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The effect of a competitive strategy and green supply chain management on the financial and environmental performance of logistics service providers

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Abstract

Despite the critical role of logistics service providers (LSPs) in improving the environmental sustainability of supply chains, there is still uncertainty about how LSPs can turn environmental management into competitive advantage. Based on a Finnish national logistics survey and financial reporting data from 266 LSPs, this article examines their competitive strategies and green supply chain management (GSCM), and tests their respective relationships with environmental and financial performance. Financial data are used to measure financial performance in a novel way. The findings indicate that leading LSPs competing with operational excellence and strong brands are more advanced in terms of GSCM than LSPs that do not excel in any competitive priority. GSCM practices are positively related to environmental performance, but not to financial performance. However, managers should not be discouraged by the apparent absence of short-term financial benefits of GSCM practices, which in any case could enhance future differentiation opportunities.

Keywords: green supply chain management; logistics service providers; financial performance; environmental performance; competitive strategy, sustainability

Introduction

Sustainability is of growing importance in firms' strategies (Longoni & Cagliano, 2015). Green supply chain management (GSCM) practices have emerged as practical means by which to pursue an environmentally focused strategy and to combine environmental management with supply chain management (Green et al., 2012). Including sustainability aspects in the supply chain enables organisations to respond to growing stakeholder pressure and to improve profit and competitiveness (Ansari & Kant, 2017). Logistics service providers (LSPs) are in a critical position in GSCM initiatives because they connect and interact with other firms in the network

(Piecyk & Björklund, 2015). However, they face a number of challenges in their GSCM adoption, including the complexity of network-wide actions, a need to offer customised solutions to individual customers, low profit margins limiting the resources available to finance sustainability initiatives, and higher innovation costs (Busse 2010; Piecyk & Björklund, 2015). Nevertheless, the main body of literature thus far focuses on manufacturing (Lieb & Lieb 2010; Evangelista, 2014; Maas et al., 2014). Moreover, although sustainability is increasingly used as a criterion in the selection of LSPs (Wolf & Seuring, 2010), only a small number of firms can transform environmental investments into sources of competitive advantage (Orsato, 2006).

Cousins (2005) calls for research that examines the strategic direction of firms, which is likely to have significant implications with regard to its supply-chain practices. Similarly, Wu et al. (2014) argue that firms should understand and manage the respective needs inherent in competitive and GSCM strategies to align their goals related to both financial and environmental performance. There has been little research on strategic organisational orientations as antecedents of GSCM (Kirchoff et al., 2016). Although the majority of previous studies indicate that being green pays off (Golicic & Smith, 2013), it remains unclear which types of GSCM practices best support each business strategy. Firms pursuing differentiation strategies may be more actively engaged in sustainability than low-cost producers, for example, given that differentiators are able to obtain price premiums and to pay off their environmental investments (Orsato, 2006; Hoejmose et al., 2013). The need to discuss performance and environmental issues is particularly pronounced in the logistics industry given the narrow focus and the limited number of previous studies on the topic (Perotti et al., 2012; Rossi et al., 2013; Centobelli et al., 2017), despite the substantial amount of global energy usage and energy-related emissions (Maas et al., 2014). This study addresses the following questions:

RQ1) How does the competitive strategy influence GSCM practices?
RQ2) How do GSCM practices influence the environmental and financial performance of logistics service providers?

A conceptual framework and a set of hypotheses are developed and then empirically tested on primary survey data and secondary data comprising financial reports. The previous literature within the GSCM field almost exclusively relies on self-reported measures from a single source (Wang & Sarkis 2013; Dubey et al. 2017). Dubey et al. (2017) argue that such measures cannot give a comprehensive picture of the situation, and call for objective financial data in addition. One of the novelties in this research is that self-reported survey data are combined with financial reports that are normalised to assess a firm's performance relative to its industry peers.

The structure of this paper is as follows. The relevant literature is reviewed in the next section, and four research hypotheses are posited. The research methods are described after that, and the results of the study are presented. Finally, the implications are discussed and future research areas are outlined.

Literature review and hypotheses

Firms face coercive, normative and mimetic pressure to adopt sustainable practices in their supply chains (Zhu et al., 2013; Kauppi & Hannibal, 2017). Large firms in particular have shown increasing interest in the environmental performance of their outsourced activities (Hofmann et al., 2014; Nilsson et al., 2017). Given the high level of outsourcing in logistics, the environmental sustainability of LSPs is being subjected to increasing interest and scrutiny

as a supplier-selection criterion (Wolf & Seuring, 2010; Nilsson et al., 2017). Firms engage in GSCM practices across the supply chain, either within the firm or involving external partners, to eliminate or reduce negative environmental impacts (Azevedo et al., 2011). This study focuses on practices conducted both internally and externally with customers. Internally, LSPs could reduce empty running, shift to lower-energy transport modes (e.g. from road to trail), use fuel-efficient vehicles or alternative fuels, increase environmental training, and re-organise the supply chain, for example (Lieb & Lieb, 2010; Evangelista, 2014). GSCM initiatives among LSPs and shippers, in turn, could promote transport efficiency through the optimization of routing and the freight load, for example (Marchet et al., 2014).

