



HAL
open science

A conceptual framework to understand retailers' logistics and transport organization-illustrated for groceries' goods movements in France and Germany

Corinne Blanquart, Saskia Seidel, Barbara Lenz

► To cite this version:

Corinne Blanquart, Saskia Seidel, Barbara Lenz. A conceptual framework to understand retailers' logistics and transport organization-illustrated for groceries' goods movements in France and Germany. 93rd Annual Meeting Transportation Research Board - TRB, Jan 2014, France. 16p. hal-00985969

HAL Id: hal-00985969

<https://hal.science/hal-00985969>

Submitted on 30 Apr 2014

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

1 **A conceptual framework to understand retailers' logistics**
2 **and transport organization – illustrated for groceries' goods**
3 **movements in France and Germany**
4
5

6
7
8 Corinne Blanquart¹, Saskia Seidel^{2*}, Barbara Lenz³
9 * Corresponding author
10

11
12 1 IFSTTAR,
13 Production Systems, logistics, Transport Organisation and Work - SPLOTT
14 20 Rue Élisée Reclus – BP 70317 – 59666 Villeneuve D'Ascq cedex - France
15 Phone: + 33 (0)3-20-43-83-54, Fax: + 33 (0)3-20-43-83-59
16 Corinne.Blanquart@ifsttar.fr
17

18 2 German Aerospace Center (DLR), Institute of Transport Research
19 Rutherfordstr. 2, 12489 Berlin, Germany
20 Phone: + 49 (0)30-67055-288 Fax: + 49 (0)30-67055-283
21 Saskia.Seidel@dlr.de
22

23 3 German Aerospace Center (DLR), Institute of Transport Research
24 Rutherfordstr. 2, 12489 Berlin, Germany
25 Phone: + 49 (0)30-67055-453 Fax: + 49 (0)30-67055-283
26 Barbara.Lenz@dlr.de
27

28
29
30
31
32
33
34
35
36
37
38
39
40 Submitted: 1st Aug 2013
41 Word count: 5,776
42 Tables and figures: 6 (=1,500 words)

43
44 93th Annual Meeting of the Transportation Research Board
45

46 **Abstract**

47 The article proposes a conceptual framework for analyzing the key drivers for retailers' transport
48 demand more systematically. Certainly, a better understanding of the reasons behind the growth in
49 transport demand is crucial in formulating effective measures to manage and reduce emissions. Regarding
50 to retailer-led supply chains, analyzing the retailers' transport demand and its key drivers seems to be
51 indispensable. This issue is even more important on an urban scale as retailers, through in-house or
52 outsourced logistics deliveries to points of sale, have a high share of urban freight transport.

53 The authors' main assumption is that transport strategies are embedded, both internally
54 with other non-transport strategies and also externally with the company's environment. A
55 classification of the environment in three layers is suggested:

- 56 • The macro-environment, which is linked to the competitive and regulatory
57 framework of the retail industry. Furthermore, the consumption patterns of
58 consumers are essential for the retailers within this layer.
- 59 • The meso environment refers to the retailer's sectorial dynamic. It includes
60 aspects such as the vertical integration of the distribution of the wholesale stage
61 or new relationships with the suppliers e.g. through the development of own-
62 brand products
- 63 • The micro environment is related to the strategy of the individual retailer and
64 encompasses economic strategies (type of retail format, marketing area, size of
65 the retail area etc.).

66 Furthermore, the paper illustrates the chains of interdependencies between the different
67 layers of environment and their consequences for the logistics and transport organization, using
68 the example of food retailers in France and Germany.

69 *Key words: food retail, retail strategy, logistics and transport*

70 **Introduction**

71 Transport-related emissions, especially of freight transportation, play an important role in the discussion
72 about climate change. CO₂ emissions are increasing faster in freight transport than in other sectors, so that
73 a strong need to reverse this trend is broadly acknowledged. Relevant effects may arise on different sides:
74 The OECD concluded that some 40 percent of the effort necessary to meet the criteria for
75 environmentally sustainable transport will come from technology and around 60 percent from demand-
76 side management (1). Consequently, much of current transport and environment policy aimed at
77 achieving environmentally sustainable transport will require demand-side rather than supply-side
78 measures (2).

79 Indeed, even if it is assumed that the main cause of increased emissions is the growth in transport demand
80 (3), the vast majority of actions to reduce the carbon footprint of the transport sector have been taken
81 within the transport sector itself, e.g. expansion of transport infrastructure or technical improvements.
82 These approaches are important but ignore the key drivers which create the demand for transport. To
83 achieve a sustainable transport system and to initiate effective measures, an understanding of transport
84 demand is first required (4). This understanding could be helpful to deploy a broader range of instruments
85 to reach the goal of sustainable transport.

86 Any attempt to understanding what drives transport has to take into account the way firms
87 organize their operations, the location of both production and distribution facilities, the sourcing of inputs
88 and the serving of markets. However, detailed knowledge on the decisions made concerning the
89 movement of consignments in the context of production does not exist (5). Following Rodrigue and Hesse
90 (6), the fundamental question does not necessarily reside in the nature, origins and destinations of freight
91 movements, but how and why this freight is moving.

92 Among these changes affecting transport demand, many studies put the emphasis on the changes
93 from a supplier to a retail-controlled supply chain (4, 7). Other studies underline that particular transport
94 growth occurs on an urban scale; the urban goods movements are the result of a set of choices made by
95 customers, retailers, wholesalers, carriers and local authorities (5). Allen *et al.* (8) have pointed out that
96 the demand for urban freight transport activity is derived from the demand for goods flows produced or
97 consumed in urban areas. Another substantial body of research addresses the dilemma of environmental
98 impacts and efficiency of urban freight transport, focusing on urban deliveries and retail logistics (e.g. 9,
99 10, 11).

