

Parcel Flows: The rise of parcel industry and LTL industry in Germany 1970 to 2020



View in the transshipment hall of Forwarder Peter Mordhorst in Kiel¹

Working Paper History of Mobility Nr.40/2026

Update: 1. January 2026
Prof. Dr. Richard Vahrenkamp
Professor em. für Logistik der Universität Kassel
Logistik Consulting Berlin
Mail: vahrenkamp2@gmx.de

Lecture at Tension of Europe 2026 , Eindhoven 10 July 2026

¹ Festschrift 40 Jahre IDS, edited by IDS Logistics GmbH, Kleinostheim 2022, p. 54.

Abstract:

Today, parcel services play a major role in the internet economy and are perceived as large corporations (DHL, Federal Express). Nothing is known about the flow of parcels through parcel services in historical transportation research. This paper aims to show that parcel services in Germany were not founded by large corporations, but by medium-sized LTL companies. Around 20 of these companies joined forces to found parcel services in Germany. They developed new forms of cooperation for this purpose. The organizational structure of these cooperations is shown. In addition to the new form of cooperation, they have used new technologies such as barcodes and networks based on personal computers, which became inexpensive in the 1980s, to monitor and control the flow of parcels in the network. In Germany, two of these medium-sized cooperations in the field of parcel services can be identified, Deutscher Paketdienst (DPD), founded in 1976, and German Parcel (GP), founded in 1989. German Parcel was also the first to use the innovative concept of hub-and-spoke sorting (star-shaped sorting) of parcels in ground-based transport by truck - a sorting concept previously only known from aviation. GP and DPD were acquired by the large corporations Royal Mail resp. La Poste in 2000. The LTL companies followed the parcel industry and founded cooperations of about 20 members to introduce highly standardized LTL transport.

1. Introduction

Freight transportation is hidden in the thicket of commercial activities and is not as visible as railway lines, airlines, motorways and ports. In the literature on historical transportation research, contributions on freight transport are rare. In an editorial Tiana Hayden and Dhan Singh called for more research to be initiated using the example of food transportation.² Thomas Spain and Daniel Turner contributed an article describing

² Tiana Hayden und Dhan Singh, "Food and Mobility", *The Journal of Transport History* 41:2(2020), 278–288.

the transportation of milk in Great Britain and the transportation of quails.³ They also introduced the concept of supply chain governance to historical transport research, where the coordination and control of the fragmented supply chain is explained. In an article, Richard Vahrenkamp characterized rail freight transport as a bottleneck in the rapidly growing transport demand of the mass consumer society and derived the need for road transport of freight from this bottleneck.⁴ Shane Hamilton described the transport of beef and milk from the rural areas of the United States into the cities and the role of supermarket chains in the process of concentration towards larger diaries.⁵

At this point, the focus will be on the road transportation of general cargo and the activities of medium-sized general cargo forwarding companies in western Germany. General cargo is a shipment that only partially occupies the loading area of a truck (or a railroad freight car), such as a wooden crate, a cardboard box or a barrel. It is therefore also called less than truck load (LTL).⁶ Since the 1970s, pieces of LTL have been fixed on wooden pallets so that they can be moved by manual or motorized forklifts in the transshipment hall (depot) and loaded (resp. unloaded) on trucks. Previously, they were moved manually using hand trucks.

A freight forwarder bundles the shipments from his region and transports them in a long-distance transport to the region of various recipients. The question is which innovations and cooperation models the medium-sized forwarders have pursued among themselves in order to withstand the competition with the large forwarders. It will be shown how the cooperations have developed into formal umbrella brands in order to reduce the transaction costs of the cooperation. Investments in PC-supported information systems were innovations that enabled medium-sized freight forwarders to

³ Thomas Spain und Daniel Turner, "Food for Thought: Transport within the food supply chain", *The Journal of Transport History* 42:2 (2022), 194–213.

⁴ Richard Vahrenkamp, "The Limits of Railway Transportation in a Mass Consumption society: Germany, 1900-1938", *The Journal of Transport History*, 32:1 (2011), 1-16.

⁵ Shane Hamilton, *Trucking Country: The Road to America's Wal-Mart Economy* (Princeton NJ: Princeton University Press, 2008).

⁶ Richard Vahrenkamp, *The Logistic Revolution. The Rise of Logistics in the Mass Consumption Society*, Cologne 2012.

gain control over the flow of LTL. They established parcel services as a new market segment in the LTL sector and introduced innovative sorting concepts.

The paper contributes to the debate about innovations in the sector of small and medium-sized enterprises (SME).⁷ At this point, the innovations of medium-sized LTL forwarders in the Federal Republic of Germany will be discussed. These innovations were developed between 1970 and 2000 and have not yet been recognized. In this article, medium-sized LTL forwarders are understood to be forwarders that are predominantly family-owned and managed by the owner. They have between 51 and 1000 employees.

The paper is based on following sources. I analyzed the logistics press, such as the German Traffic Press (Deutsche Verkehrszeitung DVZ), association information and the timelines of freight forwarders and conducted an interview with the former managing director of the parcel service German Parcel (oral history). I was unable to evaluate archive material from the forwarding companies, as medium-sized companies do not have archives.

2. Data of the forwarding industry

The following section presents data on the structure of the medium-sized freight forwarding industry in LTL transportation. In the Federal Republic of Germany (FRG) in 1980, the freight forwarding industry was characterized by small and medium-sized companies.⁸ In addition to the large companies Kuehne und Nagel and Schenker, there were around 5000 other forwarding companies. The large companies were

⁷ Minna Saunila, "Innovation Capability in SMEs: A Systematic Review of the Literature", *Journal of Innovation & Knowledge*, 5 (2020), 260–265. Hermann Simon, *Hidden Champions: Lessons from 500 of the World's Best Unknown Companies*, Harvard Business Review Press 1996. Hartmut Berghoff und Ingo Köhler, *Verdienst und Vermächtnis: Familienunternehmen in Deutschland und den USA seit 1800*, Campus Verlag, Frankfurt 2020, p. 136. Rainer Karlsch, *Familienunternehmen in Ostdeutschland. Niedergang und Neuanfang von 1945 bis heute*, Mitteldeutscher Verlag, 2023, p. 2.

⁸ Data of Bundesverbandes Spedition und Lagerei according to Dietmar Rehmann, „Perspektiven des mittelständischen Speditionsgewerbes“, in: *Das mittelständische Güterverkehrsgewerbe, Beiträge aus dem Institut für Verkehrswissenschaft an der Universität Münster*, edited by Hans Seidenfus, Göttingen 1983, pp. 117–161, here p. 129.

managed hierarchically, with decisions on company policy being made by the management and then implemented at the hierarchical levels and in all depots. The large companies maintained transshipment depots in all major cities in the FRG. In contrast, medium-sized companies in the FRG were only represented regionally with depots.

