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Spatial networks of electrotechnical wholesalers in the Netherlands: A GIS application

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**Spatial networks of
electro-technical wholesalers
in The Netherlands**

Summary

Electro-technical wholesale businesses stimulate the flows of electro-technical goods, such as materials for electric installation, cables, wire, switchcupboards, audio and video, lights etc., from the producers towards the final consumer. They have an intermediate position in the distribution channel between the producers of electro-technical goods and, among others, the retailers, electricians and building industry. The paper is based on an inquiry among 44 electro-technical wholesalers in the Netherlands (response=26%, N=10). This inquiry gave us more insight in the way these wholesalers operate. The 'classical' wholesale functions are still very important to this wholesale branch, such as collecting and distributing goods and keeping stocks. The information function will become of much greater importance in the future. The distribution channel of electro-technical goods can be divided two channels: consumer and industrial electro-technical goods. The position of the electro-technical wholesale companies is weak in the consumer channel, but strong in the industrial channel. In the consumer channel the producers and large scaled retail chains approach each other directly. The wholesale plays a minor role for the retailers that are organised in purchasers or sellers groups or franchising. Only for the small scaled, independent electronic retailers is the wholesale branch of considerable importance. The customers of the electro-technical wholesale businesses are less organised and more distinct. They are roughly, the production industry, electricians, institutes and do-it-yourself shops. The distribution channel of electro-technical goods has to be very close-meshed to reach all these customers. The electro-technical wholesalers are mostly orientated to their customers. This is also reflected in the inquiry, from which it came forward that the location close to the customers is the second most location factor of electro-technical wholesale businesses. In this paper we have made an attempt to translate the economic concept of the way the distribution channel is set up, into a spatial concept for the location of the electro-technical wholesale branch.

Introduction

To the sector of wholesaling we count those companies which trade in goods for their own account and risk. These goods are not produced within their own company and will not be sold to the final consumer. The main function of wholesalers is to push goods along the distribution channel. They transfer the conditions in which the producers of goods sell, into conditions in which the consumers of goods are able and prepared to buy. To accomplish this function they do not only offer a range of goods of all kinds, they also fulfil lots of services like logistic services or after-sales services. In other words, the wholesale sector has an intermediate position in the distribution channel. In the basic marketing literature we find the following definition for the distribution channel: the number of links that a product passes through in the distribution channel from the primal producer to the final consumer (van Goor ea., 1989; Kotler, 1980; Cunningham ea. 1989). In a simplified model the distribution channel would look like this:

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In reality, the position of the wholesale sector in the business community is of course far more complicated. The position of wholesale companies in the distribution column is strongly related to the goods in which they trade and the kind of suppliers and buyers they have. The intermediate position of wholesalers is dynamic. There is always a thread of elimination by other parties in the distribution channel who could take over the wholesale functions. Service industries specialised in logistics could expand their transport and storage activities with trade. An other possibility is that retail companies and industries might approach each other directly, leaving wholesale redundant. This makes wholesaling a vulnerable activity. This is one reason for the high deathrates of the wholesale sector in comparison with other sectors (Bedrijvendynamiek 1993, KvK). On the other hand, in order to withstand the strong competition, they have to be very alert and innovative. The wholesale sector has the highest rate of automation in comparison with other sectors like the health sector, banking and insurance business, industry or services (Jonkheer, 1997). It is a very dynamic sector that reacts quickly to changes in the economy and to technological changes.

There are two reasons why we want to focus on one particular line of wholesale business. Firstly, because of the above mentioned fact that the position in the distribution column is strongly related to the goods in which they trade. Secondly, the location patterns differ a great deal between different wholesale branches. The reason why we concentrate on the electro-technical wholesale business is that within this branch, two opposite developments have taken place. On the one hand, there has been a strong elimination of the wholesale business in the *consumer* electro-technical goods, such as refrigerators, washing-machines, audio and video etc. On the other hand, the position in the distribution channel of the wholesale business in the *industrial* electro-technical goods, such as materials for electric installation, cables, wire, switchboards etc., is still quite strong.

The paper will consist of three parts. Firstly, we will give a short outline of wholesale business in The Netherlands in general. The functions, activities and location pattern will be set out.