100 Yet very little is known about retailers' transport demand and its key drivers. Based on the
101 question of how the influencing factors of retailers' transport demand can be systematically grasped, the
102 authors aim to provide a conceptual framework which allows analyzing systematically the key drivers for
103 the retailer's transport demand. Subsequently, an illustration of these key drivers for the food retailers in
104 France and Germany is shown. As a conclusion, a scheme is presented demonstrating the general
105 interactions between logistics and transport factors and the drivers that have been identified. Furthermore,
106 a summary of the results highlights the dedicated links between specific factors. This can be the basis for
107 a discussion on the policy instruments to tackle the problems of climate change and the environment
108 beyond the transport sector.

109 **A conceptual framework to capture the complexity of** 110 **influencing factors of retailers' transport demand**

111 Freight transport demand may be understood as derived demand, resulting, however, from complex
112 structures and processes. Transport activities are concomitantly planned with activities occurring at the
113 origin, destination, and also at all intermediate stages to the extent that production, consumption and
114 freight distribution are jointly considered and integrated transport demand is progressively replacing the
115 traditional derived transport demand (12). Many researchers feel that it is more important to understand
116 the system in which the company operates and the factors that determine its action. This question requires
117 an understanding of what behavior is based on.

118 "What do we see upstream from the behavior of individuals? How do we see the formation of
119 societal effects, and in particular collective objects, from the latter? The first question asks for the
120 rationality of behavior: do we see rationality at the origin of behavior and if so, how do we conceive it?
121 The second question asks for the perspective of a holistic view whereby societal wholes are not merely
122 the sum of individual actions" (13). The main benefit of theories that address the origins of decisions is to
123 adopt a conception of transport strategies as embedded, both internally with other strategies and also
124 externally with the company's environment. Several conditions must be met for a strategy to be viable. It
125 must be possible for the company to implement the strategy (internal requirement). But this strategy must
126 also be coherent (external coherence) and compatible with the macroeconomic context. While the
127 company interacts with its national context, it also develops particular relations with its own sector. The

128 idea is to consider not only the macroeconomic influence on company strategy, but also that of the sector
129 (14).

130 The authors followed this framework to classify the key drivers of retailers' transport and
131 logistics strategies. In the following, first the retailers' transport and logistics strategies are described
132 before presenting their key drivers which were differentiated between three categories which at the same
133 time represent macro, meso and micro levels of key drivers (4). The result is a theoretical scheme and a
134 conceptual framework about the decision-making process for retailers' transport and logistics strategies.
135 Subsequently, the scheme will be tested and applied to the food retail sector in France and Germany.

136 ***Grasping retailers' transport characteristics***

137 The transport organization of a company is always prejudiced by logistics decisions aiming "to move
138 product efficiency along the supply chain" (15). The characteristics of retailers' transport are conditioned
139 by the organization of its transport and logistics, which differ from company to company. The
140 characterization of transport and logistics organization can be described by taking different indicators
141 related to three possible dimensions: the physical transport operations (transport features), the physical
142 activities and the material and immaterial assets:

- 143 • Physical transport operations become more and more integrated into complex logistics systems.
144 Beyond transport operations, strictly speaking, transport firms also deliver various services of
145 management of flows, input to (and sometimes also management of) information systems, co-
146 packing, co-manufacturing etc. Freight transport operations have become more and more
147 complex and differentiated over the past 30 years. Beyond shipping and handling goods, they
148 often include operations such as the treatment of information flows, the differentiation of goods
149 for the final customer etc. The conceptual representation of freight transport exclusively in terms
150 of flows of goods thus becomes less relevant to the realities of the freight transport sector. That is
151 why the description of the logistics services has to be associated with the transport indicators (16,
152 17, 18).
- 153 • Logistics and transport services can also be described in terms of physical activities (e.g.
154 transport, storage) as well as non-physical activities, related to the organization modalities of
155 these physical activities (e.g. supply chain design, selection of contractors, freightage
156 negotiations) (19).
- 157 • These logistics and transport activities rely on material and immaterial assets: the transport fleet,
158 the development of retailers' regional distribution centers (centralization or decentralization of
159 the warehousing), or the use of information technology systems (e.g. EDI, EPoS (20)). Fernie and
160 Sparks (21) identify these assets as key components for retailers' logistics and transport
161 strategies. For example, retailers manage warehouses or distribution centers to enable them to
162 keep stock in anticipation of or to react to sudden changes in the demand for products. Retailers
163 have also become increasingly concerned with being able to capture data at appropriate points in
164 the system and to use that information to have a more efficient and effective logistics operation
165 (21).

166 Several indicators can be assigned to these dimensions for logistics and transport strategies. Among these,
167 it is possible to classify influencing factors found on the micro, meso and macroeconomic levels, which

168 are not directly related to transport. Rather, the organization of transport is derived from these non-
169 transport-related factors (4).

170 ***The non-transport-related drivers***

171 It is possible to distinguish the retailers' logistics and transport environment on three different levels
172 (macro, meso and micro) which are primarily economic but include spatial elements. The differentiation
173 follows approaches, among others, of Boyer and Freyssenet (21), Freyssenet (22), Dopfer et al (23) as
174 well as Jullien and Smith (24):

175 *The macro-economic factors* are related to the competitive framework and represent retailers'
176 upstream influences. So, for instance, demands of new social and regulatory requirements on the one hand
177 and consumer concerns over ethical sourcing and environmental issues on the other may drive a need for
178 proactive management by the retailer on all aspects of product "traceability". The macro level represents
179 only company external factors.

