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Rapp (Alexander), Simonovic (Adina Lucia), Large (Rudolf O.), « Soyons plus verts !. Stratégies environnementales des prestataires de services logistiques »

Résumé – L'article souligne que les efforts effectués pour faire face au changement climatique et à la pollution sont favorables aux prestataires de services logistiques. Un cadre d'analyse fondé sur quatre stratégies environnementales (éco-efficience, leadership fondé sur le dépassement des normes, éco-marque et leadership fondé sur la réduction des coûts environnementaux) est appliqué au segment des services logistiques à valeur ajoutée afin d'en déduire des politiques proactives et des pratiques vertes pour les PSL.

Mots-clés – stratégie environnementale pro-active, industrie de la prestation logistique, logistique verte, entreposage, éco-efficience, éco-marque, durabilité

Rapp (Alexander), Simonovic (Adina Lucia), Large (Rudolf O.), « Let's get greener!. Environmental strategies of logistics service providers »

Abstract – This paper substantiates that voluntary efforts to respond to climate change and environmental pollution promote uniqueness of logistics service providers. A generic framework of four environmental strategies (eco-efficiency, beyond compliance leadership, eco-branding and environmental cost leadership) is applied to the segment of advanced logistics services to deduce proactive strategies and green practices for LSPs.

Keywords – proactive environmental strategy, logistics industry, green logistics, warehousing, eco-efficiency, eco-branding, sustainability

LET'S GET GREENER!

Environmental strategies of logistics service providers

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INTRODUCTION

This special issue of the *European Review of Service Economics & Management* deals with the interaction of logistics and services. The relationship between these subjects is manifold and shows various facets. The focus of our paper is on competition and competitive advantages in the logistics service industry. Not only in terms of enterprises, employees and turnover is the logistics service industry a significant and indispensable part of the European economy. Supplying households and companies would not be possible without a large number of logistics service providers (LSP). The recent COVID-19 pandemic in particular has made this fact evident.

Traditionally, LSPs are viewed from the shippers' perspective as a supporting third-party between the consignor and the consignee. For example, Hertz and Alfredsson (2003, p. 140) characterize a LSP as an external third-party "who manages, controls, and delivers logistics activities on behalf of a shipper". In contrast, from the perspective of providers, LSPs are autonomous companies that develop, offer and perform logistical services in order to do business with their customers. LSPs thus, play an active role, regardless of whether they offer comparatively simple service components or complex service packages.

Since logistics service companies provide a wide range of various services (Erhel and Calvi, 2018), the segments of the logistics service industry are divers and heterogeneous. Nevertheless, there is a common attribute to these segments. The logistics industry is characterized by fierce competition as the services provided by most of the companies are interchangeable. There is intensive rivalry inside the various segments of the logistics industry, the bargaining power of buyers is significant and new players – such as Amazon – enter the markets. Consequently, each LSP has to formulate proactive strategies to establish a promising position against these forces of industry competition (Fulconis *et al.*, 2016). However, achieving such a position is by no means a trivial matter. Unique selling points are difficult to achieve in the logistics service industry, not only for standardized services, but also for advanced services designed specifically for a distinct customer. Consequently, companies need to figure out how to become unique (Porter, 1985).

Policy choices of companies are prominent uniqueness drivers. "Firms make policy choices about what activities to perform and how to perform them" (Porter, 1985, p. 124). Since decisions are not made by the organizations themselves, but by the people representing those organizations, the attitudes and values of these representatives are essential when making policy choices. This perspective is supported by the Upper Echelon Theory (UET) (Hambrick and Mason, 1984; Hambrick, 2007). The Upper Echelon Theory expects "that the combination of certain situational conditions and upper echelon characteristics will lead to strategic choices that could not have been predicted as strongly by knowing only one or the other" (Hambrick and Mason, 1984, p. 197). Following the reasoned action approach, these upper echelon characteristics such as demographic indicators, cognitive base and values are viewed as background factors that do not influence the strategic choices directly, but are rather mediated through managers' attitudes, perceptions of social pressure and perceived behavioral control (Fishbein and Ajzen, 2010; Ajzen, 2012).

In recent years, public opinion and political debate (e.g. Kyoto Protocol, Paris Agreement) has been largely determined by topics like climate change, environmental protection and sustainable development (Centobelli *et al.*, 2020). It is apparent, that these changes in society's values also influence the attitudes and perceptions of the upper echelons in logistics. Consequently, these developments are likely to have

an effect on the policy choices made by chief executives of LSPs. Their conclusion could be: Let's get greener! In order to achieve this goal, LSPs must make efforts to reach the appropriate degree of corporate environmentalism.

Banerjee *et al*. (2003) propose to consider two dimensions of corporate environmentalism: environmental orientation and environmental strategy. "Environmental orientation is the recognition by managers of the importance of environmental issues facing their firms, and environmental strategy is the extent to which environmental issues are integrated with a firm's strategic plans." (Banerjee *et al.*, 2003, p. 106). Environmental orientation emphasizes the role of management support of natural environmental issues (Menguc *et al.*, 2010) and is consistent with the Upper Echelon Theory (Hambrick and Mason, 1984; Hambrick, 2007). The request to include environmental aspects in strategic planning leads directly to the necessity for environmental strategies of LSPs. Such strategies should go beyond meeting customers' requirements and coping with environmental regulations (Sharma and Vredenburg, 1998; Darnall *et al.*, 2010; Mandojana *et al.*, 2012; Shu *et al.*, 2020).

In other words, environmental strategies of LSPs should be proactive in nature, reflecting LSPs' voluntary efforts to manage the environmental impacts of their businesses (Yang *et al.*, 2019). An appropriate environmental strategy "requires both positive managerial attitudes/values toward environmental preservation (motivation) and resource allocations to build and deploy organizational capabilities (ability) to pursue such strategies" (Sharma and Sharma, 2011, p. 309). In contrast, companies pursuing reactive environmental strategies ensure compliance with environmental regulations or even try to use lobbyists to reduce the requirements of environmental regulations (Delgado-Ceballos *et al.*, 2012). The following research objectives arise from these initial considerations:

1. The identification and selection of a comprehensive framework of environmental strategies and competitive advantages based on these strategies.
2. The adaptation and application of this general framework to the logistics service industry in order to identify competitive environmental strategies and related practices of LSPs.