On the other hand, Ageron et al. (2012) argue that firms should align GSCM practices closely with their competitive strategy. According to the resource-based view (RBV) and its extended version the natural-resource-based view (NRBV), firms can achieve sustained competitive advantage if they possess valuable, rare, inimitable and non-substitutable resources (Barney, 1991; Hart, 1995). In fact, they compete on the basis of having these unique strategic capabilities, and the varying levels of heterogeneity explain differences in performance (Kirchoff et al., 2016). Proponents of the NRBV further suggest that strategy and competitive advantage can derive from capabilities that facilitate environmentally sustainable activities (Hart, 1995). However, according to van de Ven and Jeurissen (2005) and Hoejmose et al. (2013), sustainable SCM is not at the core of every firm's business strategy. Sustainable and GSCM strategies range from compliance with legislation to the development of holistic concepts involving employees, suppliers and customers (Kudla & Klaas-Wissing, 2012). According to Marchet et al. (2014), the adoption of environmental sustainability in LSPs is largely driven by economic concerns. Some LSPs might even see environmental sustainability as a source of additional costs rather than a strategic opportunity for differentiation (Evangelista, 2014). The high level of competition and price pressure result in the dominance of the economic perspective as far as investments are concerned (Oberhofer & Dieplinger, 2014). Given the strong focus among buying firms on the cost and quality of logistics services, LSPs have to sacrifice environmental sustainability for short-term financial sustainability (Nilsson et al., 2017). Most of the LSP representatives interviewed for Abbasi and Nilsson's (2016) study agreed that customer behaviour and environmental cautiousness were diametrically opposed, and that most of the challenges were about time and price. Hence, despite the call for more proactive environmental management, being at the forefront might not be the best approach for every LSP. Instead, the GSCM strategy should be tailored to support the competitive strategy. Kauppi and Hannibal (2017) propose that firms should evaluate the different alternatives and study the best practices to find the best fit with their own supply chain. Thus, it is hypothesised that:

H1: GSCM practices will differ across LSPs pursuing different competitive strategies.

Previous research has linked several performance benefits to GSCM practices (e.g. Huang et al., 2017; Vanalle et al., 2017). The target of such practices is to reduce the negative environmental impact of business operations (Zhu et al., 2008). They may also foster tacit knowledge, improve the corporate image and create competitive advantage (Vachon & Klassen, 2008; Shi et al., 2012). External GSCM practices with customers could help the firm to identify and fulfil customer requirements (Azevedo et al., 2011), and even lead to environmental innovations (Simpson & Power, 2005). Improved customer satisfaction and a better corporate image may also bring financial benefits (Zhu et al., 2013). However, the extent to which existing results apply to LSPs remains unclear.

It has been found previously that the internal GSCM practices of LSPs are strongly linked with environmental performance, whereas external GSCM with customers is more strongly associated with financial performance (Laari et al., 2016). Maas et al. (2014) suggest that having capabilities related to pollution prevention and service stewardship could help third-party LSPs to create a differentiation advantage. A good environmental reputation would allow firms to charge a premium for products and services with environmental attributes (Yadav et al., 2017). First movers going beyond regulatory compliance create entry barriers, however, strengthen the incumbents' market position and create differentiation potential (Schmidt et al., 2017). Dangelico and Pontrandolfo (2015) recommend firms to invest in capabilities that facilitate the development of environmental collaboration, which are beneficial in terms of market performance regardless of the type of actors involved in the collaboration.

Nevertheless, Lun et al. (2015) acknowledge that it may be difficult for small LSPs to develop capabilities that satisfy increasingly demanding market requirements for environmental sustainability, while Perotti et al. (2012) conclude that the effect of GSCP on the performance of LSPs seems to be limited given the low level of adoption. Moreover, some authors argue that the effect of GSCM on performance might be indirect (e.g. De Giovanni & Esposito Vinzi, 2012), or even negative (Wang & Sarkis, 2013). For example, the development of radical environmental innovations requires significant resources and may result in a significant cost increase, particularly in the short term (Devinney, 2009; Wu & Pagell, 2011). Wang and Sarkis (2013) further suggest that the initial motivations and goals of the organisations concerned could explain the mixed results. Hypotheses 2 and 3 address these contradictory perspectives:

H2: GSCM practices are positively related to the environmental performance of LSPs.

H3: GSCM practices are positively related to the financial performance of LSPs.

Despite the growing number of studies on the relationship between environmental sustainability and firm performance, there is still a need for research that will identify the performance links (Perez-Valls et al., 2016). Findings from previous studies have been inconsistent, giving practitioners no clear answers in terms what actions would be the most beneficial (Golicic and Smith, 2013). Trumpp and Guenther (2017) suggest, for example, that firms need to exceed a minimum threshold in their environmental performance for the association between environmental and financial performance to become positive.

Environmental performance could potentially add value to existing core business operations (Zhu et al., 2013). The main tangible benefits include cost savings through improved energy efficiency, gaining access to subsidies and reduced taxes (Lieb & Lieb, 2010; Evangelista, 2014; Evangelista et al., 2017). On the other hand, neglecting sustainability risks can quickly have a severe negative impact (Hofmann et al, 2014). Hence, environmental compliance reduces disposal costs and potential liabilities associated with industrial accidents, consumer boycotts and lawsuits (Yadav et al., 2017). The intangible benefits include an improved company image, a better quality of life for customers, and a stronger motivation among stakeholders to focus on environmental issues (Marchet et al., 2014). This could lead to higher sales and profits over time (De Giovanni & Esposito Vinzi, 2012). However, the firm should monitor the environment to identify potential threats and opportunities, and make the necessary investments to implement the changes (Perez-Valls et al., 2016). Hence the following hypothesis:

H4: Environmental performance is positively related to financial performance.