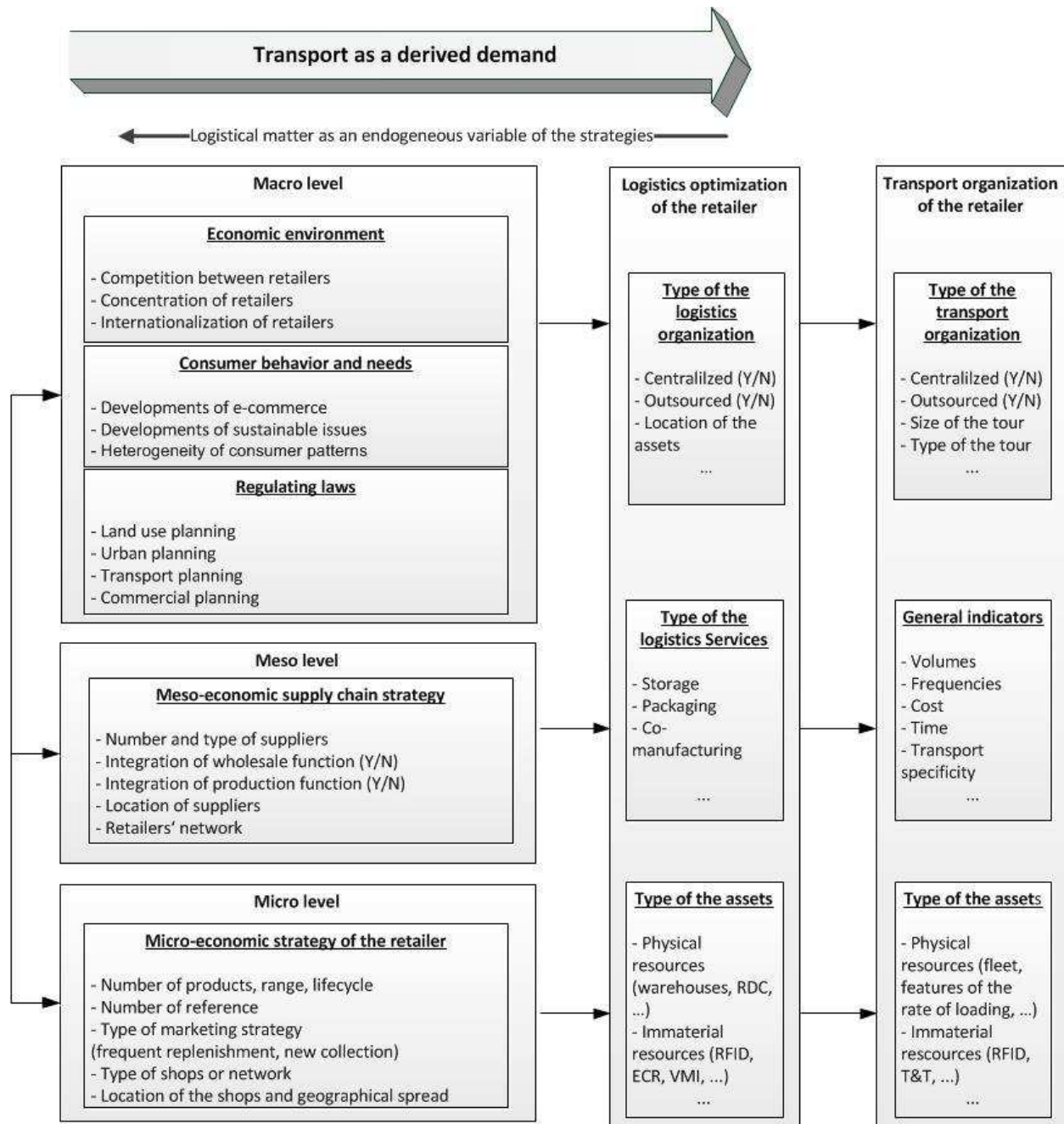
180 Following Jullien and Smith (24), factors of *meso-economic strategies* refer to the sectorial
181 dynamics around relationships with four principle partners: clients, suppliers, investors and employees.
182 From the retailers' point of view, the relationships with the wholesale stage are also important to consider.
183 The development that retailers are further pushing for control to even earlier stages within the supply
184 chain to break down all cost components also plays a role here. Taking on the procurement and seeking
185 visibility of product costs help to drive down costs and leverage component parts across products.

186 As far as *micro driving factors* are concerned, the French regulation theories have focused on the
187 identification of profit strategies of companies (21, 22). The respective analytical framework identifies six
188 fundamental sources of profit: volume, quality, diversity, flexibility, innovation, and constant cost
189 reduction. The possibility to implement the strategy can be analyzed along three major components:
190 product policies, production organization, and employee relations.

191 For trade-related transportation, these sources of profit and internal requirements raise the
192 following main questions:

- 193 1. Which products are sold?
- 194 2. Which marketing strategy is used? How is the product offer kept fresh and attractive to ever
195 more discerning customers?
- 196 3. Which type of shops or network of shops is chosen? Which are the trading formats?

197 The operationalization of this socially embedded conception of logistics and transport strategies is
198 described with the below scheme shown (Figure 1) which provides a representation of the complexity of
199 the decision-making process for the retailers, as far as transportation is concerned.



200

201

FIGURE 1 System for the decision-making process in retail

202

To test the applicability of the concept, the authors conducted a study for the food retail sector in France and Germany. This study was based on a literature survey and qualitative interviews and examined the interdependencies between the strategies on different levels, and the impact on logistics and transport organization. It was expected that both convergences and divergences between the two countries could be observed depending on the power of the different factors.