Secondly, we will focus on the electro-technical wholesale business. We will make a comparison with the wholesale sector as put out in the first part, considering the functions, activities, distribution channel and location pattern. The third part of the paper deals with the

developments within the distribution channel of electro-technical goods and consequences of these developments to the spatial network of the electro-technical wholesale firms.

Wholesale business in The Netherlands

When we compare the wholesale sector, with respect to the indicators shown in table 1, to the main other sectors in The Netherlands we see that wholesaling is not the largest sector, but still contributes to a large extent to the Dutch business life.

Table 1 The wholesale sector in comparison with other sectors in 1996

sectors	Number of firms		Employment ¹		Turnover		Productivity	
	number	%	x 1,000	%	f milliard	%	x f 1,000	index
wholesale	53,122	11.6	396	11.0	353	26.5	113	109
retail	70,638	15.4	434	12.1	116	8.7	59	57
industry	46,614	10.2	834	23.2	406	30.4	129	124
services	138,549	30.3	886	24.7	158	11.8	107	103
total	457,976	100.0	3,590	100.0	1,334	100.0	104	100

¹ in person-years

Source: Van der Burgh e.a., 1997, p. 8

Functions of wholesale business

As mentioned before, the function of the wholesale sector is to push goods along the distribution channel. By trading they transform the conditions of selling into conditions of buying: the so called 'trade function' (van den Berg et al., 1984). To be able to carry out this trade function well, one needs to have access to the market information on supply and demand.

This brings us to the second level: that of the activities to perform the trade function. The activities are on one hand aimed to create favourable conditions to obtain a transaction and on the other hand the activities are the cause of the obtained transaction. The wholesale activities do not only cause a flow of orders between the different links in the distribution channel, but also a flow of goods, a flow of money in the opposite direction and a flow of information in both directions. For all these activities one is in the need of more specialized information. These activities can also be performed by specialized organisations such as warehouse and transportation companies, banks or insurance companies. Figure 1 shows a broad outline of the trade functions and -activities. The way in which, by whom and with which intensity these functions are performed will differ from branch to branch and even from company to company.

Figure 1 Outline of wholesale functions

		PLACE	TIME	QUANTITY	QUALITY
TRADE FUNCTIONS (transaction level)	Flow of orders	Transformation of orders			
		international (import, export) national regional local	building up of a stock	collecting distributing	service, formation of assortments (large, deep)
ACTIVITIES TO PERFORM THE TRADE FUNCTION (activity level)	Flow of information	Communication			
		means of communication, telex etc., representatives	collecting data, administration, contracts	collecting and supplying of information and data	adapting of information, advise and promotion
	Flow of goods	Physical distribution and transformation			
		transportation	depots, keeping stocks	collection of goods, combining or dividing goods	service, sorting, merging, grading up, assembling or packaging of goods
	Flow of money	Payment and credit facility			
		payment, money- transports	credit facilities	collecting commissions	insurance of payment and credit facilities, changing currencies

Source: van den Berg et al., 1984, p. 18

Location pattern of the Dutch wholesale sector

The location pattern of the Dutch wholesale sector has shown two major spatial developments. The first important development is the suburbanisation of the wholesale businesses out of the city centres. This process is clearly illustrated by Ter Hart and Lambooy (1989) for the case of Amsterdam. The second development is the movement from the core area's in the economic highly developed area in the west of The Netherlands, with the four big cities of Amsterdam, Rotterdam, The Hague and Utrecht, towards more centrally located area's between these cities and towards the south. In fact, there is still a major part of the employment in wholesaling to be found in and around the big cities, 36% in 1993, but this percentage dropped from 45% in 1973 (Regional labourdata 1993/1990, CBS, 1994/1992; Statistics of employed persons 1985, CBS, 1987; Statistics of employed persons march 31st 1982/1973, CBS, 1983/1974). Popular locations now are centrally located in The Netherlands, in open spaces close to slip-roads of highways.

Figure 2 shows the location pattern for wholesale firms in The Netherlands in 1997. The data are obtained from the cd-rom Reach, which contains, among other things, the postal codes of

the wholesale companies. In total there are 45,619 wholesale businesses. We were able to show them on the map with the use of GIS.