Small companies predominated in the freight forwarding industry. With up to 50 employees, they accounted for around 85% of all companies, including 34% with up to 10 employees. Medium-sized companies with 51 employees or more accounted for only 15%. In 1980, according to the structural data of the association of forwarders (Bundesverband Spedition und Lagerei), 40% of all companies, i.e. approx. 2000, were also involved in the LTL business as “groupage freight forwarders” with trucks, among other business areas.⁹ The bundling of LTL from different consignors into one load of a truck in long-distance transportation was expressly permitted for freight forwarders under Section 460 of the German Commercial Code (HGB). Freight forwarders can also provide transportation services with their own trucks without using trucking companies. The HGB then speaks of self-entry in §458.

Over the past 100 years, LTL traffic by truck has grown very strongly in Germany and in the Federal Republic of Germany, even increasing tenfold in the 40 years from 1980 to 2020 and resulted in large and complex logistic systems for LTL which remained unknown in the literature of historical transport research. In the years 1980 to 1993, it grew at a rate of 4.7% p.a. from 3.9 million tons to 7.1 million tons. And it then accelerated growth to 6.6% p.a., growing from 7.1 million tons in 1993 to 40 million tons in 2020.¹⁰

⁹ Ibidem, p. 133.

¹⁰ Data for 1980: Bundesverband Spedition und Lagerei (ed), *Strukturdaten aus Spedition und Lagerei 1990*, Bonn 1990, p. 27. Data for 1993: Bundesverband Spedition und Lagerei (ed), *Zahlen, Daten, Fakten aus Spedition und Lagerei 1995*, Bonn 1996, p. 20. Data for 2020: Bundesverband Spedition und Logistik (ed), *Stückgutlogistik in Deutschland*, Berlin 2021, Management Summary, p. 4.

GDP (Billion €) vs. LTL (tons) 2000 to 2019 Germany

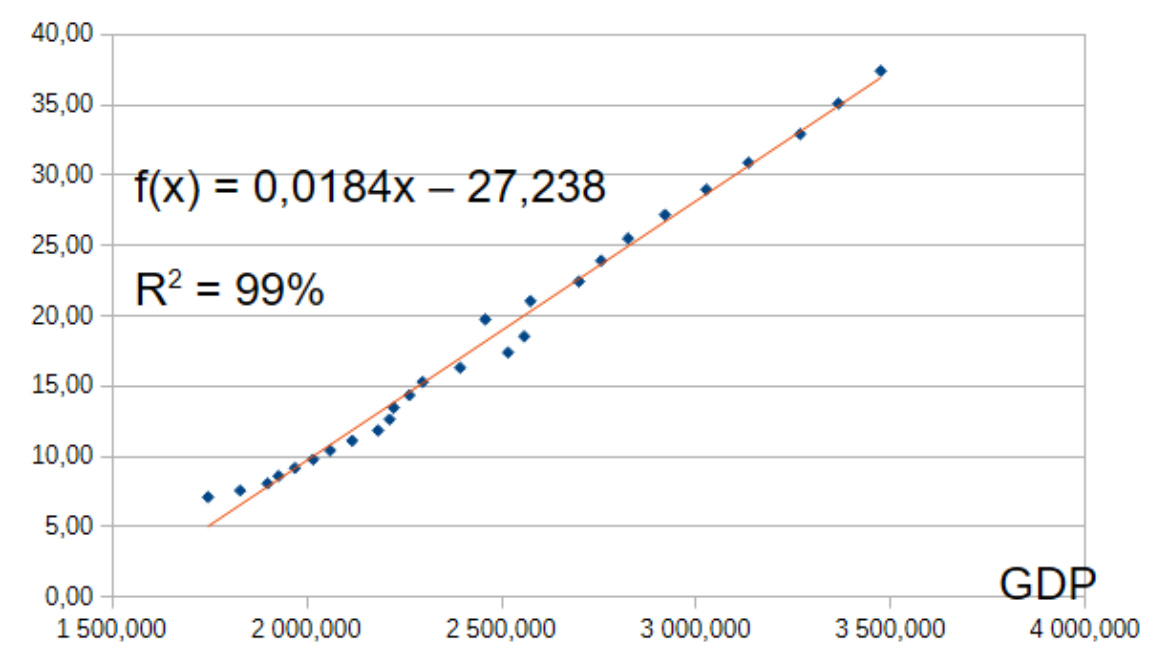


Figure 1A: Correlation of GDP and LTL-Transport in Germany 2000 to 2019

If one compares the time series of annual figures for LTL transport by truck in tons and GDP in current prices in billions of Euros for the period 1993 to 2020, one can see a high correlation of 99% between the two time series using the LibreOffice data tool. According to LibreOffice, the regression line through the data points over the period 1993 to 2020 has the form $y = 0.0189x - 28.236$, with x as GDP in billions of Euros and y the quantity transported in millions of tons. This means: For every 100 billion Euros of GDP growth, there was an increase of 1,89 million tons in LTL by trucks. The implications of this correlation for transport policy could be computed because the LTL-transport by truck is highly standardized transporting 16 pallets per truck. Assuming 180 kg, as indicated by the LTL overflow data from the IDS freight forwarding cooperative,¹¹ per LTL pallet in the dimension of an euro-pallet (800x1200 mm) and 16 pallets per truck with a loading area of 6.50 meters in length, 3 tons of LTL are transported on a long-distance truck route, or twice that amount, 6 tons, on a truck with a trailer (truck train). For an increase of €100 billion in GDP, 600,000 trucks are on the motorways, or 300,000 truck trains.

¹¹ See section 6.