203

204

205

206

207 **Methodology**

208 Food retail is difficult to assess because it is not captured in a specific statistical category. All in all food
 209 retail refers to four statistical categories: “retail trade in non-specialized stores”, “retail trade in
 210 specialized stores”, “retail trade not in stores via stalls and markets“ and “other retail trade not in stores”.
 211 Looking at “retail trade in non-specialized stores” in Germany around 91 percent of the turnover concerns
 212 “retail with food predominating”; for France even 96 percent can be recorded. Retail trade of food,
 213 beverages and tobacco represents nearly 50 percent of the turnover of the total retail trade in France and
 214 Germany: 47 percent for France and 42 percent for Germany in 2010 (25). In 2008, some 20 percent of all
 215 retail companies were associated with food retail (22 percent for Germany, 19 percent for France).

216 In order to derive information about the logistics and transport strategies of food retailers and
 217 their links to the economic environment on different levels, about 56 interviews were conducted with
 218 different actors in the supply chain (see Table 1). The interviews, conducted in France and Germany,
 219 were held in the period from January to April 2012. The questions were related to the following topics:
 220 gaining knowledge about the interviewed company, their (choice of) geographical locations, their relation
 221 to other supply chain actors, their overall activities, their assortments, and their used physical assets.

222 The interviews held face-to-face and via telephone were based on a guideline which was sent out
 223 to the interviewees before. With the interviews, the full range of food retail formats i.e. hypermarkets,
 224 supermarkets, discounters and others were covered.

	Supplier	Wholesaler	Retailer	Service providers
France	3	4	15	8
Germany	5	6	7	8

225 **TABLE 1 Conducted qualitative interviews with food actors in France and Germany**

226 In the following selected findings from the interviews and literature review are presented according to the
 227 concept outlined above.

228 ***The macro environment of food retailers***

229 The micro and meso environment of retailers is often impacted by public policies. Consumption patterns
 230 play another big role. Through the conducted interviews, we found that consumption patterns influence
 231 not only the products offered at the point of sale, but also have an influence on the chosen suppliers. One
 232 example is the increasing demand for regional products: changing the assortment towards more regional
 233 products often results in a stronger involvement of regional suppliers. Dawson (26) suggests that
 234 “changes in consumption are related to long term changes in income and price elasticity and short term
 235 advertising campaigns, but there are also broad shifts in demand which represent changing social attitudes
 236 to products.” Assortment or product adoptions frequently result in changing network structures and
 237 consequently also the retailers’ transport and logistics organization. Changing consumer needs and trends
 238 can also be related to changes in population, such as demographic change.

239 Looking at the role of regulation which directly impacts the retailers’ macro environment, one of
 240 the most important aspects are rules for land use: In Germany, in most urban areas, excluding central and
 241 special areas, shops are limited to a maximum area of 1,200m², i.e. a maximum sales area of 800m². All
 242 food retailers who strive for bigger sales areas must prove that this will not have negative effects on

243 central shopping areas (§ 11 Abs. 3 BauNVO). As discounters' sales areas normally fall below this, they
244 are favored by this law. Legislation in France limited the number of new hypermarket and supermarket
245 openings in 2006 which prompted large stores to expand existing surface area. Complaints that this new
246 measure benefitted existing hyper-/supermarkets resulted in a modification in July 2008, included in the
247 "Loi de modernization de l'économie" (LME), which allowed the opening of new stores under 1,000m².

248 ***The meso-economic environment of food retailers***

249 The retailers' integration of the wholesale stage and new relationships with suppliers through the
250 development of own-brand products are the two most important characteristics of the meso environment
251 of food retailers. This is linked to the retail format and the development of big retail groups and has an
252 influence on the procurement volumes and the type of logistics organization through distribution centers.

253 Two main trends can be observed in the food retail in France and Germany: the change to
254 retailer-led supply chains and the integration of the procurement and wholesale stage by the big retailers.
255 Cost reductions are achieved by eliminating the role of the traditional wholesaler through direct supply
256 from primary producers and manufacturers to regional distribution centers (RDCs), and then on to
257 superstores. Only for fruits and vegetables do traditional wholesalers still have an important position.
258 Another cost saving strategy, of discounters in particular, is cutting down storage time through just-in-
259 time delivery from the distribution centers to the points of sale for almost all products.

260 On the other hand, the bargaining power of retailers is increasing due to the merging of retailers
261 to retail affiliations, consolidations at international level and the growing importance of private or store
262 labels. In most of the mature EU15 retail markets, the eight biggest companies accounted for between 50
263 and 80 percent of the national grocery retail market in 2007. Procurement costs are reduced by extracting
264 more favorable terms from suppliers. This is supported by the emergence of retailer-owned brands
265 oriented towards the lower price segment. In France, for instance, the "private label" sales reached 31
266 percent of all food product retail sales in 2008. Added to this is the increased production of meat and
267 sausage by the retailers themselves and the direct delivery from the production site to the point of sale so
268 that we find an entire process chain. The interviews showed that meat production locations may function
269 as a distribution center for other products, too, in particular for convenience foods like prepared salads or
270 sushi.

271 ***Micro-economic strategy of food retailers***

272 Strategies concerning the retail format, the sales area and the marketing policy are the most important
273 ones for food retailers. But there are differences between France and Germany that lead to variation in the
274 volume and frequency of deliveries in particular.

275 In the grocery sector, two new formats were developed in both countries. One was the
276 hypermarket (e.g. Auchan) in France, the other was the grocery (hard) discounter (e.g. Aldi) in Germany
277 (27). Hard discounters traditionally offer a range of 600 to 700 products, with a high share of own brands,
278 at low price and ultra-low margins. The market concentration reinforces the domination of these two
279 formats (28); discounters had about 16,200 points of sales and a market share of 35 percent in Germany in
280 2011 (29). But in both countries, we observe a saturation of the markets for these traditional formats. This
281 situation leads to market adaption: hard discounters widen their assortment by selected brand products.
282 Other retailers use the strategy of market segmentation by introducing store types that are mainly
283 differentiated by size, assortment and price segment (see table 2).