Figure 1 illustrates the four hypotheses derived from the literature in a conceptual framework.

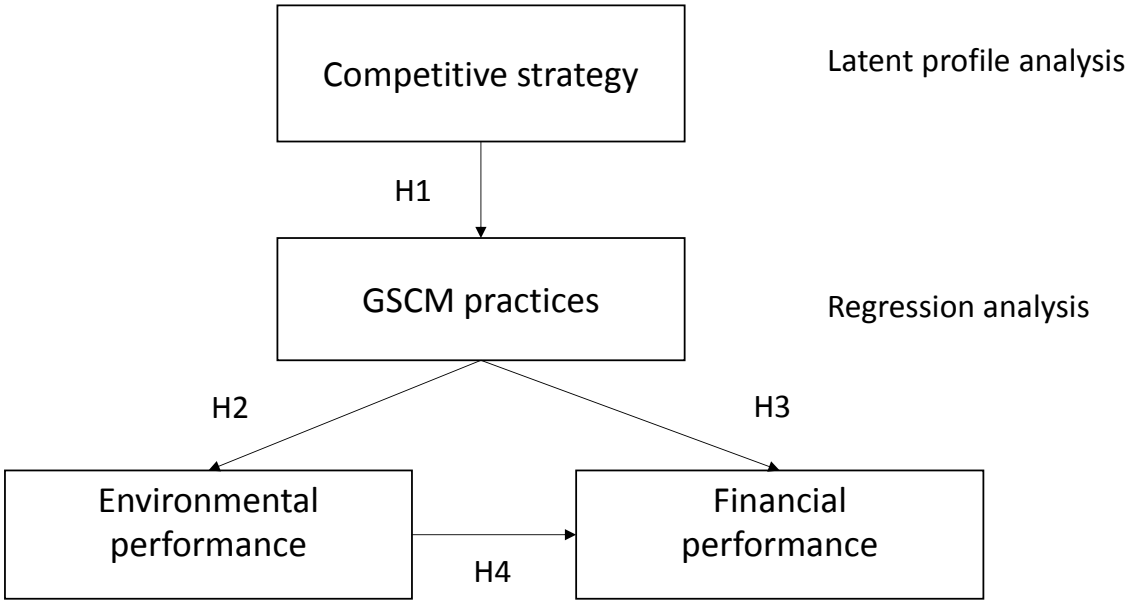

Figure 1 A conceptual model of the research hypotheses

Methods

Data collection

The authors gathered the survey data via an online questionnaire as part of the national Finland State of Logistics Survey 2014. The sample frame comprised all non-student members of the Finnish Association of Purchasing and Logistics, members of the Finnish Transport and Logistics Association, and members of the Federation of Finnish Enterprises active in the industries covered in the survey. The questionnaire was pre-tested on academic researchers and selected industry experts from the three participating associations, the aim being to obtain comments on its suitability and comprehensibility. Adjustments were made based on the comments, then the main questionnaire was emailed to 29,196 people. The total number of responses was 1,731 and the overall response rate was 5.9 %. Nevertheless, the response rate for medium- and large-sized firms was relatively high, and the survey covers a large proportion of the main industries – measured as a share of turnover. Wagner and Kemmerling (2010) examined 229 survey studies in the field of logistics, including the respective response rates. According to their findings, the response rate of the Finland State of Logistics 2014 survey is well in line with that reported in other surveys of a similar scale. In total, 617 responses were collected from LSPs.

The next step was to collect data on financial performance for the fiscal year 2014, based on business-identity codes, from the external financial-reporting database, Voitto+, the aim being to avoid common method bias (Podsakoff et al., 2003). Only LSPs for which financial data was available were included in this research. Thus, the sample used in this study comprises 266 logistics service providers operating in Finland. Over 97 % of Finnish firms operating in the transportation and storage sector, as covered by NACE rev. 2 section H, are micro-sized, in other words with a turnover of less than 2 MEUR (Statistics Finland, 2016). In the current

sample, 61 % of the firms are micro-sized. Hence, in terms of turnover, the sample represents a larger proportion of the industry.

The sample comprises responses from the following industries: freight transport by road, 81 % of responses; supporting and auxiliary transport activities, 6 %; storage and warehousing, 4 %; other logistics and transport industries, the remaining 9 %. The majority (85%) of the respondents identified themselves as in the top management of the firm, whereas 8.5 %were in middle management. The remaining respondents represented other functions in the firm.

Non-response bias was assessed in an independent samples t-test comparing early and late respondents (Armstron & Overton, 1977). The two groups were compared across theoretical constructs, which revealed no statistically significant differences at $p<0.05$ and indicated that non-response bias was not a concern (Andersson & Gerbing, 1988). To avert a possible consistency motive, the dependent (environmental performance) and independent (GSCM management practices) variables were separated and placed in different phases of the survey. To avoid social-desirability bias, the respondents could choose whether or not to give their email address and the name of the firm. Content and substantive validity were addressed with reference to previous studies on scale development and in discussions about the individual items among the research group.