In the 27 years from 1993 to 2000, the growth in LTL transportation by truck was 6.6% p.a., 9 times as high as the average growth in GDP of Germany, reflecting the great importance of the mechanical engineering and consumer goods industries and their high degree of product differentiation, which generate a high demand for small consignments.¹² Consider, for example, the subsequent delivery of a box of high-demand clothing items to a retail store, or the delivery of an urgent spare part for a machine to a repair shop. In 2020 (data from previous years is not available), 20% of turnover in the LTL business by truck was generated with products from the mechanical and plant engineering sector, 15% with the food sector and 13% with the construction industry.¹³

The freight forwarding industry was subject to numerous regulations on liability, transfer of risk and insurance in the HGB and had to deal with a restrictive allocation of licenses for long-distance road haulage and prescribed transport prices by the Federal Ministry of Transport. The number of trucks licensed for long-distance transport was limited to 20,000.¹⁴ On the other hand, the established forwarding companies were also protected from competition from abroad by the tight regulatory framework. When the Tariff Repeal Act was passed in 1994 and the European Union allowed foreign trucks to cross the border freely into Germany from 1993, Dutch and, from 2004, Polish hauliers exerted pressure on the German forwarding sector, which led to a concentration movement in the forwarding industry. The two parcel services “Deutscher Paketdienst” (DPD) and “German Parcel” (GP), owned by medium-sized forwarder companies, were sold to the French postal service La Poste and Royal Mail respectively, partly as a result of the low price policy of the German Federal Post Office (Bundespost). They were in conflict with the state-owned Bundespost due to its low-price policy. At a press conference in Hamburg, Horst Matthies, Chairman of the Supervisory Board of DPD, was critical of the Bundespost's practices. He pointed out

¹² Susan Strasser, Charles McGovern, Matthias Judt (eds), *Getting and Spending: European and American Consumer Societies in the 20th Century* (Cambridge: Cambridge University Press, 1998).

¹³ Bundesverband Spedition und Logistik (ed), *Stückgutlogistik in Deutschland*, Berlin 2021, p. 53.

¹⁴ Richard Vahrenkamp, *The Logistic Revolution*, Chapter 14, as note 5.

that the excessive revenue from letter traffic was being used to subsidize the construction of new postal freight centres. The actions of the Bundespost posed a challenge to the existence of medium-sized companies in the parcel sector.¹⁵

3. The business models of large forwarders

It is interesting to ask why the large number of smaller forwarder companies were able to hold their own against the larger ones. Thanks to their capital strength, the large forwarder companies were able to offer nationwide truck transportation throughout West Germany. They maintained depots in the 65 major cities of the Federal Republic, from which they were able to offer LTL deliveries to other major cities with delivery times of three days. The three-day delivery time includes one day for the transportation of the shipment from the customer placing the order (“shipper”) to the respective depot in the region by local transport. A local transport company can be used for this collection. On day two, the shipment is transported as a groupage shipment from various consignors to the destination depot by long-distance transport. On day three, delivery is made by local transport from the destination depot to the recipient of the consignment. The following figure shows a model of bundling different consignments on the long-haul route between two regions.

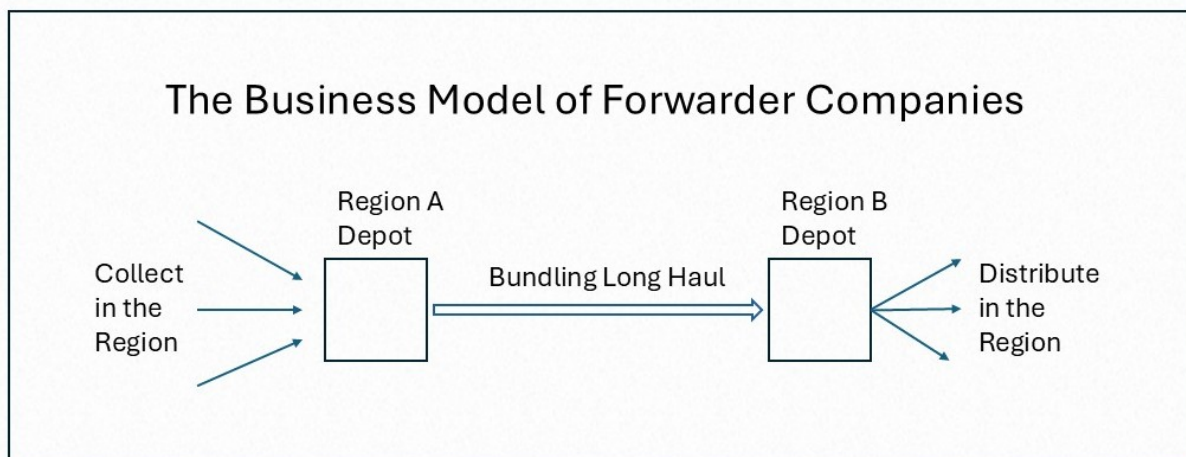


Figure 1: Business Model of Freight Forwarders by Truck

¹⁵ *Main Echo*, Aschaffenburg, 12 April 1995. I would like to thank the Aschaffenburg City Archives for providing this source.

However, the delivery time of three days could only be adhered to for a core network in western Germany (Hanover - Cologne - Stuttgart). If the sender and recipient were far apart, an additional day was required for long-distance transportation leading to a total delivery time of 4 days. The network of major forwarding companies for long-distance truck transports between the major cities with more than 100.000 inhabitants alone required large investments in handling depots and vehicles, as more than 4000 daily direct transports are theoretically possible between the 65 major cities (exactly $65 \cdot 64 = 4160$).

In fact, not all routes are driven with one truck in long-distance transport by the large forwarder companies, but depots in the range of 200 km are driven to in combination (relay traffic) if the capacity utilization for direct transports was not given. If three depots A, B, C are located in one directional sector, the shipments to B and C are loaded from A onto one truck, which drives to B, unloads the general cargo for B there and loads the shipments from B to C. The truck continues to C and unloads the shipments for C. The return journey to A is similar, so that the truck arrives back at the home depot in the evening.¹⁶

In the depots, trucks with the incoming general cargo consignments were positioned at the gates on one side of the warehouse (see figure 2). The incoming general cargo consignments could originate from local groupage traffic from customers in the region who had provided their consignments for long-distance transport, or from long-distance transport from a corresponding freight forwarder. The division into local groupage transports and long-distance transports arriving at the entry gates took place on a daily basis: the local transports arrived in the morning and the long-distance transports in the afternoon. The following illustration shows the layout of a general cargo depot.

¹⁶ Bundesverband, as note 12, p. 26.