Figure 2 Spatial location of wholesale firms in The Netherlands in 1997, absolute numbers

One dot equals ten wholesale firms

Source: cd-rom Reach, based on data from the NV Databank, Dutch Chambers of Commerce

From the map we learn that wholesale business is still concentrated around the bigger cities in general and Amsterdam and Rotterdam in particular. Compared to this area in the west, the periphery of the country is not well represented at all. The dots in the rest of the country also

correspond with cities. Quite often wholesale companies are located in smaller communities close to the cities.

Several factors are of importance when a wholesale company has to choose a location. First, the history of the business has to be taken into account. Wholesale companies are often very small, consisting only of the founder and maybe some personnel. Quite often the choice of location is a factor of the place of living of the founder or owner of the company (the behavioral approach, Pellenbarg, 1985). This could stand in contrast with some more rational factors. In the following an overview is given of some of these so called rational factors.

First, the availability of sites and buildings for businesses is of course of importance. They have to give the firm the opportunity to operate well and if necessary, the possibility to expand. Of course the price of land plays an important role as well, because of the relatively large surface needed for stockkeeping. The second factor is the accessibility of the business establishment. Mostly large enterprises desire a situation close to the slip roads of highways. Wholesale businesses, that work on an international scale tend to locate nearby harbours or airports, since good accessibility will lower the transport costs. Third, besides these economic factors, there is the influence of the government. National and local authorities determine which functions certain locations can have. In the past, large city planning projects took place in The Netherlands. In many cases (wholesale) businesses had to make way for housing. Finally, the location is influenced by the suppliers and buyers. Most literature (Ter Hart en Lambooy, 1989; Langenberg-Van der Klauw, 1994) states that the location with regard to the buyers is more important, especially for the "distributing" wholesale companies, since they are buyer-oriented.

However, it is also said that one cannot look at the location of clients alone. One should also take the number of deliveries, the different sorts of goods according to weight, volume, value, whether they are perishables and the desired delivery time into consideration. Also, wholesale businesses do not only have relations with their buyers (retail, catering industry etcetera) and suppliers (industry). The location with regard to service industries (like transportation companies, banks, government institutions) is of importance as well. Besides that, the presence of a certain market or an auction-mart can determine the place of business for specific groups of wholesale branches.

The movement on the maps away from the agglomerations and the periphery, but towards more central regions indicates that accessibility is becoming a more crucial location factor. The accessibility of the big city agglomerations suffers by the tremendous increase of congestion in these twenty years. At the same time different developments take place. The increasing importance of just in time delivering for example. One of the main functions of wholesale businesses has always been to provide for the right goods, in the right amount, at the right time and place (Haccoû, 1969). In which 'right' means 'desired by the clients'. If the clients desire the goods just in time, wholesale companies have to meet the needs of the market. With this increase of just in time delivering, the need for highly accessible locations increases as well. Therefore, wholesale companies can more and more be found nearby the slip roads of highways outside the cities. Nationally operating wholesale businesses often operate with very large distribution centres located centrally in The Netherlands and well accessible.

Electro-technical wholesale business

As mentioned earlier in this paper, the products in which the electro-technical wholesale branch trades, can be divided into two groups: the consumer and the industrial electro-technical goods. The first group is the easiest for us to imagine, as we use them every day: audio and video, washing machines, dryers, kitchen supplies, personal care etc. The industrial electro-technical goods are less obvious to us. Here we deal with technical and electric installation materials, such as wires, cables and supporting systems for cable, switchboards, safety supplies, electronic tools, electric heating and cooling systems and professional light systems. The trade in electric installation materials forms the core business of the electro-technical wholesalers. The largest Dutch electro-technical wholesale company has over 70.000 articles. There are no electro-technical wholesale companies anymore in the Netherlands that only cover the electro-technical consumer goods. The majority of them have these consumer goods in their assortment as a side product. The next table shows the composition of the average assortment.

Table 2 Composition of the average assortment of the electro-technical wholesale branch

	industrial and consumer et	industrial et
light	17.6	21.4
wire	15.1	18.3
electric installation material and switches	7	8.5
switchboards and distributing-boxes	6	7.3
switch materials for industrial use	17.1	8.6
supporting systems and gutters for cable	3.7	4.5
other installation materials	15.6	18.9
rest (communication, IT)	8.8	10.7
consumer electronics	17.6	0
total	100	100

Source: FEG, 1996

The assortment is increasingly determined by the customers, which means that wholesale firms continue to trade in new products. In the electro-technical wholesale branch there is an increase in products for communication and information technology, such as hardware used in industrial networks and control-tables.