This paper is structured as follows: The first section provides an overview of previous literature concerning the environmental management of LSPs as well as environmental strategies and competitive advantages in general. The main purpose is to identify potential frameworks of environmental strategies and practices. In this way, the first research objective should be achieved. Section two presents a segmentation of the logistics service industry. The aim of this analysis is the selection of one exemplary logistics industry segment to which to apply the general framework in more detail. The third section presents the application and necessary adaptations of the framework to the chosen industry segment. This should result in a contribution to achieving the second research goal being made. In particular, section three describes four types of environmental strategies and related practices for each type. The last section offers conclusions, managerial implications, limitations, and recommendations for future research.

1. LITERATURE

1.1. ENVIRONMENTAL MANAGEMENT OF LSPS

Strategic interest in using and developing environmental programs along the supply chain is growing with the accompanying governmental demands on climate targets (Foster *et al.*, 2000; Rossi *et al.*, 2013; Centobelli *et al.*, 2017a; Centobelli *et al.*, 2020). This means that, nowadays, there is a growing research interest in the field of sustainability in manufacturing, trade and service industry (Foster *et al.*, 2000; Evangelista *et al.*, 2017; Centobelli *et al.*, 2020). It is noticeable that a majority of the research articles examines the adaptation of environmental practices or strategies in the manufacturing industry while research in the field of logistics industry is almost neglected (Lin and Ho, 2012; Laari *et al.*, 2017; Centobelli *et al.*, 2020). According to the literature, different research streams in the field of environmental management of LSPs can be acknowledged: Studies to achieve and define the typologies of environmental initiatives (Evangelista *et al.*, 2010; Lieb and Lieb, 2010;

Pieters *et al.*, 2012; Centobelli *et al.*, 2017b), studies on factors, drivers and barriers influencing the motivation of LSPs to adopt environmental initiatives (Abdullah *et al.*, 2012; Lin and Ho, 2012; Rossi *et al.*, 2013), studies including the supporting technology and ICT Tools with regard to the adoption of environmental initiatives by LSPs (Centobelli *et al.*, 2020), and studies on the implementation of environmental initiatives and their impact on LSPs' environmental-economic-business performance (Choi and Zhang, 2011; Perotti *et al.*, 2012, Laguir *et al.*, 2021). This paper's focus is on environmental activities and operations (in the form of environmental initiatives) of LSPs as well as on LSPs' environmental strategies.

1.1.1. Environmental practices

The implementation of environmental initiatives is gaining increasingly strategic relevance for LSPs (Centobelli *et al.*, 2017a; Evangelista *et al.*, 2017). With these initiatives LSPs are in a position to support manufacturers and consumers and their requirements as specific environmental strategies (Centobelli *et al.*, 2017a,b). As a result, the use of environmental initiatives and practices by LSPs has more and more been the subject of research in recent years (Marchet *et al.*, 2012; Evangelista, 2014; Centobelli *et al.*, 2017a). Overall, different definitions and perspectives of environmental initiatives exist in the literature. Maas *et al.* (2012) specify environmental initiatives as the environmental aims that an LSP holds. Other authors use the term environmental initiatives mainly to refer to the individual environmental activities and operations adopted by the LSP (Perotti *et al.*, 2012; Pieters *et al.*, 2012). In addition, there are also publications that emphasize the critical role of technologies and innovations in relation to environmental initiatives and their implementation (Centobelli *et al.*, 2020).

Centobelli *et al.* (2017a) examine the distribution of environmental initiatives among LSPs and develop a new classification for them. According to this classification, environmental initiatives are composed of three perspectives, (1) the managerial perspective (as the environmental aim), (2) the organizational perspective (as the environmental operations) and (3) the technological perspective (as the technological tools) (Centobelli *et al.*, 2017a). At this point, a further subdivision is made by Centobelli *et*

al. (2017a) into single-firm initiatives and supply chain initiatives (where external stakeholders and supply chain partners are included). The single firm initiatives represent activities of the LSPs in the selected functions logistics service, warehousing, transport and management pursuant to Centobelli *et al.* (2017a). Environmental activities in transport include, for example, the use and implementation of eco-driving or alternative fuels, while at the management level the inclusion of the employees through appropriate training is also shown. Supply chain initiatives, on the other hand, specifically involve collaboration activities, for example with customers or other LSPs (Centobelli *et al.*, 2017a).

This paper emphasizes that the environmental strategy of an LSP can be seen as a composition of those terms, mentioned in the proposed framework (Centobelli *et al.*, 2017a). Weijers *et al.* (2012) also state this distinction between external environmental practices, including external stakeholders or other LSPs and internal environmental practices of LSPs, which represent single firm activities. Their model is intended to break down the environmental activities that have already been undertaken by the investigated LSPs and aims to classify them into the two dimensions of optimizing and innovating. The authors show that an additional temporal level could also be inserted at this point, indicating whether an activity is carried out only once or strategically over a longer period of time (Weijers *et al.*, 2012). Weijers *et al.* (2012) concluded that the examined LSPs tend to favor environmental operations that increase the efficiency of prevailing internal programs in order to develop lower costs.

The empirical paper of Colicchia *et al.* (2013) addresses environmental activities in the logistics service industry. A framework is developed using the basic environmental operations implemented by companies involved in logistics and freight transport activities. These areas are (1) distribution strategies and transportation execution, (2) warehousing and green building, (3) reverse logistics, (4) packaging management, (5) internal management and the external areas of (6) collaboration with customers and (7) other external companies. Environmental activities in the area of internal management were less common than environmental activities related to transportation and distribution activities of LSPs (Colicchia *et al.*, 2013).