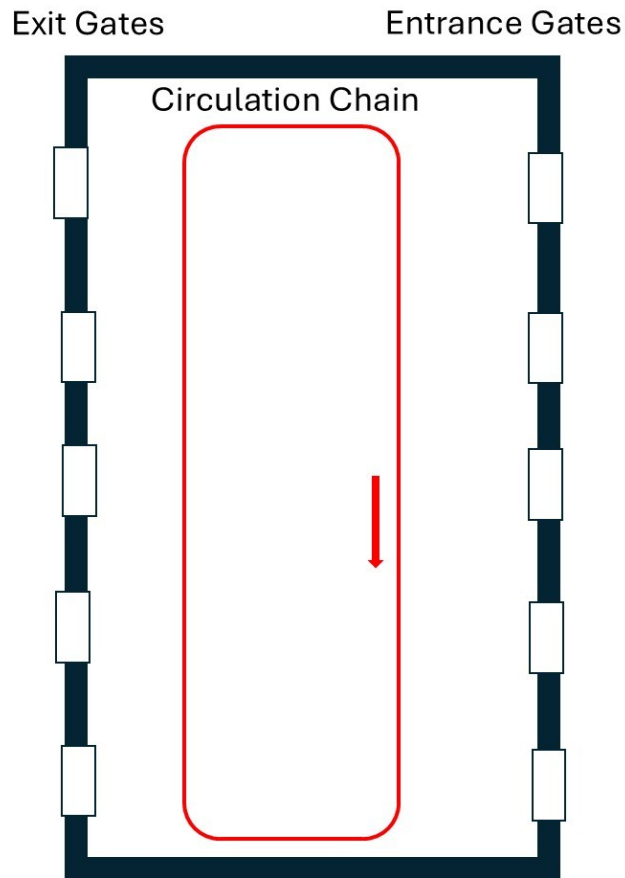


Figure 2: Layout of a Transshipment Hall (Depot)

Monika Dommann drew attention to the architecturally significant layout of warehouses.¹⁷ The layout of a general cargo depot belongs in this context. At the layout, the gates for incoming general cargo on the right-hand side are opposite the gates for outgoing general cargo. After the trucks loaded with general cargo pallets arrive at the entrance gates, they are unloaded with forklift trucks and the general cargo is temporarily stored at the gates. With the help of a circular conveyor chain, the individual load pallets are brought to the gates of the destinations, which are marked on the load pallets with labels. Monika Dommann had already referred to the conveyor chain as a material flow element in her book *Material Flow*.

¹⁷ Monika Dommann, *Materialfluss. Eine Geschichte der Logistik an den Orten ihres Stillstands*, Frankfurt am Main 2023.

For the business model of general cargo forwarders, transportation on the motorway was essential for overcoming the long-distance relationship. Only trucking on the motorway could bring about fast and reliable transportation. Without the motorway, a transport time of 3 days for general cargo from shipper to recipient would not have been possible. The modern logistics industry is therefore based on the motorway infrastructure. The motorway network in western Germany had already been largely completed by 1975, including the routes from Kassel to Dortmund and from Hagen to Giessen. Transport times on rural roads were considerably longer, as the following examples from the 1920s show, when there were no motorways in Germany: The journey time for a truck between Heilbronn and Cologne was one day and between Heilbronn and Leipzig two days.¹⁸

Adapted to demand, the long-distance routes were operated 5 times a week, or 2 times or just 1 time. Until the day of departure, the general cargo is collected and stored in the depot in front of the gate of the destination relation. This is the origin of the term groupage freight forwarding. In rail logistics for general cargo, the consignments were collected in a freight wagon intended for the destination relation until a load of 3 tons was reached. The freight wagon was then taken on the long-distance route to the destination.¹⁹ In contrast to the fast express delivery service, groupage freight forwarding was based on a trade-off between delivery speed and price. The freight forwarders charged lower transport prices for the slower delivery.

Following a survey of 149 general cargo depots nationwide conducted by Dirk Lohre and Wilfried Stock in 2019/2020 and the resulting responses from 135 depots, the authors were able to determine that, on average, 1012 consignments of 329 tons (corresponding to 325 kg per consignment) were sent and 803 consignments of 261 tons (corresponding to 325 kg per consignment) were received per depot every working day.²⁰ On average, a consignment consisted of two pallets. However, strong fluctuations were observed, as the authors explain: "General cargo logistics is characterized by highly volatile, cyclical shipment volumes, which are always

¹⁸ *Das Auto-Ferntransport-Gewerbe*, issue 1, 1930, p. 8s.

¹⁹ Vahrenkamp, as note 5, p. 104.

²⁰ Bundesverband, as note 12, p. 40.

additionally boosted by seasonal factors. The Christmas season, which is characterized by consumption and begins each year in September, regularly leads to additional volumes and volume peaks, which can only be handled by additional temporary staff and additional bookings of external freight space. Similar peaks in volume can be seen in the spring with the start of the construction and gardening season and in months with a high density of public holidays and shorter working weeks with a simultaneous spike in demand."²¹

The LTL forwarders used the innovative technology of swap bodies in long-distance truck transport, with which the cargo units could be positioned separately from the motor vehicles on four supports with a length of 1.30 meters at the loading gates of the transshipment halls. This technology represents a further development of container technology and also separates the motor vehicle from the loading unit. In order for the motor vehicle to drive under the swap body and pick it up, it is necessary for the motor vehicle to be able to raise and lower the pick-up frame. This is the case with trucks that have air cushion suspension. This technology was developed by truck manufacturer Henschel in Kassel and presented for the first time at the 1957 International Motor Show in Frankfurt. The swap body technology was invented by the medium-sized freight forwarding company Dachser in the 1960s and introduced in the company in 1970.²² All LTL forwarding companies in West Germany then adopted this innovation throughout the 1970s.

4. The business model of medium-sized forwarders

The medium-sized forwarding companies were in competition with the financially strong large forwarding companies such as Kuehne und Nagel and Schenker. The following section shows how medium-sized freight forwarders were able to face up to the competition from the large freight forwarders through innovative cooperation mod-

²¹ Bundesverband Spedition und Logistik (ed), *Stückgutlogistik in Deutschland*, Management Summary, Berlin 2021, S. 4.

²² Ibidem, p. 55.

els and the introduction of technical innovations.²³ However, the fact cannot be concealed, that a strong concentration process had begun in the medium-sized forwarding industry by the end of the 1990s.²⁴

Accounts of the history of individual medium-sized forwarding companies are rare.²⁵ Little information is known about the owner families and their roles and values in the companies examined here. As medium-sized companies, they had only rarely kept a company archive. The grandchildren's generation is now active in company management and, as I discovered, has no interest in cooperating to clarify the founding history. Numerous medium-sized transport companies have also been bought up by larger logistics companies, such as the family businesses Pracht in Haider and Cordes&Simon in Schwemmingen.

The business model of the medium-sized freight forwarders in the LTL sector was as follows. They built up a network of friendly medium sized LTL forwarding companies, mostly within a distance of 200 km to 400 km. To build up this network they advertised in the logistic press in search of cooperation partners.²⁶ They accepted consignments whose destination address was in the region of a depot of selected medium-sized friendly freight forwarders. In most cases, the medium-sized freight forwarders had only five such cooperation partners.²⁷ In this network, the medium-sized freight forwarders operated in a regional area. The destination depots of the regional cooperation partners were no more than 200 to 300 km away. This meant that, unlike the large freight forwarders, the medium-sized LTL forwarders were unable to offer long-distance routes in Germany as direct transports and cover the entire country with long-distance transports. However, in the cascade model, they were able to have their shipments forwarded to the destination address of more distant depots by friendly forwarding

²³ Oliver Rösler, *Gestaltung von kooperativen Logistiknetzwerken*, Wiesbaden 2003, p. 37.