284 **TABLE 2 Examples for retailers' market segmentation**

Example for France	Example for Germany
Carrefour (selected company type)	Rewe (selected company type)
Carrefour (large scale supermarket up to 20,000m ²)	Rewe (full range supermarket)
Champion (full range, >1000m ²)	Rewe Center (full range, big department store)
8 à Huit (fresh food, convenience, small scale 70-400m ²)	Rewe CITY (full range supermarket up to 1000m ² in cities and at airports <1000m ²)
Dia (hard discount, 500-800m ²)	Nahkauf (shop around the corner, small scale)
	Rewe to go (focused on convenience)
	Penny (discounter)

285 These formats influence the retailers' marketing policies. Hypermarkets develop a "services" policy
 286 whereas discounters focus on a margin policy. The high sales volumes and low store and personnel costs
 287 which discounters generated through a limited range of assortment and minimal store fittings allowed for
 288 low trade margins. With average profits reaching only 0.8 percent of sales in West Germany – down from
 289 3.4 percent in 1970 – and 0.5 percent in the poorer Eastern part of the country, Germany's retail industry
 290 is probably the least profitable of the whole industrialized world (30). Returns are particularly meager in
 291 the food segment – at 0.5 percent of turnover, compared to 5 percent in the UK and 3.5 percent in France.

292 Another typical difference between the two countries is the fact that the average sales area per
 293 supermarket is smaller in Germany than in France. As the interviews indicated, this is closely related to
 294 the different format of the stores. The surface for food sales per inhabitant, however, is 0.47m² in
 295 Germany and only 0.37m² in France. Further investigation is needed to understand the reason behind this
 296 difference.

297 Summarizing our observations we find interactions between the micro-economic framework of
 298 retailers' strategies and their environment. The macro environment, above all public policy, has an impact
 299 on the retail format and on the relationships with the suppliers. However, the unbalanced structure of the
 300 distributive supply chains also explains the genesis of this last, public form of regulation. The meso
 301 environment is closely linked to the retail format and retailers' marketing policy. All these elements and
 302 interdependencies have consequences for the logistics and transport organization of retailers.

303 **Consequences on the logistics and transport organization of** 304 **food retailers in France and Germany**

305 In the following, the logistics consequences of environmental structures will be described and their
 306 impacts on transport discussed.

307 ***Logistics consequences***

308 Logistics plays a fundamental role in supporting retail companies in rationalizing their distribution
 309 infrastructure and making more efficient use of their resources. Consequently, logistics has emerged as a
 310 key business operation to enhance a company's competitive advantage via improved customer service and
 311 lower costs (31).

312 The changes of the environment on the meso level are closely linked to the development of
 313 central sourcing through buying offices and to the emergence of large distribution centers. Control of the
 314 supply chain has passed to the large supermarkets and hypermarkets. This development has led to a

315 restructuring of the procurement systems of supermarkets, based on central sourcing. Supermarket chains
316 have been shifting away from the old procurement model based on sourcing products from the traditional
317 wholesale markets, toward the use of new procurement systems (32).

318 In France, mergers and alliances among major hypermarkets and supermarkets have aligned the
319 country's five largest retailers with seven central buying offices. These buying offices usually also
320 undertake tasks like sourcing products, handling import and customs formalities, logistics, supply,
321 maintenance, delivering and sometimes pricing and labeling for their retail customers. Only a few major
322 food retailers buy directly. In Germany each leading retail group has a different business structure,
323 purchasing, and distribution system. The purchasing departments for the large retailers are often divided
324 by retail format and, sometimes, by region of the country. Buying associations or groups also play an
325 important role in German retailing. They are often operated by a wholesale company which does the
326 purchasing and marketing, and provides other services for independent retailers (30).

327 Another important change is centralized procurement through Distribution Centers (DCs). As a
328 result the number and size of wholesalers' warehouses is in decline, which also leads to a consolidation of
329 stocks at a reduced number of very large regional DCs, controlled by the retailers but often operated by a
330 Third Party Logistics Manager (33). These distribution centers are mostly located along motorway
331 corridors. At the same time changes in logistics practices are favoring the development of distribution
332 centers based on cross-docking, with only small amounts of warehousing (33). Following Lamey (34), it
333 seems that the centralization of retail logistics operations at European level has reduced transport,
334 warehousing and inventory costs by an estimated 40-50 percent overall. At the beginning, the
335 implementation of centralized deliveries aimed at three dimensions: reduced costs, improved customer
336 service and faster reactivity to changes in demand. Under the pressure of increasingly demanding and
337 volatile consumers, the large French food retailers especially ended up favoring the last two dimensions
338 (35). The extent to which food retailers reorganize their distribution networks by rationalizing the number
339 of distribution centers and establishing composite warehouses (i.e. large warehouses that hold more than
340 one product category) tends to depend on the number and type of the retail outlets operated.

341 The interviews showed that differences in retail logistics organization are closely linked to the
342 retail format. For example, logistical costs for hypermarkets and supermarkets increased throughout the
343 1990s, particularly with an improvement in delivery systems to reduce the number of stock outs in outlet.
344 This also resulted in a greater product variety (36, 37). Currently, the main problem of large French food
345 retailers is that they manage several retail formats, unlike the two German hard discounters Lidl and Aldi,
346 who manage a single retail format. But separation in terms of logistical choices can also be observed in
347 Germany, as discounters and full range assortment warehouses have different requirements. Rewe Group,
348 which owns the discounter Penny and Rewe supermarket, separated their logistics organization and
349 warehousing in 2012 to optimize their processes according to the different requirements of the
350 organizations.