The unmeasured latent method construct (ULMC) technique (Podsakoff et al., 2012; Williams & McGonagle, 2016) was used to control for the potential effect of method biases (such as the consistency motive and acquiescence). Hence, an unmeasured latent method factor was added to the measurement model, and all the observed variables were allowed to load on their respective theoretical constructs and on the method factor. The method-factor loadings were constrained to be equal, for identification purposes. The fit of the model with the method factor was not significantly better than the fit of the original measurement model (ΔX^2 (5 df) = 10.046), $p>0.05$. The observed variables also loaded on their corresponding latent factors. Finally, as Fuller et al. (2016) state, common method variance can exist at relatively high levels (70% or more) in typical survey-based business research before common method bias is likely to alter the conclusions. All in all, common method bias is unlikely to threaten the validity of the findings.

The measures and their development

The questionnaire items on internal GSCM activities were adapted from Zhu et al. (2008) and Yang et al. (2013), whereas the items covering GSCM activities with customers were modified from Vachon and Klassen (2006), Zhu et al. (2008), and De Giovanni and Esposito Vinzi (2012). Each item was designed for responses on a five-point Likert scale. The respondents were asked to consider their activities in the previous two years. The decision was made to focus on internal GSCM and GSCM with customers because LSPs tend not to have classic suppliers, whereas demands from business partners and customers are significant (Oberhofer & Dieplinger, 2014).

The competitive-priorities scale was developed on the basis of previous work (e.g. Stock et al., 1998; Beal & Yasai-Ardekani 2000). The final scale comprised items measuring differentiation, such as branding and marketing, price and operational dimensions such as cost, flexibility, quality and speed. The respondents were asked to evaluate which of the items currently were sources of advantage for their firm in relation to their competitors. Consequently, the scale measures realised strategy, in other words actual performance in these

competitive priorities rather than strategic intent or emphasis placed (Mintzberg 1978). Each item was designed for responses on a five-point Likert scale.

Financial performance was measured as Return on Investment (ROI), Return on Assets (ROA) and Earnings Before Interest and Taxes as a percentage (EBIT-%) (e.g. Töyli et al., 2008; Solakivi et al., 2011). Raw financial performance measures were obtained from the Voitto+ database containing financial data from approximately 100,000 Finnish firms. They were then normalised by comparing firms that had responded to the survey to all firms in the respective industry in the database to give each firm a rank. The resulting rank was subsequently divided by the number of firms in the industry to get the final value for each measure. According to Töyli et al. (2008), logistics operations, cost structures and the competitive situation vary significantly from one industry to another. The normalization of performance measures in relation to peers in the same industry reduces the impact of this variation on the analysis of the hypothesised associations.

In addition, three control variables were used. First, firm size was measured as turnover and divided between micro-sized (n=163) and small-to-large-sized firms (n=103) based on the turnover criterion of the European Commission. Next, the single largest customer's turnover share (%) was used to assess dependence on the largest customer, which in turn might affect the willingness to participate in GSCM practices. The third control variable measured the part of the value chain the firm mainly serves (manufacturing (n=193) or trading (n=73). Table 1 summarises the measurement items.

Table 1 Measurement items

Research constructs and items	**Source**
Internal GSCM	
INT1 Being environmentally conscious is an integral part of our corporate culture.	Zhu et al. (2008); Yang et al. (2013)
INT2 We plan the deliveries of the company to minimize the environmental impacts.	
INT3 We utilise green marketing for our products and/or services.	
INT4 We conduct internal environmental audits to ensure that products and/or services meet the environmental goals.	
INT5 We do cross-functional cooperation for mitigating environmental impacts.	
GSCM with customers	
CUST1 We have developed our deliveries to be more environmentally friendly with our customers.	Vachon & Klassen (2006); Zhu et al. (2008); De Giovanni & Esposito Vinzi (2012)
CUST2 Our company and our customers have a clear mutual understanding of responsibilities in environmental issues.	
CUST4 Our customers have asked us for information on our environmental compliance.	
CUST5 Our customers have demanded us to ensure the environmentally friendly practices of our suppliers.	
CUST6 Our customers have demanded us to implement an environmental management system (eg. ISO 14000, EMAS)	
Environmental performance	
ENVPERF 1 Our CO2 emissions considering the transport performance have decreased.	Zhu et al. (2008); De Giovanni & Esposito Vinzi (2012) Yang et al. (2013)
ENVPERF2 Our energy consumption considering the transport performance has decreased.	
ENVPERF3 Consumption for hazardous materials considering the transport performance has decreased.	
Competitive strategy	
COMP1 Stronger brand	Ward & Duray (2000); Beal & Yasai-Ardekani (2000); Krajewski et al. (2010)
COMP2 More succesful marketing communication	
COMP3 A lower price level	
COMP4 Lower costs of operations	
COMP5 More effective capacity utilization	
COMP6 Superior quality of our products or sevices	
COMP7 Speedier operations	
COMP8 Variety of products and services	
Financial performance	
FINPERF1 Return on Investment	Töyli et al. (2008); Solakivi et al. (2011)
FINPERF2 Retun on Assets	
FINPERF3 Earnings Before Interest and Taxes %	
Control variables	
SIZE; 0= micro-sized company with a turnover from 0 to 2 million EUR , 1=small, medium or large company with turnover more than 2 million EUR	
SINGLE; the single largest customer's share of turnover (%)	
CHAIN; part of the value chain mainly served; 0=manufacturing, 1=trading	

Analysis

First, a confirmatory factor analysis (CFA) was conducted to evaluate validity and reliability. Modification indices and standardised residuals were used to improve the fit of the model. Next, latent profile analysis (LPA) was used to identify firms with similar patterns of competitive strategy. LPA is a model-based clustering approach in which a priori unknown subpopulations (latent classes) within the data explain the relationships between the items (Vermunt & Madigson, 2002; Geiser, 2013). The choice of the cluster criterion could be considered less arbitrary than in conventional cluster analysis in that LPA is based on a testable statistical model (Vermunt and Madigson, 2002; Notelaers et al., 2006). Analysis of variance (ANOVA) was used to assess differences in GSCM practices between competitive-strategy groups (H1).

