuentes, C. and Fredriksson, C. (2016), "Sustainability service in-store: service work and the promotion of sustainable consumption", *International Journal of Retail & Distribution Management*, Vol. 44 No. 5, pp. 492-507.

Ganesan, S., George, M., Jap, S., Palmatier, R.W. and Weitz, B. (2009), "Supply chain management and retailer performance: emerging trends, issues, and implications for research and practice", *Journal of Retailing*, Vol. 85 No. 1, pp. 84-94.

Golicic, S.L. and Smith, C.D. (2013), "A Meta-analysis of environmentally sustainable supply chain management practices and firm performance", *Journal of Supply Chain Management*, Vol. 49 No. 2, pp. 78-95.

Green, K., Zelbst, P., Meacham, J. and Bhadauria, V. (2012), "Green supply chain management practices: impact on performance", *Supply Chain Management: An International Journal*, Vol. 17 No. 3, pp. 1-44.

Hair, J.F., Ringle, C.M. and Sarstedt, M. (2011), "PLS-SEM: indeed a silver bullet", *Journal of Marketing Theory and Practice*, Vol. 19 No. 2, pp. 139-152.

Hair, J.F., Sarstedt, M., Ringle, C.M. and Mena, J.A. (2012), "An assessment of the use of partial least squares structural equation modelling in marketing research", *Journal of the Academy of Marketing Science*, Vol. 40 No. 3, pp. 414-433.

Henseler, J., Ringle, C.M. and Sinkovics, R.R. (2009), "The use of partial least squares path modeling in international marketing", in Sinkovics, R.R. and Ghauri, P.N. (Eds), *Advances in International Marketing*, Vol. 20, Emerald Group, Bingley, pp. 277-320.

Herhausen, D., Binder, J., Schoegel, M. and Herrmann, A. (2015), "Integrating bricks with clicks: retailer-level and channel-level outcomes of online–offline channel integration", *Journal of Retailing*, Vol. 91 No. 2, pp. 309-325.

Hervani, A.A., Helms, M.M. and Sarkis, J. (2005), "Performance measurement for green supply chain management", *Benchmarking: An International Journal*, Vol. 12 No. 4, pp. 330-353.

Holweg, C., Teller, C. and Kotzab, H. (2016), "Unsaleable grocery products, their residual value and instore logistics", *International Journal of Physical Distribution & Logistics Management*, Vol. 46 Nos 6/7, pp. 634-658.

Hu, L. and Bentler, P.M. (1999), "Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives", *Structural Equation Modeling: A Multidisciplinary Journal*, Vol. 6 No. 1, pp. 1-55.

Hübner, A., Wollenburg, J. and Holzapfel, A. (2016), "Retail logistics in the transition from multi-channel to omni-channel", *International Journal of Physical Distribution & Logistics Management*, Vol. 46 Nos 6/7, pp. 562-583.

Hulland, J. (1999), "Use of partial least squares (PLS) in strategic management research: a review of four recent studies", *Strategic Management Journal*, Vol. 20 No. 2, pp. 195-204.

Humphreys, P.K., Wong, Y.K. and Chan, F.T.S. (2003), "Integrating environmental criteria into the supplier

selection process", *Journal of Materials Processing Technology*, Vol. 138 Nos 1/3, pp. 349-356.

Iles, A. (2007), "Seeing sustainability in business operations: US and British food retailer experiments with accountability", *Business Strategy and the Environment*, Vol. 16 No. 4, pp. 290-301.

Jensen, J.K. (2012), "Product carbon footprint developments and gaps", *International Journal of Physical Distribution & Logistics Management*, Vol. 42 No. 4, pp. 338-354.

Jones, P., Comfort, D. and Hillier, D. (2005), "Retailers and sustainable development in the UK", *International Journal of Retail & Distribution Management*, Vol. 33 No. 3, pp. 207-214.

Jones, P., Comfort, D. and Hillier, D. (2007), "What's in store? Retail marketing and corporate social responsibility", *Marketing Intelligence & Planning*, Vol. 25 No. 1, pp. 17-30.

Kaipia, R., Dukovska-Popovska, I. and Loikkanen, L. (2013), "Creating sustainable fresh food supply chains through waste reduction", *International Journal of Physical Distribution & Logistics Management*, Vol. 43 No. 3, pp. 262-276.