Furthermore, it is important to investigate the drivers that motivate LSPs to adopt environmental initiatives in their environmental management. Lin and Ho (2012) identify the following as factors that positively influence the adoption of environmental initiatives: (1) making environmental practices explicit and increasing them, (2) improving organizational learning capabilities, (3) the quality of human resources, (4) environmental uncertainty, and (5) external support from the government, summarized as technological, environmental and organizational factors. These existing factors that promote the adaptation of environmental initiatives by LSPs can be outlined into two basic perspectives, according to Marchet *et al.* (2012): external and internal factors:

- External factors can be defined as those that act on the LSP as pressure from outside to adopt environmental activities into their environmental management. Moreover, it is possible that this remains external pressure from the prevailing policy or governmental institutions (Lieb and Lieb, 2010; Lin and Ho, 2012; Marchet *et al.*, 2012). External pressure can also have its origin in customers and their particular environmental requirements (Evangelista *et al.*, 2010; Lieb and Lieb, 2010; Abdullah *et al.*, 2012; Lin and Ho, 2012).
- Internal factors, instead, refer to the internal organization of the LSP. They are therefore company-related drivers, for example, in relation to economic factors (Evangelista *et al.*, 2010) or an image improvement through the introduction of an environmental initiative. They also include the active motivations of LSPs to achieve environmentally friendly positions. Lieb and Lieb (2012) mention the motivation of LSPs to do "the right thing" in terms of environmental aspects.

In summary, there are contrasting perspectives in the literature concerning the main impact on the adoption of environmental initiatives among LSPs. While some authors put the positive influence more on internal factors, such as environmental awareness, others assume a strong external influence by the customer or the government.

1.1.2. Environmental strategies

In order to approach the subject of environmental strategies of LSPs in terms of content, the distinction of various perspectives on the nature of environmental strategies is crucial. As a first perspective, an environmental strategy could be understood as the interaction of the environmental organization culture, the number of environmental initiatives and the factors influencing their implementation (Evangelista *et al.*, 2017). In addition, as mentioned previously, the environmental strategy of LSPs could be also defined as including corporate environmental aims, environmental operations and additional information systems as its components (Centobelli *et al.*, 2017a; Centobelli *et al.*, 2020).

Based on the existing research streams, it can be recognized that there are different ways in which LSPs deal with environmental strategies. Evangelista *et al.* (2017) identified diverse methods by which the strategy was implemented by LSPs in Italy and the UK. The approaches ranged from a non-existing strategy to a formal strategy to an explicit strategy taken by the investigated LSPs. On the one hand, there are proactive types of LSPs that possess environmental awareness and, due to the perceived importance of environmental issues, try to consider environmental objectives directly in strategy formation and service operations (Weijers *et al.*, 2012; Evangelista *et al.*, 2017). Accordingly, Laari *et al.* (2017) classified LSPs into those types of environmental strategy implementation – the so-called laggards and the leaders. The type of the leaders reflects a proactive strategy where the LSPs recognize the strategic priority of environmental issues and integrate it into their services offered (Evangelista *et al.*, 2017; Laari *et al.*, 2017). Based on this, Centobelli *et al.* (2020) identify four proactive strategies for adopting environmental initiatives in freight transport and the logistics industry, which include the different phases of the process for the adoption of environmental initiatives: (1) sustainability leaders, (2) green practice adopters, (3) information system adopters and (4) sustainability followers. However, this classification according to stages of green implementation is not appropriate to categorize the application of specific environmental strategies along LSPs.

On the other hand, there are LSPs who make little effort to apply ecological practices and who do not perceive the strategic priority of

environmental issues (Evangelista *et al.*, 2017; Laari *et al.*, 2017; Centobelli *et al.*, 2020). They offer more or less traditional logistics services and only fulfil the minimum requirements for environmental protection (Laari *et al.*, 2017). In general, however, benefits are also mentioned in relation to the introduction of strategic environmental components by LSPs. Evangelista *et al.* (2014) regard proactive introduction of environmental strategies for LSPs as a strategic opportunity for differentiation in the market. Marchet *et al.* (2012) support this theory and assume a long-term differentiation advantage for LSPs by adapting environmental strategies. Laari *et al.* (2017), in contrast, postulate that the requirement for proactive environmental management is not always the best approach for each LSP. Instead, the authors conclude that the environmental strategy should be aligned with the prevailing competitive strategy (Marchet *et al.*, 2012; Laari *et al.*, 2017). According to Fürst and Oberhofer (2012), who deal with road freight transport in their study, it is also necessary to look in more detail at the respective industry sector in order to use environmental management effectively.

It should be mentioned at this point, that there are ambiguities regarding the analysis of environmental strategies in the logistics service industry. Evangelista *et al.* (2017) state, that issues concerning the implementation of environmental strategies and their practical application remain largely unresolved. Furthermore, existing research on environmental strategies of LSPs merely deals with large LSPs and neglects small and medium-sized LSPs (Evangelista *et al.*, 2017). Research on environmental strategies in the logistics service industry also mainly focuses on individual environmental activities, not on the totality of various operations (Centobelli *et al.*, 2020). Consequently, research is mainly concerned with the building blocks of environmental strategies, such as environmental initiatives of LSPs (Evangelista *et al.*, 2014).

Overall, it can be stated that there is no uniform awareness of the environmental sustainability importance among LSPs and no defined environmental strategy roadmap (Isaksson and Huge-Brodin, 2013; Centobelli *et al.*, 2017a). There are divers approaches as to how strategies should be implemented and how environmental aspects should be involved (Pieters *et al.*, 2012; Weijers *et al.*, 2012; Rossi *et al.*, 2013; Evangelista *et al.*, 2017). However, as seen before, there is no clearly defined approach for the implementation of an environmental strategy

among LSPs that covers each of the relevant aspects (Pieters *et al.*, 2012; Rossi *et al.*, 2013; Evangelista *et al.*, 2017). For example, there is still confusion regarding the best way of translating environmental practices into competitive advantages (Evangelista *et al.*, 2017; Laari *et al.*, 2017).