Finally, GSCM practices were regressed hierarchically onto financial-performance measures for each type of competitive strategy (H2-H4). Hierarchical multiple regression allows the testing of the effects of certain independent variables without the influence of others. Step 1 included only the control variables (firm size, part of the value chain and the single largest customer's share of turnover). Internal GSCM was introduced in Step 2, followed by GSCM with customers in Step 3. Lastly, both internal and external GSCM were included in the model simultaneously in Step 4.

Results

CFA was conducted on the scales measuring GSCM using maximum likelihood estimation. Modification indices and standardised residuals were used to improve the fit of the model. The results of the final CFA are shown in Table 2.

Table 2 The results of the final CFA

Latent variables	Unstandardised factor loading	Completely standardised factor loading	t-value
Internal GSCM (α = 0.878, CR = 0.880, AVE = 0.647)			
INT1 Being environmentally conscious is an integral part of our corporate culture.	1.000	0.833	-[a]
INT2 We plan the deliveries of the company to minimize the environmental impacts.	1.122	0.835	14.841
INT3 We utilise green marketing for our products and/or services.	1.144	0.805	14.189
INT5 We do cross-functional cooperation for mitigating environmental impacts.	1.006	0.741	12.754
GSCM with customers (α = 0.860, CR = 0.872, AVE = 0.647)			
CUST2 Our company and our customers have a clear mutual understanding of responsibilities in environmental issues.	1.000	0.734	-[a]
CUST4 Our customers have asked us for information on our environmental compliance.	1.303	0.888	13.856

CUST5 Our customers have demanded us to ensure the environmentally friendly practices of our suppliers.	1.313	0.913	14.094
CUST6 Our customers have demanded us to implement an environmental management system (eg. ISO 14000, EMAS)	0.853	0.616	9.504
Environmental performance (α = 0.871, CR = 0.845, AVE = 0.647)			
ENVPERF 1 Our CO2 emissions considering the transport performance have decreased.	1.00	0.873	-[a]
ENVPERF2 Our energy consumption considering the transport performance has decreased.	1.020	0.834	13.166
ENVPERF3 Consumption for hazardous materials considering the transport performance has decreased.	0.772	0.695	11.371

[a] T-statistics for these parameters were not available because they were fixed for scaling purposes.

Fit indices: $X^2/df = 2.502$, GFI = 0.937 , CFI = 0.971, NFI = 0.953, IFI = 0.972, RMSEA = 0.077

As the table shows, the average variance extracted (AVE) values, the Cronbach's alphas and the composite reliabilities are above accepted thresholds (Garver & Mentzer, 1999). The average variance extracted (AVE) values for all the constructs are higher than 0.50. The fit indices show a good fit (Hu & Bentler, 1999) ($X^2/df = 2.502$, GFI = 0.937, CFI = 0.971, NFI = 0.953, IFI = 0.972, RMSEA = 0.077, p-value < 0.01). The results affirm the uni-dimensionality and the reliability of the model. The standardised factor loadings range from 0.616 to 0.913, indicating convergent validity. Next, the correlation between the latent variables was fixed at 1.0, and then freed (Anderson & Gerbing, 1988). The X^2 difference between the fixed and the constrained model was 408.530 with one degree of freedom, which is statistically significant ($p < 0.001$) and indicates discriminant validity. The arithmetic means were used as single-indicator constructs in subsequent stages to measure internal GSCM, GSCM with customers and environmental performance.

Next, latent profile analysis was conducted to identify the competitive-strategy groups. Several criteria were used in choosing the number of groups: 1) the fit of the model according to the log likelihood (LogL) value (the higher the better), and both the Akaike information criterion (AIC) and the Bayesian information criterion (BIC) (the smaller the better); 2) the accuracy of the classification according to the entropy value (between 0 and 1, the higher the better) and the average latent class posterior probabilities; 3) the proportional sizes of the latent classes; and 4) the interpretability of the results (Muthén, 2003; Geiser, 2013; Berlin et al., 2014). These key indicators imply the choice of a 2-class solution (Table 3). The corresponding strategy profiles of the two groups are shown in Figure 1.

Table 3 Likelihood ratios, information criteria, entropy, class proportions and average latent class posterior probabilities for the competitive strategy LPAs

	LogL	AIC	BIC	Entropy	Class proportions	Average latent class posterior probabilities
Competitive strategy						
1-class solution	-2760.516	5553.032	5610.368	1.000	1.000	1.000
2-class solution	-2642.484	5350.964	5469.220	0.788	0.697 /0.303	0.944 / 0.920
3-class solution	-2596.381	5292.761	5471.936	0.694	0.309 / 0.363 / 0.328	0.823 / 0.881 / 0.886
4-class solution	Does not converge					

Next, names were assigned to the two groups based on between-profile comparisons. Twenty-nine per cent of the studied LSPs belonged to a group that competes on the basis of operational excellence supported by brand and marketing (named “Leaders” here). The majority (71%) belonged to another group that seem only to place modest emphasis on the studied competitive priorities, with mean values ranging from 2.91 to 3.70 (named “Laggards”). This type of firm tends to be unable to place a distinct emphasis on any competitive dimension (Pertusa-Ortega et al., 2009), and reflects the “stuck-in-the-middle” strategy, as suggested by Porter (1985). There do not seem to be significantly different strategy profiles, but one group of LSPs had managed to turn some of the competitive priorities into a source of competitive advantage. There may be some outliers, but the LPA does not reveal them. More detailed elaboration of the potential outliers in either group is beyond the scope of this analysis, but it could be a fruitful avenue for future research.