Kirchoff, J.F., Tate, W.L. and Mollenkopf, D.A. (2016), "The impact of strategic organizational orientations on green supply chain management and firm performance", *International Journal of Physical Distribution & Logistics Management*, Vol. 46 No. 3, pp. 269-292.

Kolk, A., Hong, P. and Van Dolen, W. (2010), "Corporate social responsibility in China: an analysis of domestic and foreign retailers' sustainability dimensions", *Business Strategy and the Environment*, Vol. 19 No. 5, pp. 289-303.

Kotzab, H. and Teller, C. (2005), "Development and empirical test of a grocery retail instore logistics model", *British Food Journal*, Vol. 107 No. 8, pp. 594-605.

Kotzab, H., Munch, H.M., de Faultrier, B. and Teller, C. (2011), "Environmental retail supply chains: when global goliaths become environmental davids", *International Journal of Retail & Distribution Management*, Vol. 39 No. 9, pp. 658-681.

Kovács, G. (2008), "Corporate environmental responsibility in the supply chain", *Journal of Cleaner Production*, Vol. 16 No. 15, pp. 1571-1578.

Lai, K-h., Cheng, T.C.E. and Tang, A.K.Y. (2010), "Green retailing: factors for success", *California Management Review*, Vol. 52 No. 2, pp. 6-31.

Lee, S.-Y. (2015), "The effects of green supply chain management on the supplier's performance through social capital accumulation", *Supply Chain Management: An International Journal*, Vol. 20 No. 1, pp. 42-55.

Lehner, M. (2015), "Translating sustainability: the role of the retail store", *International Journal of Retail & Distribution Management*, Vol. 43 Nos 4/5, pp. 386-402.

Liu, Y., Srai, J. and Evans, S. (2016), "Environmental management: the role of supply chain capabilities in the auto sector", *Supply Chain Management: An International Journal*, Vol. 21 No. 1, pp. 1-19.

McKinnon, A. (2010), "Environmental sustainability: a new priority for logistics managers", in: McKinnon, A., Cullinae, S., Browne, M., Whiteing, A. (Eds), *Green logistics: improving the environmental sustainability of logistics*, Kogan Page Limited, London, pp. 3-30.

Maloni, M.J. and Brown, M.E. (2006), "Corporate social responsibility in the supply chain: an application in the food industry", *Journal of Business Ethics*, Vol. 68 No. 1, pp. 35-52.

Marques, F., Mendonça, P.S.M. and Jabbour, C.J.C. (2010), "Social dimension of sustainability in retail: case studies of small and medium Brazilian supermarkets", *Social Responsibility Journal*, Vol. 6 No. 2, pp. 237-251.

Miemczyk, J., Johnsen, T.E. and Macquet, M. (2012), "Sustainable purchasing and supply management: a structured literature review of definitions and measures at the dyad, chain and network levels", *Supply Chain Management: An International Journal*, Vol. 17 No. 5, pp. 478-496.

Min, H. and Galle, W.P. (2001), "Green purchasing practices of US firms", *International Journal of Operations & Production Management*, Vol. 21 No. 9, pp. 1222-1238.

Mollenkopf, D., Stolze, H., Tate, W.L. and Ueltschy, M. (2010), "Green, lean, and global supply chains", *International Journal of Physical Distribution & Logistics Management*, Vol. 40 Nos 1/2, pp. 14-41.

Murphy, P.R. and Poist, R.F. (2000), "Green logistics strategies: an analysis of usage patterns", *Transportation Journal*, Vol. 40 No. 2, pp. 5-16.

Nunnally, J. (1978), *Psychometric theory*, 2. ed., McGraw-Hill, New York, NY.

Parwoll, M. and Wagner, R. (2012), "The impact of missing values on PLS model fitting", in Gaul, W., Geyer-Schulz, A., Schmidt-Thieme, L., Kunze, J. (Eds), *Challenges at the interface of data analysis, computer science, and optimization*, Springer, Berlin, Heidelberg, pp. 537-544.

Petljak, K., Renko, S. and Rašić, S. (2016), "Greening transport activities in the food retail supply chain", *International Journal of Logistics Systems and Management*, Vol. 25 No. 1, pp. 129-143.