1.2. ENVIRONMENTAL STRATEGIES AND COMPETITIVE ADVANTAGES

Various classifications of environmental strategies have been proposed in strategic management literature. In the early stages, companies perceived environmental issues and the stipulation to protect the environment to be constraints on their business activities (Azzone and Bertle, 1994). As a result, a reactive approach dominated both strategic management and strategic management research. Following this approach, companies only considered environmental issues if they had been stipulated by political regulations. Studies on compliance-based environmental management argued that regulations could lead to unproductive investments, higher costs and thus resulting in a loss of competitive advantages (Walley and Withehead, 1994).

Nowadays, companies place more emphasis on other stakeholders than on political regulations in their environmental management practices (Henriques and Sardorsky, 1996; Neu *et al.*, 1998). Hence, with increasing consumer awareness and social pressure as well as with a growing number of green investors, a transition has occurred (Azzone and Bertle, 1994). In order to be one step ahead of their stakeholders' requirements, companies have begun proactively to deal with the inclusion of the environment in their corporate strategy (Buysse and Verbeke, 2003). Studies on proactive environmental management have argued that companies going beyond pure compliance can create entry barriers (Dean and Brown, 1995), gain competitive advantages in international markets (Nerth, 1998) and improve financial performance (Klassen and McLaughlin, 1996). This transition from compliance-based management to strategic environmental management caused the emergence of first classifications (González-Benito and González-Benito, 2005). Studies on corporate social responsibility that made similar distinctions turned out to be a source for application (Henriques and Sardorsky, 1999). Based on the four social responsiveness categories – (1) reactive, (2) defensive, (3) accommodative, (4) proactive (Caroll, 1979) – Hunt and Auster (1990), Roome (1992) and Winsemius and Guntram (1992) have

developed a number of stages ranging from reactivity to the highest stage of proactivity.

This first research stream discusses the question of whether or not "it pays to be green" and tries to confirm that a more proactive environmental management is superior. The second research stream strives to enlarge and enhance the first approach and examines how companies might gain competitive advantages through environmental strategies (Orsato, 2006). Therefore, new approaches have emerged under the consideration of general strategic management theories. For example, Hart (1995) applies the resource-based view (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) to the topic of environmental strategy and creates the natural-resource-based view of the firm. He argues that "strategy and competitive advantage in the coming years will be rooted in capabilities that facilitate environmentally sustainable economic activity" (Hart, 1995, p. 991).

In this context, Hart (1995) presents a conceptual framework, which distinguishes three interconnected strategies: pollution prevention, product stewardship and sustainable development. Pollution prevention builds upon continuous improvement of products and services in order to minimize emission, effluents and waste. This strategic capability is associated with lower costs and is therefore in line with the basic approach of cost leadership. Product stewardship expands the idea of pollution prevention and seeks to minimize the life-cycle cost of products. Therefore, it builds upon stakeholder integration to create competitive advantages through preemption of competitors (e.g. through exclusive access to green materials). Moreover, it can be associated with the strategy of product differentiation. Finally, the sustainable development needs to be based on a shared long-term vision in order to minimize the environmental burden of firm growth and development. Firms that pursue a sustainable development need to have substantial investments and a long-term commitment in order to gain competitive advantages from their future position.

Fifteen years later, this framework was expanded by Hart and Dowell (2011) with the addition of a fourth strategy. The strategy "base of the pyramid" attaches to sustainable development with the aim of meeting the unmet needs of the poor (the base of the pyramid). Hart and Dowell (2011) argue that in order to achieve a long-term growth, firms need to

build on embedded innovations. Hart and Ahuja (1996) investigated the strategy of pollution prevention through examining the effect of emission reduction on firms' savings. They substantiate that it pays to be green, however, raise concern that when getting closer to zero pollution the costs may offset the cost reductions from lower emissions. This might suggest that at some point, firms will need to proceed to more advanced strategies (e.g. product stewardship) in order to gain further competitive advantages (Hart and Ahuja, 1996). Therefore, Hart (1997) transferred his previously presented conceptual framework into a stage model consisting of three stages: (1) pollution prevention, (2) product stewardship, (3) clean technology. Moreover, Sharma and Vredenburg (1998) demonstrate that companies develop unique organizational capabilities from proactive environmental strategies, which, it has been suggested, leads to competitive advantages.

Based on Hart's (1995) framework, Buysse and Verbeke (2003) propose three dominant environmental strategies as the result of a cluster analysis. This classification combines the ideas of the reactive/proactive approaches and the resource-based view of the firm: reactive, pollution prevention and environmental leadership. Related concepts to the resource-based view of the firm were also used to expand the natural-resource-based view of the firm. Aragón-Correa and Sharma (2003) view a proactive environmental strategy related to dynamic capability, that enables the firm to adapt to environmental changes and requires organizational and managerial resources as well as environmental capabilities. Furthermore, they indicate that it is "important to adopt a long-term, consistent strategy" in order to gain competitive advantages (Aragón-Correa and Sharma, 2003, p. 84).

While Hart (1995) implicitly integrated the ideas of Porter's (1980, 1985) generic strategies into his conceptual framework, Shrivastava (1995) explicitly uses them as a basis to elaborate on his model. He synthesizes sustainability practices and generic strategies to develop three ecologically sustainable generic strategies. Firstly, the ecologically sustainable least-cost strategy includes the use of clean technologies and the standardization of environmentally friendly product designs. Secondly, the creation of an ecologically sustainable differentiation strategy involves the use of environmental orientation of product features and the deployment of ecological packaging in order to differentiate from competitors. And

finally, the ecologically sustainable niche strategy seeks market niches for ecologically friendly products and complements the sustainable competitive strategies of Shrivastava (1995). More recently, Orsato (2006) has built on this research and developed a comprehensive framework of environmental strategies and competitive advantages. Four generic types of competitive environmental strategies were proposed to answer the still neglected question of "When does it pay to be green?". Using the two dimensions of competitive advantages (differentiation vs. lower costs) and competitive focus (organizational process vs. products and services) the following strategies have been determined: eco-efficiency, beyond compliance leadership, eco-branding, environmental cost leadership (see Figure 1).