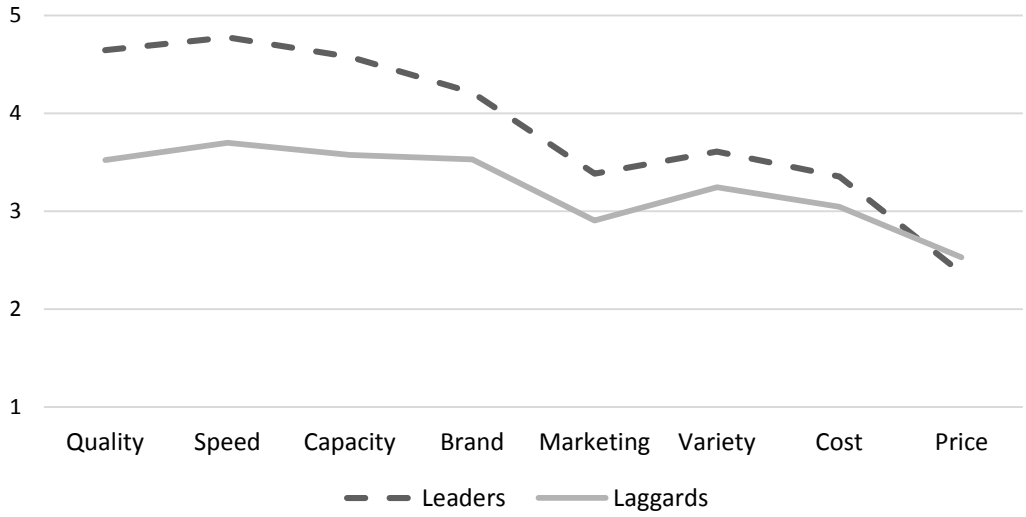

Figure 2 Competitive strategy profiles in line with the selected performance/competitive criteria of the two groups ("Leaders" and "Laggards"), mean values (1 = lowest value, 5 = highest value)

The gap between the two groups turned out to be the widest on the dimensions of quality and speed, and smallest or even inverse on the cost and price dimensions. Interestingly, neither of the groups taken as a whole seemed to place strong emphasis on competing on the basis of a low price and low costs, which seems to support the notion that service performance precedes price discussions (e.g. Menon et al., 1998). It could also indicate that the price and costs of operations are order qualifiers, whereas operational excellence is an order winner. The Leaders' group also seemed to benefit from stronger strategic capabilities, given that the independent samples t-test shows a significant difference (p=0.050) between Leaders and Laggards in Return-On-Investment.

The results of the ANOVA reported in Table 4 support Hypothesis 1 in that firms pursuing different competitive strategies display different GSCM practices. Leaders (group 1) engage in a higher level of internal and external GSCM practices than other LSPs.

Table 4 ANOVA statistics and cluster means related to GSCM practices

	Group 1 (n = 76) Leaders	Group 2 (n = 190) Laggards	F-value	p-value
	Mean	Mean		
Internal GSCM	4.081	3.640	14.430	< 0.001
External GSCM with customers	3.462	3.072	6.657	< 0.05

Table 5 shows the results of the regression analysis. On the basis of the R2 values, the best fit for EBIT percentage was achieved when the model included both the GSCM and the control variables (Step 4). In the Leaders' group, the best fit for ROI, ROA and environmental performance was achieved when only internal GSCM and the control variables were included. In comparison, the adjusted R-squared was low for the Laggards' group, indicating that GSCM practices are less relevant for them than for those in the the Leaders' group. Internal GSCM

and GSCM with customers showed a statistically significant relationship with the environmental performance of LSPs in both competitive-strategy groups, internal GSCM being more strongly related to environmental performance. These findings are in line with the results of previous studies in manufacturing, such as Thun and Müller (2010) and Huang et al. (2017), concluding that GSCM leads to better environmental performance in terms of environmental protection and resource efficiency.

The only statistically significant ($p < 0.10$) effect of GSCM practices on financial performance was negative, and was between ROA and GSCM with customers in the Laggards' group. Environmental performance was not related to any item measuring financial performance. Hence, Hypothesis 2 is supported, whereas Hypotheses 3 and 4 are not. Table 6 summarises the hypothesis-testing process. These results corroborate those reported by Pullman et al. (2009) and Wang & Sarkis. (2013), for example, who found no/negative linkage between environmental sustainability in the supply chain and financial performance.