²⁴ Paul Erker, „Familienunternehmen in der deutschen Logistikbranche“, in: Hans-Liudger Dienel und Hans-Ulrich Schied (eds), *Die moderne Strasse*, Frankfurt 2010, pp. 361–380, here p. 375.

²⁵ See Paul Erker, *Das Logistikunternehmen Dachser. Die treibende Kraft der Familie als Erfolgsfaktor im globalen Wettbewerb*, Frankfurt 2008.

²⁶ See e.g. DVZ on 18 March 1982, p. 25.

²⁷ Managing Director Werner Rudolph of Spedition Rudolph in the audio book for the 66th anniversary of the Rudolph Group Baunatal 2012, Station 9: Partner und Pakete, access under <https://www.rudolph-log.com/ueber-uns/geschichte>.

companies. Although this stopover at the depots required time, as an additional day had to be scheduled for handling, it was able to compete with the conditions of large freight forwarders in terms of price. The forms of cooperation among the LTL forwarders followed what management theory has described as a network: blurred boundaries and no formal organization.²⁸

The regional arrangement of the truck forwarding companies enabled the drivers of the trucks used to remain close to the region and, after delivering the goods to the destination depot at midday, to return to their home depot with loads from the destination depot and arrive at their place of residence in the evening. With this form of organization, there is no need to spend the night in a hotel due to long distances. The cost-intensive manning of a truck with two drivers, who had to take turns on a long route typical for large forwarding companies in order to comply with the regulations on rest breaks and who had to stay overnight in a hotel in the evening, is also eliminated by this. The large forwarder firms had to pay a higher wage for each driver in the case the truck was manned by two drivers.²⁹

Furthermore, with the means of meeting transports, the medium-sized LTL forwarders can connect partners 400 km or 500 km away. If a truck starts in the morning at the forwarding company with the destination of the partner and at the same time a second truck starts in the morning at the partner with the destination of the forwarding company, they meet in the middle of the route in a parking lot at midday. The truck drivers exchange the swap bodies and transport it to their own depot in the afternoon.³⁰ Freight transport in the haulage industry, which is limited to the region, is also known from the locomotive drivers of the German railroad company DB Cargo³¹ and represents a new result of mobility research on freight transport, which was previously unknown in historical transport research on freight transport.

²⁸ Ranjay Gulati, Nitin Nohria and Akbar Zaheer, "Strategic Networks", *Strategic Management Journal* 21 (2000), pp. 203-215.

²⁹ DVZ on 8 April 1982, p. 8.

³⁰ IDS Logistics, as note 10, p. 27.

³¹ Sascha Kopp, „Warum DB Cargo eine „brutales Jahr“ erwartet“, in: *Allgemeine Zeitung (Mainz)* on 20 February 2024.

This regional arrangement of truck transports means that medium-sized LTL forwarders have a more favourable cost structure on long-distance routes than large forwarders, which have to deploy two drivers on long-distance routes. However, this cost advantage is at the expense of longer delivery times for LTL due to the cascade model. Each additional freight forwarder involved in the long haul, extends the delivery time by one day, as the incoming LTL must first be re-sorted at the depot to the intended destination before it can be transported on the following day.

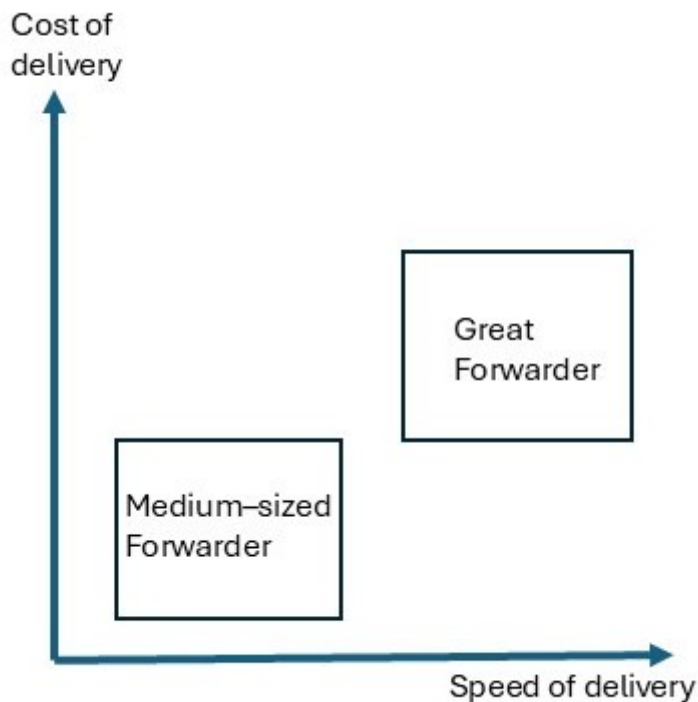


Figure 3: Portfolio of the competitive positions of freight forwarders (source: own creation)

The figure above shows the competitive position of medium-sized LTL forwarders compared to large forwarders in a portfolio of delivery times and costs on long-distance transports. It is interesting to note that in this context, the large freight forwarders do not have any economies of scale cost advantages on the long haul.

The regionally positioned medium-sized groupage freight forwarders not only serve the transport needs for procurement and sales of companies in large cities, but their regional positioning, often in smaller towns, also reflects the regional location of many industrial and commercial companies in small towns and therefore leads to a competitive advantage in terms of customer proximity compared to the large freight forwarders, whose depots are primarily located in the large cities. In order to cooperate, the medium-sized LTL forwarders established a complicated network of contracts, within

which the LTL was passed from one forwarder to the next until it had reached its destination.³²

5. Umbrella organizations of medium-sized forwarders

The business model of nationwide cooperation required individual contracts between the freight forwarders involved. It could reduce the transactions costs for around 20 medium-sized forwarder companies, which could cover the whole area of western Germany with their roughly equal regional catchment areas, to join forces and agree uniform conditions. In 1982, IDS was the first such horizontal cooperation to be founded as a uniform umbrella brand with a uniform appearance towards customers and uniform conditions and quality guarantees in the form of a limited liability company (GmbH) in order to strategically position itself in the competitive LTL market. The loose network was further developed into the fixed framework of a GmbH. With its range of services, IDS was now able to act like a major freight forwarder. In the regionally defined areas of activity of the freight forwarders, they could operate either as shareholders of IDS or as franchisees of IDS. IDS heavily standardized LTL transport. The trucks operated on long-distance routes according to fixed schedules, regardless of the current load capacity. IDS transported only general cargo that weighed no more than 2.5 metric tons and could be loaded onto pallets. Heavier shipments were rejected, as were very long or very large ones. These, however, could still be transported via the traditional general cargo network of the founding companies. IDS declined special requests from shippers, such as immediate delivery or delivery with temporary storage.