Piacentini, M., MacFayden, L. and Eadie, D. (2000), "Corporate social responsibility in food retailing", *International Journal of Retail & Distribution Management*, Vol. 28 No. 11, pp. 459-469.

Reiner, G., Teller, C. and Kotzab, H. (2013), "Analyzing the efficient execution of in-store logistics processes in grocery retailing – the case of dairy products", *Production and Operations Management*, Vol. 22 No. 4, pp. 924-939.

Renko, S. (2008), "How the process of internationalization enhances the sustainability of the croatian retailing", *World Journal of Retail Business Management*, Vol. 2 No. 4, pp. 3-10.

Renko, S., Rašić, S. and Knežević, B. (2010), "Environmental responsibility of the Croatian retailing", *International Journal of Management Cases*, Vol. 12 No. 2, pp. 613-624.

Ringle, C.M. Wende, S. and Becker, J.-M. (2015) "SmartPLS 3", SmartPLS GmbH, Boenningstedt, available at: www.smartpls.com

Sarkis, J. (2012), "A boundaries and flows perspective of green supply chain management", *Supply Chain Management: An International Journal*, Vol. 17 No. 2, pp. 202-216.

Seuring, S. and Müller, M. (2008), "From a literature review to a conceptual framework for sustainable supply chain management", *Journal of Cleaner Production*, Vol. 16 No. 15, pp. 1699-1710.

Steenkamp, J.-B.E.M. and Baumgartner, H. (2000), "On the use of structural equation models for marketing modeling", *International Journal of Research in Marketing*, Vol. 17 Nos 2/3, pp. 195-202.

Styles, D., Schoenberger, H. and Galvez-Martos, J.-L. (2012), "Environmental improvement of product supply chains: a review of European retailers' performance", *Resources, Conservation and Recycling*, Vol. 65 (August), pp. 57-78.

Tachizawa, E.M., Gimenez, C. and Sierra, V. (2015), "Green supply chain management approaches: drivers and performance implications", *International Journal of Operations & Production Management*, Vol. 35 No. 11, pp. 1546-1566.

Vachon, S. and Klassen, R.D. (2006), "Extending green practices across the supply chain: the impact ", *International Journal of Operations & Production Management*, Vol. 26 No. 7, pp. 795-821.

Vanpoucke, E., Quintens, L. and Van Engelshoven, M. (2016), "The role of motivation in relating green supply chain management to performance", *Supply Chain Management: An International Journal*, Vol. 21 No. 6, pp. 732 -742.

Walton, S.V., Handfield, R.B. and Melnyk, S.A. (1998), "The green supply chain: integrating suppliers into environmental management processes", *International Journal of Purchasing and Materials Management*, Vol. 34 No. 1, pp. 2-11.

Wiese, A., Kellner, J., Lietke, B., Toporowski, W. and Zielke, S. (2012), "Sustainability in retailing – a summative content analysis", *International Journal of Retail & Distribution Management*, Vol. 40 No. 4, pp. 318-335.

Winter, M. and Knemeyer, A.M. (2013), "Exploring the integration of sustainability and supply chain management: current state and opportunities for future inquiry", *International Journal of Physical Distribution & Logistics Management*, Vol. 43 No. 1, pp. 18-38.

Wong, C.Y., Wong, C.W.Y., and Boon-itt, S. (2015), "Integrating environmental management into supply chains", *International Journal of Physical Distribution & Logistics Management*, Vol. 45 Nos 1/2, pp. 43-68.

Youn, C., Kim, S., Lee, Y., Choo, H.J., Jang, S. and Jang, J.I. (2017), "Measuring retailers' sustainable development", *Business Strategy and the Environment*, Vol. 26 No. 3, pp. 385-398.

Ytterhus, B.E., Arnestad, P. and Lothe, S. (1999), "Environmental initiatives in the retailing sector: an analysis of supply chain pressures and partnerships", *Eco-Management and Auditing*, Vol. 6 No. 4, pp. 181-188.

Zhu, Q. and Sarkis, J. (2004), "Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises", *Journal of Operations Management*, Vol. 22 No. 3, pp. 265-289.