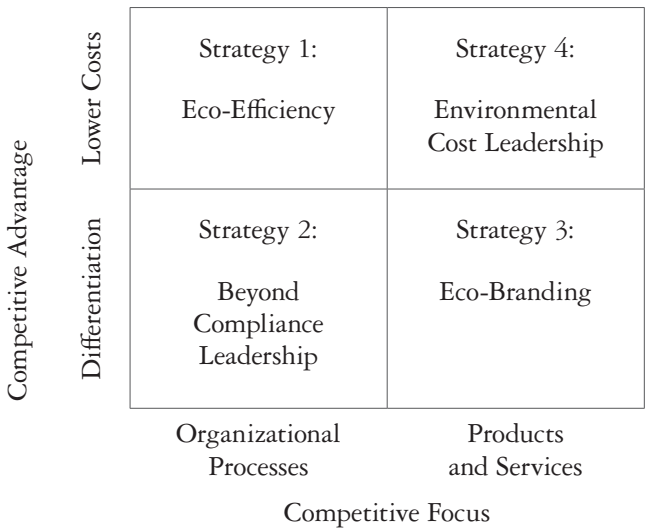

Fig. 1 – A framework of competitive environmental strategies (Orsato, 2006, p. 131).

Eco-efficiency is a strategy in which the company seeks to gain competitive advantages through lower costs while decreasing the environmental impact of their organizational processes at the same time. Organizational processes are also addressed by the strategy of beyond compliance leadership. However, with this strategy, companies do not rely on efficiency and lower costs, but rather on differentiation. Companies

want to communicate their efforts in decreasing the environmental impact of their organizational processes to customers and are willing to invest accordingly. Eco-labelling, certificates or business codes are essential marketing instruments in pursuing this strategy. The same applies to the strategy of eco-branding. This time, the differentiation is based on the environmental attributes of products and services. For these eco-friendly products, companies expect a price premium that will give them a competitive advantage.

Finally, the environmental cost leadership strategy requires more radical adjustments to the products or services in order to gain economic advantages by competing on lower costs. Although the dimensions suggest clear boundaries between the strategies, the division cannot be assumed to be rigid. Furthermore, according to Orsato (2006, p. 131), "most managers tend to pursue more than one environmental strategy simultaneously". In contrast to the approaches outlined above, this typology can be viewed as a choice model (Orsato, 2006). However, it does not represent an either-or decision. Due to its broad applicability, this typology has already been examined in the IT sector (Loeser *et al.*, 2011) and in the automotive industry (Finkorn and Müller, 2012). In addition, de Marchi *et al.* (2013) extend this conceptualization by integrating economic updating and proposing two additional strategies relevant to the value chain. Previous studies suggest that the firm's characteristics and capabilities, the structure of the industry, and the positioning within an industry will have an influence on the selection and implementation of the strategies (Orsato, 2006; Albino *et al.*, 2009; de Marchi *et al.*, 2013). The same applies to the logistics service industry. Therefore, the need for an industry-specific analysis of this typology is highlighted.

2. SEGMENTS OF THE LOGISTICS SERVICE INDUSTRY

The logistics service industry is not homogeneous. Although this finding is trivial, the awareness of distinct segments is crucial to understand competition in the logistics service industry. Industry segmentation is

more than just market segmentation since the focus is on the development of appropriate competitive strategies to create and sustain superior performance (Porter, 1985). If the logistics industry is analyzed as an array of products and buyers, two main dimensions are crucial: service varieties and shippers' characteristics (Porter, 1985). Porter (1985) suggests several characteristics as examples to identify product segments, which are, however, primarily suitable for material goods. For services in general and for logistics services in particular, more specific characteristics are required to map the product varieties in the industry. Logistics services can be segmented according to a variety of criteria (Klaus, 2011; Erhel and Calvi, 2018). Usually, segments are differentiated according to key logistics activities, such as transportation, warehousing, packaging and materials handling, or size and character of the units transferred. Further criteria are the transport and storage technologies used and the level of quality achieved (Mentzer *et al.*, 2004).

Another important criterion is the nature of contract used for legal transactions as this is usually defined by national law, e.g. in the German HGB or in the French Code de Commerce. In this way, the segments freight forwarding, transport and warehousing result. Porter (1985) mentions the general variable "bundled vs. unbundled", which is of great importance in logistics. Logistics service packages comprise a coordinated bundle of related services such as warehousing, materials handling, order processing and ancillary services. Such advanced logistics services are in contrast to basic logistics services, which consist of only one service component (Andersson and Norrman, 2002; Selviaridis and Norrman, 2015; Merminod *et al.*, 2019). Finally, fourth party logistics providers who orchestrate advanced logistics services without being the owners of logistics facilities themselves may constitute a distinct segment of the logistics industry (Fulconis and Paché, 2018).

The second base for industry segmentation in logistics are the dissimilar characteristics of the buyers of logistical services ("shippers"). Basically, a distinction is made between private customers and commercial customers. For example, this segmentation is inevitable in the parcel business, since the forces of competition are quite different. In other markets, manufacturers, wholesalers, retailers or public authorities dominate as buyers of logistics services. Important criteria for segmentation are therefore, for example, the industry in which the

buyer competes, the buyer's location, its technological sophistication and company size.

Consequently, there are numerous ways of industry segmentation in logistics. Nevertheless, segmentation variables are only useful if they actually reveal dissimilar competitive forces in the identified segments. The division of an industry into subunits should not be fragmented. In the following, we use the criteria "key logistics activity" and "degree of bundling" to characterize the segment called "advanced logistics services in warehousing (AW)" as a relevant example. The first argument to select AW for further investigation is economic relevance since the market volume of this segment is huge. In addition, when compared to other important segments, e.g. the parcel service, providers of advanced logistics services in warehousing have primarily been viewed from the customer's perspective as pure customizers (Large *et al.*, 2011). Proactive environmental strategies of these service providers are therefore novel and challenging.