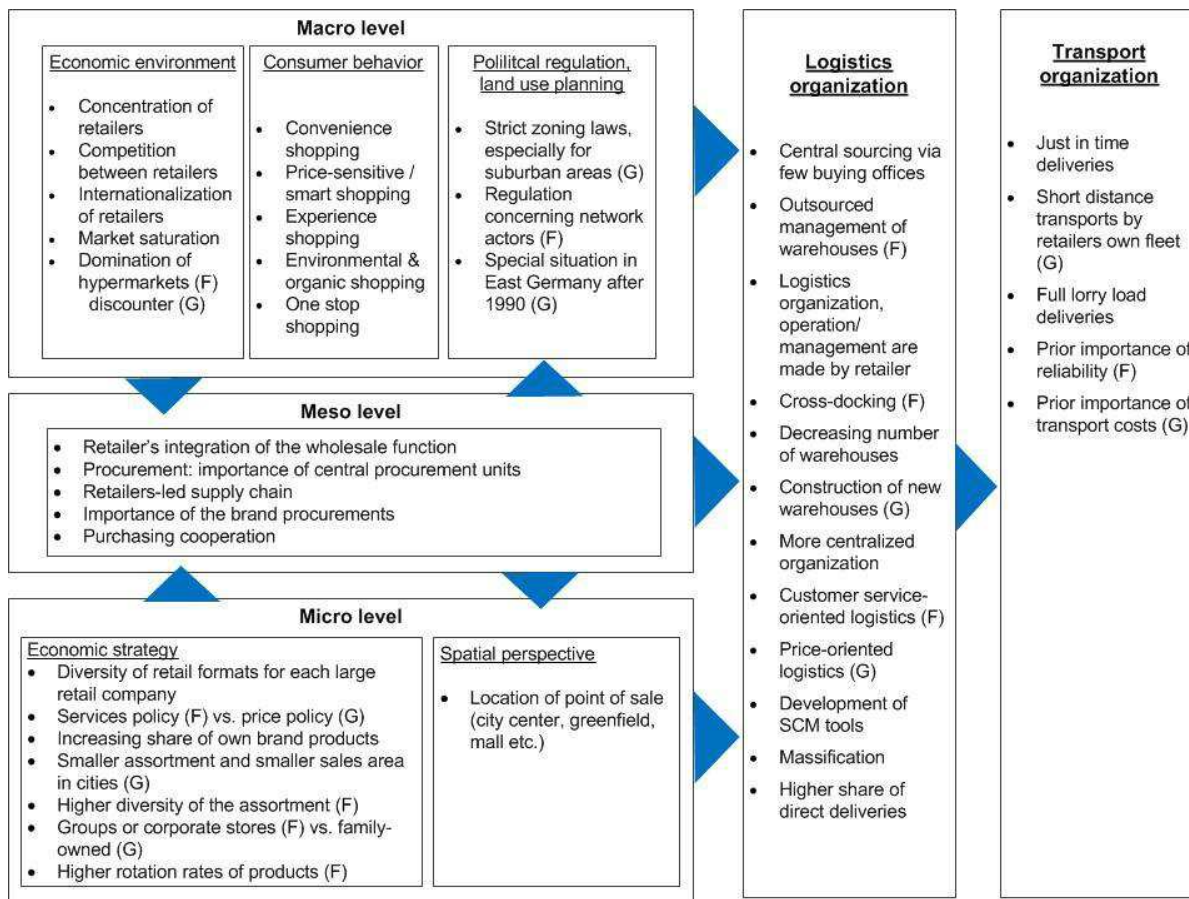
351 ***Transport consequences***

352 Most products have to be transported in some way between production and consumption. Retailers
353 therefore have to manage a transport operation that might involve different forms of transport, different
354 sizes of containers and vehicles and the scheduling of drivers and vehicles (38). Looking at inbound
355 transportation, retail distribution remains a significant contributor to road congestion and infrastructure
356 costs. Our interviews confirmed that attempts to shift retail transport from road to rail have mostly been
357 unsuccessful (33). The main recorded changes in transportation tackle the outbound. There are smaller,

358 more frequent deliveries to stores, combined with longer shop opening hours, which is increasing vehicle
 359 movements faster than retail turnover. The extensive use of IT enables an optimization of the delivery
 360 patterns. Carrefour, for example, went from about 80 trucks per day delivering from 2,500 suppliers, to
 361 their RDCs and hypermarkets currently each receiving deliveries from ten trucks per day.

362 Usually changes in logistics structures affect transportation, as when stock holding is centralized
 363 into fewer, larger distribution centers. Transport distance increases and place higher demands on transport
 364 in terms of delivery reliability. Since the cost of transport is often low compared to the cost of storage and
 365 stockholding, a more centralized DC strategy has generally resulted in cost savings for retailers (37).