Zhu, Q., Sarkis, J. and Lai, K-h. (2007), "Green supply chain management: pressures, practices and performance within the Chinese automobile industry", *Journal of Cleaner Production*, Vol. 15 Nos 11/12, pp. 1041-1052.

Zsidisin, G.A. and Siferd, S.P. (2001), "Environmental purchasing: a framework for theory development", *European Journal of Purchasing & Supply Management*, Vol. 7 No. 1, pp. 61-73.

Appendix 1. Measurement scales

Table AI. Scales

Construct	Items	Sources
Water and energy management (WEM)	WEM_1_reducing energy consumption WEM_2_using energy-saving lamps WEM_3_regularly checking water consumption using water meters	Jones *et al.* (2005); Erol *et al.* (2009); McKinnon (2010); Lai *et al.* (2010)
Waste management (WM)	WM_1_separately collecting packaging waste by type of material (primary packaging, secondary packaging) WM_2_monitoring composition (types) of packaging waste WM_3_offering reusable bags to customers	Jones *et al.* (2005); Erol *et al.* (2009); Lai *et al.* (2010); Kaipia *et al.* (2013)
Green logistics (GL)	GL_1_selecting the location of the warehouse/distribution center GL_2_using renewable energy in the warehouse distribution center	Murphy and Poist (2000); McKinnon (2010)
Green purchasing (GP)	GP_1_evaluating the environmental practices of suppliers GP_2_collaborating with suppliers to reduce packaging/packaging waste	Min and Galle (2001); Zsidisin and Siferd (2001); Beske *et al.* (2008)
Cooperation with suppliers (COOP)	COOP_1_collaborating with suppliers to create environmentally friendly packaging COOP_2_conducting seminars/workshops for suppliers related to environmental protection COOP_3_attending suppliers' seminars/workshops related to environmental protection COOP_4_encouraging suppliers to establish their own environmental programs COOP_5_encouraging active cooperation with suppliers to reduce the impact of business activities on the environment	Walton *et al.* (1998); Humphreys *et al.* (2003); Bai and Sarkis (2010)
Environmental performance (ENV)	ENV_1_reducing greenhouse gas emissions ENV_2_reducing waste water ENV_3_reducing solid waste ENV_4_reducing use of hazardous/harmful/toxic materials ENV_5_cooperation with suppliers in terms of environmental protection	Zhu and Sarkis (2004); Hervani *et al.* (2005); Zhu *et al.* (2007); Zhu *et al.* (2007)
Economic performance (ECON)	ECON_1_reducing transportation costs ECON_2_reducing warehousing costs ECON_3_decreasing reverse logistics costs	Zhu and Sarkis (2004); Hervani *et al.* (2005); Zhu *et al.* (2007)

Appendix 2. Sample description

Table AII Food retailers' demographics

Variable	Level	n	(%)
Origin of capital	Domestic	181	95.3
	Mixed or foreign	9	4.7
Total revenue in 2012	Less than €131,580,00*	39	20.5
	From €131,580,00-€6,578,950,00	115	60.5
	More than €6,578,950,00	36	18.9
Number of employees	Up to 10 employees	110	57.9
	From 10 to 50 employees	38	20.0
	From 50 to 250 employees	17	8.9
	More than 250 employees	25	13.2
Market	Local	161	84.7
	Regional	18	9.5
	National or international	11	5.8

Notes: *1 EUR ∼ 7.4 HRK; HRK = currency of Croatia (Kuna)

Table AIII Sample characteristics related to food retail

Variable	Level	n	(%)
Length of doing business in Croatian market	Less than 5 years	14	7.4
	From 5 to 10 years	14	7.4
	More than 10 years	162	85.3
Revenue from food products sale	Less than 25%	26	13.7
	From 25 to 50%	33	17.4
	From 50 to 75%	78	41.1
	More than 75%	53	27.9
Number of suppliers of food products	Up to 50 suppliers	124	65.3
	From 50 to 100 suppliers	30	15.8
	More than 100 suppliers	36	18.9
Retail formats	Convenience stores	106	55.8
	Supermarkets	19	10.0
	Hypermarkets	9	4.7
	Different retail formats	55	29.5

Corresponding author

Stefan Seuring can be contacted at: seuring@uni-kassel.de