3. ENVIRONMENTAL STRATEGIES OF LSPS

According to the proposed framework of Orsato (2006), it is necessary to identify the underlying practices for each strategy to be able to make clear statements on how LSPs competing in the segment of advanced logistics services in warehousing (Advanced Warehousing Providers, AWPs) should invest in order to establish a promising position and gain competitive advantages. As literature shows (Weijers *et al.*, 2012; Colicchia *et al.*, 2013; Centobelli *et al.*, 2017a), LSPs do a "little bit of everything" (Orsato, 2006, p. 140) and base their adoption of environmental practices on a short-term perspective (Colicchia *et al.*, 2013), without having a clear long-term environmental strategy in mind which ultimately costs them valuable resources and competitive advantages (Aragón-Correa and Sharma, 2003). Therefore, the various practices, initiatives and operations of AWPs have been collected and assigned to the four strategies developed by Orsato (2006) as shown in Figure 2. The definitions of Orsato's (2006) framework serve as delimitation criteria.

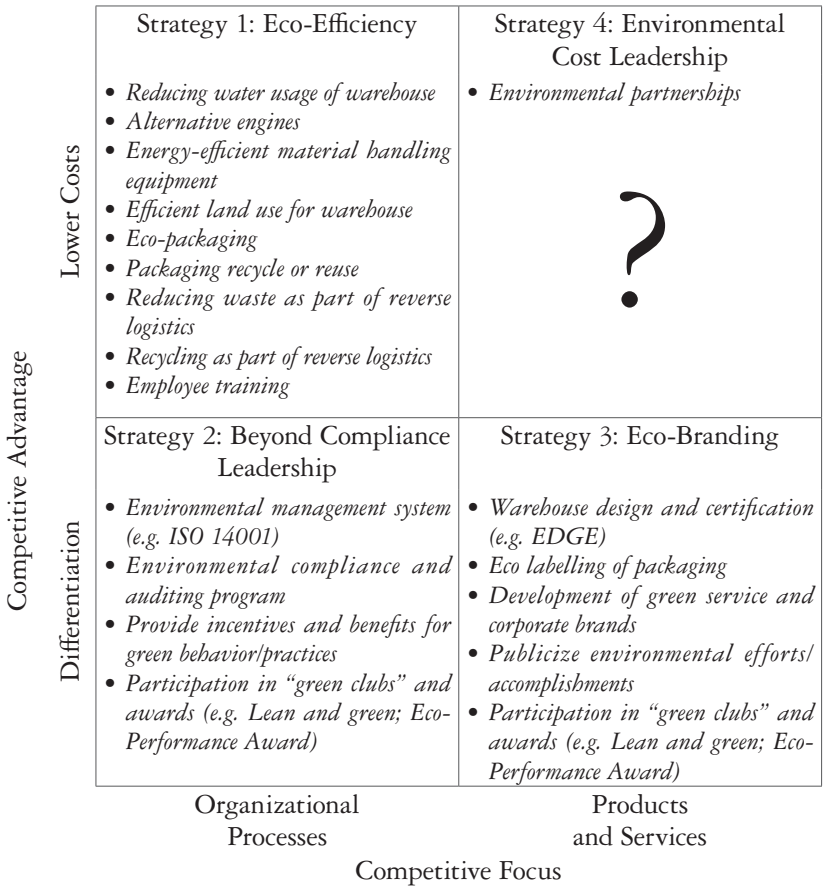

Fig. 2 – Environmental strategies for AWPs.

Due to the fierce competition in the logistics service industry, price is still one of the most frequently used selection criteria for LSPs (Wolf and Seuring, 2010; Evangelista *et al.*, 2018; Aguezzoul, 2019) and thus assuming that buyers of AW would not pay a price premium for environmental practices (Rossi *et al.*, 2013), an environmental strategy based on lower costs holds great potential for AWPs in terms of competitive advantages. This assumption has been partly confirmed by the study of Laguir *et al.* (2021), who found out that eco-efficiency orientation through several environmental practices has a positive influence on environmental

performance and thus on economic performance. To achieve these cost advantages and thus pursue an eco-efficiency strategy, the AWPs can implement various practices regarding warehousing, packing management, reverse logistics, internal management and collaborations. First of all, in the planning stages of a new warehouse, attention can be paid to efficient land use, which would reduce the construction costs of the warehouse and the extent of soil sealing at the same time (Wagner, 2010; Large *et al.*, 2013; Evangelista *et al.*, 2017).

For the design of the warehouse, AWPs can use energy-efficient heating and lighting systems as well as power-saving material handling equipment (Murphy and Poist, 2000; Jumadi and Zailani, 2010; Colicchia *et al.*, 2013; El Baz and Laguir, 2017). In addition, the warehouse can be operated with alternative energy sources such as solar panels to reduce CO_2 emission and equipped with efficient water systems for water treatment and water usage reduction (Lieb and Lieb, 2010; Colicchia *et al.*, 2013). Main environmental practices for the packing management are the reduction of packing material, the use of eco-friendly packing material and the re-use of materials to reduce waste (Jumadi and Zailani, 2010; Perotti *et al.*, 2012, Laguir *et al.*, 2021). Interestingly, Laguir *et al.* (2021) could not confirm an enhanced economic performance impact of eco-efficiency orientation through the implementation of eco-design and packaging, which might suggest that eco-design and packaging are not suitable for gaining competitive advantages based on cost advantages. Reverse logistics practices focus on the treatment of hazardous materials, the reduction and the recycling of waste (Lieb and Lieb, 2010; Laguir *et al.*, 2021). Furthermore, it is important that employees are trained in recycling, waste reduction processes as well as in controlling energy usage in warehouses in order to optimize cost advantages and environmental sustainability (Lieb and Lieb, 2010).