³² Matthias Thulesius, *Überregionale Kooperationen mittelständischer Unternehmen des Güterkraftverkehrs- und Kraftwagenspediteurgewerbes*, Dissertation Thesis, University Bayreuth 1994.

The forwarding companies involved in IDS retained their independence. The founding protocol of 1982 emphasizes the “complete economic independence”,³³ i.e. the companies were able to continue their existing customer relationships independently of the umbrella organization IDS. This guarantee provided support for the move to establish a cooperative umbrella organization in the 1980s, which was perceived as “revolutionary” by the owners of the individual companies, as the commemorative publication “40 Years of IDS” noted in retrospect.³⁴ In the horizontal cooperation, the partners each had equal voting rights in the partners' meeting. In their regional areas of activity, the partners or franchisees had protection from competition from the other members of the cooperation. An advisory board represented the interests of the shareholders vis-à-vis the management. According to Section 5b of the 1974 version of the German Act against Restraints of Competition, the IDS merger did not violate the ban on cartels as it promoted the efficiency of small and medium-sized companies.

The idea of the umbrella brand was taken up by numerous medium-sized forwarder companies, which also founded umbrella brands as horizontal alliances of around 20 forwarder companies. They followed the model set out by IDS and before by the parcel service DPD: legal form of a limited company, equal voting rights, advisory board of owners, protection against competition in the region. The following table provides an overview. The ongoing establishment of umbrella brands was possible in the rapidly expanding LTL market described above. The umbrella brands can be seen as an organizational innovation. In 2020, Lohre and Stock identified the 15 LTL forwarding companies in Germany listed in the following table, whereby the large companies were structured hierarchically and the medium-sized cooperations horizontally.³⁵

³³ Festschrift IDS, cf. note 10, p. 1s.

³⁴ Ibidem, p. 2.

³⁵ Bundesverband, as note 12, p. 35.

Nevertheless, 10 medium-sized cooperations were still on the market, which speaks for the resilience of this form of organization.

Enterprise	Leadership	Number of shippings national	Number of Depots	Shipping per Depot
DHL/unitrans	Hierarchy/Coop.	14.030.000	35	400857
Dachser	Hierarchy	12.300.000	40	307500
IDS	Cooperation	11.880.000	50	237600
Schenker	Hierarchy	9.720.000	42	231429
Cargoline	Cooperation	9.750.000	50	195000
System Alliance	Cooperation	6.955.000	46	151196
Emons	Hierarchy/Coop.	3.900.000	38	102632
Raben	Hierarchy/Coop.	4.200.000	41	102439
24plus	Cooperation	4.440.000	49	90612
Online	Cooperation	2.240.000	63	35556
CTL	Cooperation	1.800.000	143	12587
Dialog	Cooperation	490.000	45	10889
VTL	Cooperation	1.040.000	99	10505
Palletways	Cooperation	776.398	74	10492
SimCargo	Cooperation	1.440.000	150	9600

Table 1: LTL companies in Germany in 2020.

According to this table, the freight forwarder Dachser had risen from the SME sector of the 1970s to become a major freight forwarder.

6. The parcel services DPD and GP of medium-sized forwarders

The founding of the private parcel services “Deutscher Paketdienst” (DPD) in 1976 and “German Parcel” (GP) in 1988 as horizontal cooperation alliances and competitors to the state owned Bundespost can be seen as a further organizational innovation of the medium-sized LTL forwarding companies. The parcel service DPD set out the model, all other umbrella organizations in the parcel sector and LTL sector followed: legal form of a limited company, equal voting rights, advisory board of owners, protection against competition in the region.

Like LTL, the parcel market was characterized by strong growth, driven by the trend towards product differentiation and small consignments. The founders of DPD and GP made the strategic decision to develop the parcel market as a new market segment in the LTL sector. Parcels were increasingly appearing in the LTL volume of freight forwarders and could be better handled by the freight forwarders in systems, which were separated from LTL. In contrast to LTL, which has an average weight of 180 kg per collo, but peaks at up to 2½ tons, the parcel market has a weight limit of 25 kg or 30 kg.³⁶ Due to the cuboid dimensions of a parcel, it is easier to handle than LTL and handling is easier to automate. The private parcel services limited their customer base to companies. The shippers had, as customers of the Bundespost, to deliver their parcels to a collection point of the Bundespost. As an innovation in marketing, the private parcel services collected the parcels from the shippers' door and thus gained a competitive advantage. The private parcel services targeted not only the large mail-order companies Quelle and Neckermann, but also the numerous medium-sized mail-order companies. Other than Bundespost, the private parcel services speeded up the delivery time of a parcel from the shipper to the door of the receiver to less than 24 hours in the central region of BRD (Hanover–Cologne–Stuttgart).

When DPD and GP were founded, around 20 medium-sized LTL forwarding companies joined forces to cover the whole of West Germany with their catchment areas. The following table shows the 20 founding members of the DPD parcel service operating as Ltd. located in Koblenz since 1976:

³⁶ The US postal service had a weight limit of 70 lb for packages, see the entry at <https://faq.usps.com/s/article/Parcel-Size-Weight-Fee-Standards>. The parcel service FedEx in the 1970s took over this limit, see its company history, *How Time Flies: FEDEX Delivers the 21st Century*, published by FedEx Corporate Communications, Memphis 1998, p 58. 70 lb is about 31 kg – a limit that was in the range 25 kg to 30 kg introduced by German parcel services.