Table 5 Regression-based results

Dependent variable		Group 1 Leaders									Group 2 Laggards							
	Step	INT	CUST	ENV-PERF	SIZE	CHAIN	SINGLE	R^2	Adjusted R^2	Step	INT	CUST	ENV-PERF	SIZE	CHAIN	SINGLE	R^2	Adjusted R^2
EBIT %	1				0.015	-0.045	<0.001	0.011	<0.001	1				0.002	-0.023	<0.001	0.006	<0.001
	2	-0.031			0.021	-0.040	<0.001	0.034	<0.001	2	-0.015			0.003	-0.024	<0.001	0.009	<0.001
	3		-0.027		0.011	-0.055	<0.001	0.035	0.020	3		-0.018		0.009	-0.023	<0.001	0.014	0.008
	4	-0.020	-0.019		0.016	-0.049	<0.001	0.043	0.027	4	-0.006	-0.016		0.009	-0.024	<0.001	0.014	0.013
	5			-0.005	0.019	-0.047	<0.001	0.012	<0.001	5			-0.020	0.004	-0.024	<0.001	0.013	0.009
ROI	1				0.174***	0.011	0.001	0.102	0.064	1				0.041	0.012	<0.001	0.006	<0.001
	2	-0.039			0.181***	0.017	0.001	0.123	0.074	2	-0.016			0.043	0.010	<0.001	0.008	<0.001
	3		-0.22		0.171***	0.004	0.001	0.111	0.061	3		-0.021		0.051	0.011	<0.001	0.014	<0.001
	4	-0.034	-0.008		0.179***	0.014	0.001	0.124	0.062	4	-0.004	-0.020		0.050	0.011	<0.001	0.014	<0.001
	5			-0.017	0.185***	0.006	0.001	0.109	0.058	5			-0.23	0.043	0.009	<0.001	0.012	<0.001
ROA	1				0.120*	-0.004	0.001	0.061	0.021	1				0.024	-0.001	<0.001	0.002	<0.001
	2	-0.047			0.129**	0.003	0.001	0.096	0.045	2	-0.025			0.027	-0.004	<0.001	0.008	<0.001
	3		-0.026		0.116*	-0.013	0.001	0.077	0.025	3		-0.028*		0.037	-0.002	<0.001	0.017	<0.001
	4	-0.041	-0.010		0.126**	-0.001	0.001	0.098	0.033	4	-0.011	-0.025		0.037	-0.003	<0.001	0.018	<0.001
	5			-0.019	0.132**	-0.010	0.001	0.070	0.017	5			-0.030	0.028	-0.004	<0.001	0.014	<0.001
ENVPERF	1				0.621*	-0.303	0.009*	0.083	0.045	1				0.105	-0.091	-0.002	0.001	<0.001
	2	0.368**			0.557*	-0.359	0.011**	0.160	0.113	2	0.321***			0.071	-0.063	-0.002	0.092	0.072
	3		0.236*		0.656**	-0.220	0.009**	0.129	0.080	3		0.202***		0.013	-0.085	-0.003	0.071	0.051
	4	0.300*	0.119		0.586*	-0.307	0.011**	0.169	0.110	4	0.249***	0.124*		0.022	-0.066	-0.002	0.109	0.085

* significant at p<0.1; ** p <0.05, *** p<0.01

With regard to the control variables, medium-to-large-sized firms seem to have better ROI and ROA than micro-sized firms: their greater size might allow them to diversify more effectively and to buffer the risks related to sustainability projects (Stadtler & Lin, 2017). Furthermore, firms that are more dependent on one large customer tend to produce a better environmental performance. One reason for this could be that having a single large customer facilitates the coordination of environmental activities between the LSPs and shippers. Another possible explanation is that dominant buyers use their power over suppliers to force them to improve their sustainability performance (Brockhaus et al., 2013). Suppliers that are highly dependent on a single large customer do not have the authority to negotiate the details of such sustainability requirements (Wilhelm et al., 2016).

Table 6 The results of the hypothesis testing

Hypothesis	Outcome
H1. GSCM practices will differ across LSPs pursuing different competitive strategies.	Supported
H2. GSCM practices are positively related to environmental performance of LSPs.	Supported
H3. GSCM practices are positively related to financial performance of LSPs.	Not supported
H4. Environmental performance is positively related to financial performance.	Not supported

Discussion and conclusions

This article enhances understanding of how a competitive strategy promotes GSCM practices, thereby narrowing the gap in the literature pointed out by Cousins (2005). LSPs were classified into two groups based on the latent profile analysis of survey data: 1) Leaders and 2) Laggards. Members of the former compete by means of high service levels supported by their brand whereas the latter do not seem to excel in any competitive priority. Laggards might not have formulated a clear strategic direction, or they have not managed to realise their intended strengths (Mintzberg, 1978). A competitive strategy is also reflected in the pursued GSCM strategy. Leaders were more advanced in both internal and external GSCM. These LSPs might be able to obtain a premium price for their environmentally sustainable, high-quality logistics services, as Orsato (2006) and Yadav et al. (2017) suggest. However, Maas et al. (2014) note that traditional differentiators such as reliability, flexibility and customer service are still more important. The LSP representatives interviewed for the study conducted by Colicchia et al. (2013) agreed that environmental sustainability could be a differentiation advantage in the long term, but that its current significance was limited.