The eco-efficiency strategy is suitable for AWPs that do not assess sufficient resources to implement radical environmental practices or develop eco-friendly innovations. Therefore, this strategy is pre-destined for small and medium sized AWPs to gain cost advantages (Orsato, 2006). Additionally, some of these practices are supported by government subsidies (Colicchia *et al.*, 2013; El Baz and Laguir, 2017). As Hart and Ahuja (1996) recognize, the strategy based on the exploitation of efficiencies has its limits. This is also true in the case of AWPs. As the

level of efficiency increases, additional efforts such as eco-packaging become increasingly cost-intensive, which contradicts the idea of the eco-efficiency strategy. Therefore, AWPs need to switch to other strategies such as environmental cost leadership or supplement the existing one with beyond compliance leadership or eco-branding strategies.

Despite price still being an important criteria in LSP selection, more and more customers request their providers act sustainably (e.g. Lin and Ho, 2012; Lieb and Lieb, 2010), indicating an interest in more sustainability focused LSPs and a recognition of their ecological efforts (Large *et al.*, 2013). Hence, it can be assumed that differentiation strategies like beyond compliance leadership or eco-branding possess potential even in such price-driven and highly competitive industries. Beyond compliance leadership strategy relies upon significant investments to demonstrate the company's ecological effort to the customers and promote an eco-friendly reputation (Orsato, 2006). For AWPs this typically includes environmental practices, such as the environmental management system certification according to ISO 14001 (El Baz and Laguir, 2017; Evangelista, 2014; Evangelista *et al.*, 2017) or the installation of environmental compliance and auditing programs (Darnall *et al.*, 2009; Lieb and Lieb, 2010; Colicchia *et al.*, 2013).

This can be supported with the publication of corresponding certificates, environmental efforts and accomplishments and with the provision of incentives and benefits for green behavior (Murphy and Poist, 2000; Colicchia *et al.*, 2013). To build environmentally sustainable reputation, AWPs should support specific awards (e.g. Eco-Performance Award; BVL Sustainability Award) or so-called "green clubs" (e.g. Lean and green). Overall, these practices are costly in nature and do not guarantee future cost savings. In fact, cost savings based on these practices are "rather exceptions than the norm" (Orsato, 2006, p. 139). Moreover, this strategy bears the risk that, if an increasing number of AWPs implement environmental practices such as ISO 14001, the differentiation advantage will turn into a standard requirement (Rossi *et al.*, 2013; Orsato, 2009).

As with eco-efficiency strategy, Laguir *et al.* (2021) provides evidence that eco-branding orientation through several environmental practices (distribution and transport; warehousing and green building; reverse logistics) shows a positive influence on environmental performance and thus on economic performance. This result suggests that eco-branding

strategy may also lead to competitive advantages in the AW segment. In contrast to the beyond compliance leadership strategy, the eco-branding strategy requires AWPs to display competences in brand management and green marketing to an even greater extent (Orsato, 2009). Due to the fact that service brands are more often attached to the organization than to an individual product (Berry, 2000), the practices of the eco-branding strategy cannot be clearly assigned to the offered services, instead there are significant overlaps between the eco-branding and beyond compliance strategies.

To achieve a price premium from customers, AWPs can use warehouse designs, which reflect sustainability (e.g. greening of buildings). In addition, warehouse buildings can be certified, for example by EDGE, for their zero-carbon emissions or packaging can be eco-labelled to show that it is based on sustainable resources. Another way to communicate the environmental strategic orientation of the company is to publicize their environmental efforts and accomplishments (Murphy and Poist, 2000; Colicchia *et al.*, 2013), either on websites or on social media (Serbetcioglu and Göçer, 2020). For example, Kühne and Nagel present such efforts in a marketing-effective way as their "Net Zero Carbon-Program". Similar to DHL and La Poste, which compete in the consumer market with their corporate brand logos "go green" and "EcolOgic", AWPs could also expand their marketing efforts into developing such corporate logos, which in turn could help to promote a green image and implement a green corporate brand.

This is a general problem, as LSPs do not prioritize strategic marketing, especially building corporate brands, despite their awareness that marketing could be an important element in such a competitive industry (Davis *et al.*, 2008). A significant number of LSPs, especially mid-sized enterprises, still bear the names of their founders. Consequently, these company names are not necessarily appropriate for the purpose of building strong corporate brands. At the service level, green brands are also rare. For example, Fiege Logistik offer their recycling practices bundled and labeled as "Waste Control" service, suggesting a stronger association to sustainability. Due to the lack of similarity and diffusion of green service and corporate brands in the AW segment, this kind of differentiation strategy offers the opportunity of gaining competitive advantages. Since the implementation of the eco-branding strategies

requires significant resources and time, well established green brands cannot easily be imitated by competitors (Orsato, 2009).

The combination of the lowest costs and the lowest environmental impact represents the strategy of environmental cost leadership and "certainly a tough call for most" (Orsato, 2009, p. 121). So, how can AWPs achieve environmental cost leadership? The literature on environmental practices gives little indication on this question. Nevertheless, one practice could be identified which has the potential to implement an environmental cost leadership for AWPs: environmental partnerships. As Lieb and Lieb (2010) and Colicchia *et al.* (2013) suggest, these collaborations provide knowledge, data access, experience and network effects in order to reduce costs and environmental impact. For example, cooperation programs can be used to recycle and reuse materials along the supply chain or a measurement approach can be developed to control and adjust the CO_2 emissions generated by suppliers, customers and the focal AWP (Colicchia *et al.*, 2013).

This is also in line with Orsato's (2009) recommendation that a sustainability strategy based on cost leadership needs to go beyond competition with systemic changes in infrastructure and collaborations among several players, such as competitors, suppliers or customers. Following this approach, substantial costs can be reduced, and unique competitive advantages can be generated, which in the future might also enable them to move to new market spaces (Orsato, 2009). Moreover, such environmental partnerships make it possible to shape public policy through collective power (Lieb and Lieb, 2010). However, it is still underdetermined how environmental cost leadership strategy of AWPs can be implemented in detail as the possibilities in this logistics service industry segment are limited by given structures, routines and strong cost orientation.