Location	Enterprise
Berlin, Griesheim, Cologne	Zeitfracht
Hamburg, Osnabrueck	Gebr. Hellmann
Flensburg	Transit Transport Flensburg
Bremen	E.H. Günther und Sohn
Hannover	Albert Krage und Söhne
Braunschweig	GÜSA Gütersammelstelle
Kassel, Fulda, Wuerzburg	Friedrich Zufall
Fröndenberg	Internationale Speditionsgesellschaft
Siegen	Intercosi GmbH
Heilbronn	Schneider GmbH
Stuttgart, Koblenz, Woms	Erich Denkhaus
Ettlingen	Meyer Transport GmbH
Schwemmingen, Hagen	Cordes&Simon
Freiburg	Streck Transport GmbH
Neu-Ulm	Honold KG
München	Werndl Spedition KG
Passau	Friedolin Häring
Regensburg	Amtslader Vereinigung Regensburg
Nuremberg	Interspe Internationale Speditionsgesellschaft
Konradsreuth, Limbach	Adolf Kanzler KG

Table 2: The founding members of the DPD parcel service in 1976³⁷

Following an inquiry to the press office, Spedition Zufall stated that it had 453 employees in 1976. According to an entry in the Bayern Wiki, Spedition Haering in Passau had 800 employees in 1993. A DPD press release stated that 17 founding members of DPD in 1981 had an average of 705 employees, i.e. they were actually in the medium-sized category.³⁸

The DPD parcel service already showed strong growth in its early years. The volume of shipments rose from 1.1 million parcels in 1976 to 3.6 million in 1977 and to more than 5 million in 1978, i.e. around 600 parcels per depot per day. DPD built up a huge delivery network. According to the company, in 1986 DPD served 20,000 consignors and delivered to 160,000 consignees.³⁹ However, the high shipping figures should not conceal the high founding risk of DPD, which is illustrated by the fact that the early

³⁷ Data according to *Deutsche Verkehrszeitung* 10 July 1976, p. 3.

³⁸ DVZ on 21 December 1982, p. 30.

³⁹ Ernst Frahm, „Nationale und internationale Paketdienste“, in: Spiegel Verlag (ed.): *Transportmärkte im Wandel*, volume 13: Kurier– Express– und Paketdienste, Hamburg 1987, pp. 70–82, here p. 71.

years of DPD were characterized by high start-up losses, which led to the departure of three shareholders, whose collection areas were taken over by other franchisees.⁴⁰ In 1991 DPD shipped 98 million parcels and achieved a turnover of DM 950 million. It had a market share of 8.5% of the total market of 1.2 billion parcels in Germany.⁴¹ In 1995 DPD recorded a turnover of DM 1200 million.⁴²

⁴⁰ Ibidem.

⁴¹ DVZ on 7 April 1992.

⁴² Peter Klaus: Top100 der Logistik, Nurenberg 1996, p. 50.

The following table shows the 25 founding members of the GP parcel service in 1988, which, according to press reports, were medium-sized companies with an average of 200 employees across all members:⁴³

Location	Enterprise
Berlin	Ulrich Rieck & Söhne Internationale Speditions-GmbH & Co. KG, Berlin (10)
Hamburg	KG Bursped Speditions GmbH & Co., Hamburg (20)
Neumuenster	Herbert Voigt GmbH & Co. KG, Neumünster (23)
Bremen	F. W. Neukirch Internationale Spedition GmbH & Co. KG, Bremen (28)
Oldenburg	F. W. DEUS GmbH & Co. KG, Oldenburg (29)
Guxhagen	Rudolph & Söhne GmbH Internationale Spedition GmbH, Baunatal (35 Guxhagen)
Bocholt	WM-Holding GmbH & Co. KG, Bocholt (42 Wesel ?)
Wesel	Heinrich Knoche + E. Barth Vereinigte Speditions-GmbH, Duisburg (erloschen? Heute 42 Wesel)
Westerkappeln	Heinrich Boes GmbH & Co. KG, Osnabrück (45 Westerkappeln-Velpe)
Bielefeld	Gebr. Mönkemöller GmbH & Co. KG, Bielefeld (48)
Polch	Gras Spedition GmbH & Co. KG, Neuwied (54 Polch)
Mainz	G. L. Kayser Spediteur seit 1787 GmbH & Co. KG, Mainz (60)
Rennerod	Pracht Spedition + Logistik GmbH, Haiger (63 Rennerod ?)
Neunkirchen	Josef Konz GmbH & Co. KG, Spedition + Logistik, Saarbrücken (erloschen? Heute 66 Neunkirchen)
Mannheim	Meyer & Klos Internationale Spedition GmbH, Mannheim (68)
Vaihingen	Erwin Steinle Internationale Spedition GmbH & Co. KG, Schwieberdingen (70, heute Vaihingen)
Grafenau	Häring Service Company AG + Co. KG a. A., Grafenau (erloschen? Heute 70 (Vaihingen, Spedition von K+N übernommen))
Weilheim	Kraftverkehr Barth (73 Weilheim)
Offenburg	TRANSITAS Internationale Spediteure GmbH, Kehl (76, Offenburg, Depot heute Schutterwald)
Freiburg	Spedition Fritz Fross GmbH & Co. KG, Teningen (78? Freiburg i.B., heute Eschbach, Spedition von Nörpel übernommen)
Ulm	C.E. Noerpel Spedition GmbH & Co., Ulm (79)
Naila	Gebr. Bischoff Spedition GmbH & Co. KG, Naila (86)
Aschaffenburg	VIKTORIA-Transport GmbH & Co. KG, Aschaffenburg (87 (heute) Schaaheim)
Kuernach	Hans Geis GmbH & Co. KG Internationale Spedition, Bad Neustadt (88 Kürnach)
Gersthofen	Andreas Schmid Internationale Spedition GmbH & Co. KG, Gersthofen (89)

Table 3: The founding members of the GP parcel service in 1988⁴⁴

With regard to Table 3, it should be noted that although Spedition Pracht in Rennerod was a medium-sized company in terms of size, it had belonged to the Hapag-Lloyd logistics group since 1983.⁴⁵ The following figure shows the 25 founding members of

⁴³ *Hessisch Niedersächsische Allgemeine*, 27 May 1989.

⁴⁴ Data according to the former managing director, Rico Back, of GP. The author conducted a telephone interview with Rico Back on 30.9.2024.

⁴⁵ *Die Welt*, 7 October 2003.

GP at a commemorative ceremony to mark the 25th anniversary of its founding in 2014.⁴⁶



Figure 4: The 25 founding members of the parcel service German Parcel in 2014. Front left Werner Rudolph from forwarder Rudolph as chairman of the advisory board of GP.

DPD and GP adopted the swap body technology for transporting parcels from the LTL forwarders. At the beginning of 1976, goods handling at the DPD parcel service was still very manual, but this was gradually mechanized through various innovations in sorting parcels by destination on conveyor belts, the use of barcode labels to control the material flow and the reading of the destinations on the parcels using laser scanners. The process was controlled by computer systems, which became inexpensive in the 1980s with personal computers costing around 5.000 Deutschmarks each compared to 100.000 Deutschmarks for a medium-sized computer. The control minimized failures during the movement of parcels in the depots and raised speed and quality of the process. With these technical innovations, the parcel services could provide speed and quality in their service and were at the forefront of the logistics

⁴⁶ Press release GLS, 30 September 2014.

industry and the industry at all. They were at the leading edge of introducing speed and quality as a business model.