366 The results of the interviews and the literature demonstrate the complexity of the decision-making
 367 process for the retailers as far as transportation is concerned. Transferred to our general scheme the
 368 following figure can be drawn (Fig.2):



369 **FIGURE 2 Findings for food retail in France and Germany, based on “decision-making concept”**

370 ***Synthesis and conclusions***

371 Our findings show that the organization of logistics and transport in food retail is influenced by various
 372 framework conditions that can be allocated to different levels of its environment: the micro, meso, and
 373 macro. Furthermore, the interview results allowed the derivation of specific indicators that have an
 374 influence on retailers' transport and logistics organization, taking for example the days of storage which
 375 are strongly influenced by the type of product and the type of format of the retailer. Differences in the
 376 interviewed companies' logistics organizational structure could be mainly ascribed to the retail format

377 (supermarket, hypermarket, discounter, hard discounter), the range of assortment and the type of products
 378 offered at the point of sale. Retailers' spatial warehousing policy and the type of logistics services used
 379 depends on whether they belong to a group or affiliation as well as their type of retail format. Looking at
 380 transport operations, the type of retail format and the offered type of products are among the main
 381 influencing drivers. The point of sale itself has the most important influence: the location within the town
 382 or city, the geographical distribution as well as the distance to the DC/RDC determine the nature of the
 383 transport. The identified indicators of logistics and transport, and the factors which have the strongest
 384 influence on them are summarized in tables 3 and 4:

385 **TABLE 3 Indicators of logistics**

Indicators of logistics and their key drivers

Days of storage	Type of product Type of retail format
Number of warehouses	Type of product Range of assortment Type of retail format Geographical spread of point of sales Belonging to a group or affiliation
Spatial patterns of the warehousing policy	Geographical distribution of the point of sales Type of retail format Belonging to a group or affiliation
Share of outsourcing	Type of retail format Type of logistics services
Type of logistics services	Retail policy (rotation of the products and costs) Type of retail format
Use of SCM tools	Type of retail format

386 **TABLE 4 Indicators of transport**

Indicators of transport and their key drivers

Frequencies	Type of retail format Location of point of sales
Service performance	Retail policy (assortment priority and rotation of products vs costs)
Deliveries	Type of products/product groups
Outsourcing	Retail size-format Status (group or affiliations) Distance from warehouse to point of sales
Load rate /Load volume	Type of retail format Size of sales area point of sales (Type of truck)
Size of the tour	Type of retail format Size of sales area Location of point of sales Distance to DC/RDC
Transport modes (Inbound)	Type of products Origin of the products Distances from supplier to warehouse
Type of trucks	Type of products
Transport costs	Type of product

387 Overall we could demonstrate how sales related strategies of retailers influence logistics and transport,
 388 and based on our empirical findings for the food retail in Germany and France we were able to allocate
 389 relevant factors and key drivers to our conceptual framework. The results underline that for an

390 understanding of transport (demand) a systemic view that is going beyond logistics and transportation is
391 needed.

392 **Acknowledgment**

393 The authors would like to thank the food industry interview partners who gave the authors a
394 comprehensive insight and overview of their companies every day.

395 **References**

- 396 1. Maibach, M., C. Schreyer, D. Sutter, H.P. van Essen, B.H. Boon, R. Smokers, A. Schrotten, C.
397 Doll, B. Pawlowska, and M. Bak. *Handbook on estimation of external costs in the transport*
398 *sector, Internalisation Measures and Policies for All external Cost of Transport (IMPACT).*
399 Version 1.1, Delft, CE, 2008.
- 400 2. Wiederkehr, P., R. Gilbert, P. Christ, and N. Caid. *Environmentally Sustainable Transport (EST):*
401 *Concept, Goal, and Strategy – The OECD’s EST Project.* EJTIR, 4, no. 1, 2004.
- 402 3. European Environment Agency (EEA). *Beyond transport policy- exploring and managing the*
403 *external drivers of transport demand*, Technical report n°12/2008, 2008
- 404 4. Blanquart, C., S. Müller, S. Seidel, and V. Ehrler. From a supplier to a retail controlled supply
405 chain: what are the impacts on transport demand? From data analysis to model development. In
406 *Social and Behavioral Sciences 54*, 2012, pp. 275-285.
- 407 5. Comi A., P. Delle Site, F. Filippi, and A. Nuzzolo. Urban freight transport demand modeling: a
408 State of the Art. *European Transport Issue 51*, paper n° 7, ISSN 1825-3997, 2012.
- 409 6. Hesse, M. and J.-P. Rodrigue. The transport geography of logistics and freight distribution.
410 *Journal of Transport Geography 12*, 2004, pp. 171-184.
- 411 7. Fernie, J. and L. Sparks. Retail logistics: changes and challenges. In *Logistics and retail*
412 *management: emerging issues and new challenges in the retail supply chain*, John Fernie and
413 Leigh Sparks (eds), 3rd Edition, Kogan Page, London and Philadelphia, 2009.
- 414 8. Allen, J., M. Browne, T. Cherrett, and F. McLeod. *Review of UK Urban Freight Studies.* Report
415 produced as part of the Green Logistics Project: Work Module 9 (Urban Freight Transport),
416 London, U.K., 2008. <http://www.greenlogistics.org.>, Accessed July 10, 2013.
- 417 9. Taniguchi, E. and R. E. C. M. Van Der Heijden. An evaluation methodology for city logistics.
418 *Transport Reviews: A Transnational Transdisciplinary Journal*, Vol. 20 No. 1, 2000, pp. 65-90.
- 419 10. Anderson, S., Allen, J. and M. Browne. Urban logistics--how can it meet policy makers'
420 sustainability objectives?. *Journal of Transport Geography*, Vol. 13 No. 1, 2005. pp. 71-81.
- 421 11. Dablanc, L. Goods transport in large European cities: Difficult to organize, difficult to modernize.
422 *Transportation Research Part A: Policy and Practice*, Vol. 41 No. 3, 2007. pp. 280-285.
- 423 12. Rodrigue, J.-P. Challenging the Derived Transport Demand Thesis: Issues in Freight Distribution.
424 *Environment & Planning A*, Vol. 38, No. 8, 2006.
- 425 13. Billaudot, B. Institutionnalisme, rationalisme et structuralisme en sciences sociales. *Cahiers de*
426 *Recherche EMOI 2004 no 3*, 2004.
- 427 14. Boyer, R. *The Regulation School: A Critical Introduction.* Oxford University Press, 1990.
- 428 15. Behrends, S. *Urban freight transport sustainability. The interaction of urban freight and*
429 *intermodal transport.* Doktorsavhandlingar vid Chalmers tekniska högskola., 2003.
- 430 16. Blanquart, C. and V. Carbone. The impact of sustainability on global logistics strategies:
431 contradictory issues. In *The paradoxes of globalization.* E. Milliot and N. Tournois (Eds),
432 Palgrave-Macmillan, 2010, pp.166-182.
- 433 17. Lenz, B. Uncoupled or integrated? - Implementation, utilization, and effects of I&C-technologies
434 in firms in rural regions. The example of East Württemberg. In *Géocarrefour* Vol. 75 no.1, p.47-
435 54.
- 436 18. Schamp, E.W. *Vernetzte Produktion. Industriegeographie aus institutioneller Perspektive.*
437 Darmstadt (Wissenschaftliche Buchgesellschaft), 2000.