The LSPs in the Laggard group, in turn, seemed to be less proactive in environmental issues than Leaders, being likely to provide non-differentiated logistics services (Lieb & Butner, 2007) and only fulfilling minimum environmental requirements. For them, environmental sustainability is likely to be a cost-cutting policy of which environmental benefits are a positive by-product (Evangelista et al., 2017). One possible reason for this is that transport buyers prioritise traditional criteria over environmental sustainability in their purchase decisions (Wolf & Seuring, 2010; Nilsson et al., 2017). It has also been reported that shippers are not willing to spend more for greener logistics services (e.g. Colicchia et al., 2013). The recent economic

downturn may have affected the respondents' views in that monetary objectives typically overrule pro-environmental solutions in less favourable economic situations (Mustonen et al., 2016). This supports the findings reported by Perotti et al. (2012) in that there is a growing awareness of environmental issues among LSPs but it is not fully reflected on the operational level, partly due to the lack of customer commitment. Van den Berg and De Langen (2017) suggest that a major reason for this is that customers do not communicate their demands for environmental sustainability well enough, which service providers perceive as a lack of demand. Furthermore, buyers seldom systematically monitor the environmental performance of LSPs (Nilsson et al., 2017; Bask & Rajahonka, 2017). Indeed, LSPs could benefit from increased collaboration and enhanced communication with key customers (Dangelico & Pontrandolfo, 2015; Van den Berg & De Langen, 2017) that might strengthen mutual commitment to the development of environmentally sustainable logistics services. The role of environmental sustainability in the selection and governance of LSPs and its impact on GSCM practices could thus be an interesting area for future research.

This article also highlights the need to focus on the relationship between GSCM practices and performance in the context of LSPs, specifically by using survey methods to validate the results of exploratory case studies with empirical generalizations (Perotti et al., 2012; Evangelista, 2014). As hypothesised, GSCM practices were positively linked to environmental performance. Consistently with previous research findings from the manufacturing industry (e.g. Vanalle et al., 2017), GSCM practices within the firm's boundaries turned out to be more strongly linked to environmental performance. LSPs could also directly engage with customers and design their environmental strategies in customer-oriented projects (Evangelista et al., 2017), which could also enhance environmental performance.

This article is one of the few studies on GSCM to combine self-reported data with data from financial reports (e.g. Markley & Davis, 2007; Wang & Sarkis, 2013). One of the key contributions of the study is the introduction of a novel way of measuring the financial performance of a given firm by normalising raw financial metrics to assess performance relative to its industry peers. However, given that the performance measures in question are based on the firm's industry ranking, they might not be able to capture incremental changes in financial performance. This could explain the lack of a statistically significant relationship between GSCM practices and financial performance. Wang and Sarkis (2017), in turn, found in their recent study that firms that only symbolically engaged in corporate-social-responsibility activities were not able to enhance their financial performance. The LSPs examined in this study may have introduced a number of GSCM initiatives and duly informed the market about them, but they had not rigorously and seriously implemented them or focused their activities on a limited range of initiatives (Wang & Sarkis, 2017; Evangelista et al., 2017).

The results of this study also complement findings reported by Wu and Pagell (2011) and Li et al., (2017) suggesting that the financial benefits of GSCM practices accrue only in the long term. The Leaders might see GSCM as a future differentiation advantage (Colicchia et al., 2013), even if it could mean increasing costs in the short term. However, because most managers tend to focus on the short term, sustainability initiatives are not considered urgent, or they are perceived as too difficult to predict (Kirchoff et al., 2016). Uncertain outcomes and low priority may thus be major obstacles to making supply chains greener.

Managerial implications

The results discussed in this article highlight the need for LSPs to understand the unique characteristics of their competitive strategies. It is suggested in the literature that demands for

greener logistics services are likely to increase in the future (e.g. Wolf & Seuring, 2010). If a logistics service provider seeks competitive advantage through differentiation it could benefit from GSCM practices in the long term, although the short-term results might not be encouraging. Wu and Pagell (2011) point out that costs and resource constraints could offer a new lens through which to examine supply chain operations. Whereas traditional core service offerings such as transportation are being commoditized, there could be future differentiation opportunities for LSPs offering greener solutions (Maas et al., 2014). Mustonen et al. (2016) further suggest that suppliers need to convince their customers that they are able to offer environmental benefits alongside functional value. The implication in this is that advanced LSPs integrate environmental objectives into operational objectives, as Beamon (1999) suggested two decades ago. Logistics customers, in turn, should understand that sustainable behaviour is a new routine that needs to be specifically acknowledged and measured (Schnittfeld & Busch, 2016).

The challenge for policy-makers is to create policy instruments that encourage environmental improvements in the logistics sector without harming the competitive ability of firms. Given that the majority of these firms are small and medium-sized it may be necessary to support them financially to strengthen their environmental sustainability without losing competitiveness (Oberhofer & Dieplinger, 2014).

Limitations and future research

A limitation of the present study is the restricted geographic location of the survey respondents. Further research covering a broader geographic area would be needed to obtain more easily generalizable results. Wang and Sarkis (2013) further call for a more nuanced examination of the relationships between GSCM practices and performance. Hence, future research could shed light on this issue by focusing on non-linear relationships, mediation or moderation, for example. Hartmann and Vachon (2017), for instance, suggest that industry dynamism could moderate the relationship between environmental management and performance. Given that the survey data was collected in a cross-sectional research setting, and that financial performance was also measured at one point of time, the present findings could be complemented with multi-year financial performance data, as Carter and Rogers (2008) and Dubey et al. (2017) suggest.

The results of this study reveal differences in GSCM practices between the competitive-strategy groups. An interesting future research endeavour would be to identify an ideal GSCM profile for each group. This could be achieved by means of profile deviation analysis (Venkatraman & Prescott, 1990) to identify the top performers, and then comparing the remaining firms to these ideal profiles. Measuring alignment between the competitive strategy and a GSCM strategy would provide firms with a tool for implementing both strategies simultaneously, and for making holistic decisions within the firm and across the supply chain (Wu et al., 2014).

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