CONCLUSIONS AND IMPLICATIONS

This study is a response to the calls of Centobelli *et al.* (2017a) as well as Isaksson and Huge-Brodin (2013) to give LSP managers an

environmental strategy roadmap. Previous literature has primarily focused on the identification and classification of environmental practices based on logistics functions. Little emphasis was placed on the intention of showing how LSPs could gain competitive advantages and how they could position themselves in the logistics industry in general, and specifically within their respective segments (Colicchia *et al.*, 2013; El Baz and Laguir, 2017). Using the example of advanced warehousing this paper categorizes various environmental practices based on the competitive environmental strategy framework suggested by Orsato (2006). In doing so, we strove to derive practical implications for managers. There are various environmental practices and managers seem to do a "little bit of everything" (Orsato, 2006, p. 140). However, in order to be able to build up competitive advantages in the long term, it is necessary for managers to know which practices are suitable to set up the appropriate environmental strategy in a given industry segment. Therefore, the framework of Orsato (2006) related with the elaborated practices for AWPs is a powerful tool for managers to prioritize their investments and further to develop necessary competencies.

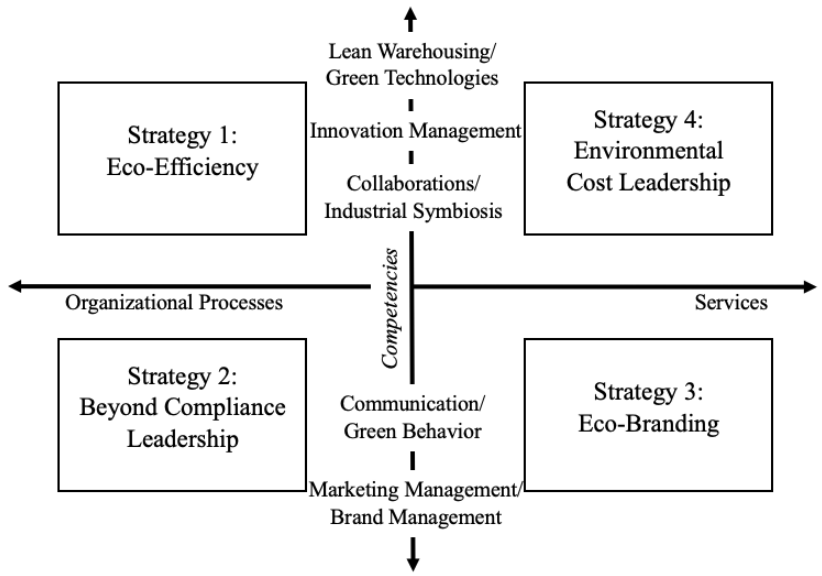

FIG. 3 – Competencies for the implementation of environmental strategies.

As Figure 3 shows, the two environmental strategies that are based on lower costs (Strategy 1 and Strategy 4) require managers to build up competencies in lean warehousing, innovation management and collaboration. Especially in the case of an environmental cost leadership strategy, AWP managers should encourage partnerships (Pieters *et al.*, 2012; Rossi, *et al.*, 2013; El Baz and Laguir, 2017) and align their perception of environmental issues with subcontractors, customers, competitors (Evangelista, 2014), and even across industries (Orsato, 2009). In contrast, the two differentiation-based environmental strategies (Strategy 2 and Strategy 3) require managers to develop and exercise more interdisciplinary competencies in marketing management, brand management and thus also in communication and green behavior (Orsato, 2009).

During the analysis, we observed that most AWPs still implement an eco-efficiency strategy. However, we suggest that in addition to this frequently used strategy, other strategies that are not based on cost reduction exclusively, may also lead to competitive advantages. For this reason, managers should reconsider their strong price orientation, because as buyers of AW services become more sensitive to sustainability issues, AWPs with a unique green image become more attractive, even as a part of a supply chain. This also applies to managers of small and medium-sized AWPs.

Considering the fact that the boundaries of the four strategies are blurred, it becomes obvious that an unambiguous and comprehensible classification of the environmental practices is difficult. Therefore, this matter is a serious limitation of the present study. The classification also creates the impression that when choosing a strategy, managers should exclusively focus on the practices assigned to the particular strategy. This assumption is correct insofar as it represents their primary goal, however, it should not contradict the idea of implementing individual practices of the other strategies. A combination or supplementation of environmental practices which is target-oriented and in line with their overall business strategy might be useful under certain conditions. Such possible coherences between the environmental strategies have not been considered in this conceptual paper. Moreover, this study analyzed the AW segment exemplary for the logistics service industry.

Further segments need to be analyzed as both the environmental practices and the implementation of the environmental strategies vary

with the structure of the logistics service industry segments among other variables (Orsato, 2006, 2009). For example, it would be stimulating to examine the strategies in the segments of parcel services or FTL transportation. With parcel services, the end consumers as customer, as well as the so-called "last mile", would have major influences on the choice of the environmental strategy and the related practices. This has already been outlined by the companies DHL and La Poste as part of the eco-branding strategy discussion. It can be suggested that these companies are ahead regarding the implementation of eco-branding and cost leadership strategies due to the strong sustainability sensitivity of their customers and related with it their "need to demonstrate their credentials of good citizenship" (Orsato, 2009, p. 65). This coincides with our observations that differentiation has already established itself as a real alternative to the widespread eco-efficiency strategy for LSPs operating in the parcel service segment. In addition, the "last mile problem" could bear eco-innovations and environmental practices that can enable the implementation of a cost leadership strategy (e.g. drones, packing stations). Future research could also extend and verify our results by using case studies. Furthermore, the performance of each strategy should be examined with the help of surveys to verify whether each of the four strategies actually could lead to competitive advantages in the logistics service industry. Based on that, a comparison of the industry segments as well as an examination of cultural differences via a cross-country study is promising.

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