At German Parcel, we find an innovative sorting concept, namely a star-shaped delivery structure, also known as a hub, which German Parcel implemented for the first time for ground-based truck traffic. Until then, it had only been used in aviation for passenger transportation and by the US parcel service FedEx with the sorting star in Memphis.⁴⁷ Staggered departure times from the various locations in Western Germany lead to an even utilization of the sorting centre. The truck transports to the hub are therefore subject to orchestration. For example, departures from Neumuenster in Schleswig-Holstein had to take place as early as 5 p.m.⁴⁸ German Parcel located the hub in Neuenstein near Bad Hersfeld, virtually in the middle of the old Federal Republic, but on the border with the former GDR, and was therefore able to benefit from the federal government's zonal border subsidy for the investment. The following figure shows the location of the sorting centre in the Federal Republic of Germany in 1989. The sorting centre had 8 unloading gates and 44 loading gates and had a capacity of 70,000 parcels per night. In 1995, a second building was added, which had a further 26 unloading gates and 90 loading gates.⁴⁹

⁴⁷ See company history of FedEx, *How Time Flies*, as note 35.

⁴⁸ Telephone interview by the author with Rico Back on September 30, 2024, the former managing director of German Parcel.

⁴⁹ Nicole de Jong, „Neuenstein - Mit dem Zirkel ins Ziel getroffen“, *Deutsche Verkehrszeitung* (DVZ), on June 21, 2013.



Figure 5: The Sorting Star of GP at Bad Hersfeld

The star-shaped delivery structure works in such a way that the trucks arrive at the sorting centre between 10 p.m. and midnight, the trucks are unloaded and the parcels are loaded onto a huge sorting machine, which then recognizes the destination of the parcel by scanning the barcodes and ejects the parcel into the waiting zone in front of the gate of the destination, where they are then reloaded into a swap body. The result of this concept is that, for example, a parcel from Hamburg to Bremen, 120 km away, is first driven counter-intuitively from Hamburg to Neuenstein over a distance of 360

km, sorted there to Bremen as the destination and then driven back from Neuenstein to Bremen over a distance of 340 km.

A report of the German traffic newspaper (DVZ) from 1993 sheds light on GP's IT infrastructure, which enables shipment control, known in IT as tracking and tracing.⁵⁰ German Parcel realized shipment control by integrating scanners into an information system. When the parcel arrives at the regional depot, it is scanned for the first time at the I-point and given a second label, the router label. This contains all the information about the destination depot, which will deliver the parcel the next day. The I-points are equipped with scales, a scanner, a personal computer with MS DOS operating system and a printer for creating the router label.

The second scanning takes place at the transshipment point, where a stationary scanner reads the parcel number and router label and uses this data for targeted ejection. Once at the destination depot, the parcel is scanned again. This provides proof that it is now on site. When the parcel is picked up by the local carrier, who delivers it the next day, it is scanned for the fourth time, marking the transfer of risk, this time to the delivery driver's area of responsibility. The data is also used to plan the delivery route.

For shippers, information about the time of delivery of parcels or LTL shipments to the recipient was of great importance. For this reason, all parcel services and later all large LTL forwarders created information systems for this purpose, e.g. Federal Express created a telephone information system in 1992. GP set up an information system via videotex service in 1992.⁵¹

The innovations in the parcel service had a knock-on effect on LTL umbrella companies like IDS. In the 1990s, the barcode was used to control the flow of materials on the

⁵⁰ DVZ on 30 March 1993, p. 8.

⁵¹ DVZ on 24 November 1992, S. 16.

load units (colli) and the star sorting concept was also applied to LTL.⁵² The groupage cooperatives adopted the innovations introduced by the two parcel services DPD and GLS of identifying packages with barcodes and handling them in a central hub. In 1994, the IDS cooperation introduced the barcode for identifying general cargo in the overall IDS system, and in 2003 set up a central hub for general cargo overflow in Neuenstein near Bad Hersfeld, which in 2011 handled an average of 2,500 consignments with 4,500 colli and 800 tons of weight every night from Monday to Friday.⁵³ This data gives an average weight of 180 kg per collo and an average number of just under 2 colli per consignment. If one assumes 32 colli built on pallets per truck train, then an average of 150 truck trains arrived at the Neuenstein hub every night. By 2012, the number of consignments at the Neuenstein hub had risen to a good 3000.⁵⁴ IDS implemented shipment tracking with the barcode. This means that consignors are informed immediately of any incidents. IDS has introduced electronic shipment tracking with tracking and tracing in the One Day express product. Previously, notifications were made manually by telex and fax, thus communicating the times of unloading, main run and delivery to the recipient. The status of consignments is now recorded via barcode scanning during main unloading and local delivery and can be called up in the computer network.⁵⁵

The innovations listed here refer explicitly to western Germany. Since the enterprises of the middle class in East Germany (GDR) had been nationalized by communist rule,⁵⁶ the GDR was unable to participate in the innovations of the middle class in western Germany and fell behind logistically.

7. Conclusion

⁵² IDS, as note 10, p. 16

⁵³ Ibidem.

⁵⁴ Ibidem.

⁵⁵ DVZ on 14 May 1992, p. 13.

⁵⁶ Karlsch, as note 6. Richard Vahrenkamp, "The Dream of Large-Scale Truck Transport Enterprises – Early Outsourcing Experiments in the German Democratic Republic, 1955–1980", *Journal of Transport History*, 36:1 (2015), 1–21.

The thesis in the literature on medium-sized companies that they incorporate a high potential for innovation could be substantiated in this paper with empirical material using the example of LTL forwarders and parcel services. Filling a gap in literature, the paper describes the complex logistical workflows in regionally positioned medium-sized LTL forwarders and parcel services and their cooperation with each other and their innovative behaviour. Through cooperation, the medium-sized LTL forwarders were able to withstand the competition from large, well-funded forwarders such as Schenker or Kuehne und Nagel. The private parcel services also emerged from the medium sized LTL forwarding companies as a remarkable innovation in the SME sector. The innovations developed by the parcel services, such as the barcode, electronically tracing and tracking and star-shaped sorting, then radiated back into the general cargo sector and were also used there. For further research, to observe the strong growth of LTL traffic in the past 40 years in other countries than Germany would be an interesting research topic. The article extends the concepts of material flow from the logistics chain to the star-shaped concept of sorting.