- 438 19. Tseng, Y-Y., Wen Long Yue, and M.Taylor. The role of transportation in logistics chains.
439 Proceedings of the *Eastern Asia Society for Transportation Studies*, Vol. 5, 2005, pp. 1657 –
440 1672.
- 441 20. Bourlakis, M.A. and C.A. Bourlakis. Deliberate and emergent logistics strategies in food
442 retailing: a case study of the Greek multiple food retail sector. *Supply Chain Management: An*
443 *International Journal* Vol. 6 n° 4, 2001, pp. 189-200.
- 444 21. Boyer, R. and M. Freyssenet. Les modèles productifs. La Découverte, Collection repères n°298,
445 2000, p.178
- 446 22. Freyssenet, M. Poursuivre l'exploration des relations macro-micro en réinterrogeant les notions
447 de mode de croissance et de modèle production, 12th colloque international du Gerpisa,Paris, 9-
448 11 June, 2004.
- 449 23. Dopfer, K., J. Foster, and J. Potts. Micro-meso-macro. In: *Journal of Evolutionary Economics* 14
450 (3), 2004, p. 263-279.
- 451 24. Jullien, B. and A. Smith. Studying the politics of the European industry: A political
452 institutionalist approach to economics, GERPISA seminar, Paris, Jan 7th, 2005.
- 453 25. Eurostat. Annual detailed enterprise statistics for trade (NACE Rev. 2 G) [sbs_na_dt_r2], 2013.
454 [http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_](http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=SBS_NA_DT_R2)
455 [product_code=SBS_NA_DT_R2](http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=SBS_NA_DT_R2) Accessed May 6, 2013.
- 456 26. Dawson, S. and M. Wallendorf. Associational Involvement: an Intervening Concept between
457 Social Class and Patronage Behavior, *Advances in Consumer Research* Volume 12, 1985, pp.
458 586-591.
- 459 27. Zentes, J. Internationalisierung deutscher Discounter und französischer Hypermarchés. In
460 *Globales Handelsmanagement*. J. Zentes and B. Swoboda (eds):. Frankfurt/Main, 1998.
- 461 28. Knorr, A. and A. Arndt. Why did Wal-Mart fail in Germany?. *Materialien des*
462 *Wissenschaftsschwerpunktes "Globalisierung der Weltwirtschaft,"*, Bd. 24, 2003, online
463 <http://www.iwim.uni-bremen.de/publikationen/pdf/w024.pdf> Accessed July 5, 2013.
- 464 29. Nielsen. Deutschland 2011. Handel. Verbraucher. Werbung, 2011.
465 [http://nielsen.com/content/dam/corporate/de/Deutsch/downloads/2011/Nielsen-D2011-](http://nielsen.com/content/dam/corporate/de/Deutsch/downloads/2011/Nielsen-D2011-internet.pdf)
466 [internet.pdf](http://nielsen.com/content/dam/corporate/de/Deutsch/downloads/2011/Nielsen-D2011-internet.pdf). Accessed July 5, 2013.
- 467 30. Wortmann, M. Strukturwandel und Globalisierung des deutschen Einzelhandels. Discussion
468 Paper III 2003-202. Wissenschaftszentrum Berlin für Sozialforschung, 2003.
- 469 31. A.T. Kearney. *Führend durch Total-Supply-Quality, Produktivität und Qualität in der Logistik*.
470 München, 1993.
- 471 32. Reardon, T. and A. Gulati. *The rise of supermarkets and their development implications:*
472 *International Food Policy Research Institute (IFPRI)*, Washington, 2008.
- 473 33. Eurocase. *Freight logistics and transport systems in Europe* Executive summary: European
474 Council of applied sciences and engineering, 2001.
- 475 34. Lamey, J. *Supply Chain Management: FT Management Report*, London, 1996.
- 476 35. Connan-Ghesquière, C. Les ruptures de stock: comportements du consommateur, facteurs
477 d'influence et satisfaction vis-à-vis du magasin, Thèse de doctorat en Sciences de Gestion,
478 Université Nancy 2, December, 2004.
- 479 36. Dubelaar, C., G.Chow, and P. Larson. Relationships between inventory, sales and service in a
480 retail chain store operation. *International Journal of Physical Distribution & Logistics*
481 *Management*, Vol. 31, No2, 2001.

- 482 37. Stassen, R. and M. Waller. Logistics and assortment depth in the retail supply chain: evidence
483 from grocery categories. *Journal of Business Logistics*, Vol. 23, No 1, 2002.
- 484 38. Fernie, J. and L. Sparks. *Logistics and retail management: emerging issues and new challenges*
485 *in the retail supply chain*: Kopan Page limited, The chartered institute of Logistics and Transport,
486 2004.