The concentration in the electro-technical wholesale branch is strong:

- the first two wholesale companies have a market share of 39%;
- the first five wholesale companies have a market share of 56%;
- the first ten wholesale companies have a market share of 74%.

This decreases the influence of the average wholesale firm. Electro-technical wholesalers from abroad do not participate on the Dutch market. There are a few Dutch electro-technical wholesale companies that have a couple of selling offices abroad. The commercial cooperation, take overs and merges are only between electro-technical wholesalers, and not between other wholesale branches or sectors. At the moment there are four purchasing groups in The Netherlands, in which electro-technical wholesale businesses cooperate: Cegro, Elektrokern, Imagro and Sanelgro.

Functions of electro-technical wholesale businesses

Figure 3 shows the functions of the electro-technical wholesale branch compared to the total Dutch wholesale sector. The 'classical' wholesale functions are still very important to the electro-technical wholesalers. These are:

- collecting goods, which in the case of the electro-technical wholesale business means mostly importing thousands of different articles of many (small) suppliers in order to offer a great variety of common and less common electro-technical products to their customers (broad and deep assortment);

- keeping stock, 90% of the electro-technical wholesale firms keep stocks of approximately 90% of the traded goods and aim the ability to offer 95-97% of the goods right out of stock within 24 hours;

- distributing goods, the average electro-technical wholesale company has more than thousand buyers, who desire small quantities delivered at the right time;

- commercial and information function, to put out orders to keep the distribution process going and to inform the customers about new products and the suppliers about the market;

- financing, only the products which are bought at the quick service counter of electro-technical wholesale firms, if available, are paid in cash;

- service function, electro-technical wholesalers play an important role in solving technical problems of customers and advising them about new techniques and products. Wholesalers sometimes carry their own brand on which they give a guarantee. The producers give a guarantee to their products.

The two functions that will become of greater importance in the future will be the stock keeping and information function. The first one because both the suppliers and buyers are to a lesser extent willing to keep their own large stocks, in order to save money. The second one because of the rapid pace in which products change and new products are introduced. These two functions will also be more integrated with each other through electronic information systems. In the electro-technical branch the following systems are used. Since 1991 a Videotex-system has been developed, called 'Instalnet'. All links of the distribution channel, producer, wholesaler and electrician, have access to this system and are able to receive information about the products, price and packing. An electrician can call to the central videotex-system, choose a electro-technical wholesaler, with whom he/she will be directly contacted. The electrician is now able to inquire the desired information and to put orders. Instalnet is based on bar coding and reduces the number of mistakes, the time to order and the time needed for payment. Some electro-technical wholesale companies have developed their own videotex-system. Besides the general information the buyers are able to obtain information with a modem about certain sale promotions. Electro-technical wholesale businesses also use viditel, on which buyers can look through the catalogue of the subscribed wholesalers. This system is more extensive than videotex. One can find information about the products, the available stock, the price (gross and nett prices) and one can order goods. Besides that, an electrician or other customer can submit a quotation for their customers. The advantages for the electro-technical wholesale firms of these systems are obvious: there is more information about the amount of goods in stock. This reduces the risks, time and costs. Considering that stock keeping always bears risks and takes about 7% of the total costs, a lot can be gained. A side effect of the open systems for information is that the wholesalers and their clients barely negotiate about the price anymore, but about the conditions of the deliveries, such as the delivery time, the (after sales) service, guarantees etc.

The increased information towards the buyers stands in line with the general growing interest in the client. An activity that has been performed more often by electro-technical wholesalers,

for example, is the composing of special packets of goods, this way serving the needs of the clients.

Figure 3 Outline of electro-technical wholesale functions

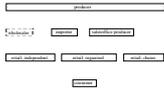
		PLACE	TIME	QUALITY	
TRADE FUNCTIONS (transaction level)	Flow of orders	Transformation of orders			
		international (import, export) national regional	building up of a stock	collecting distributing	product development, service, formation of assortments (large, deep)
ACTIVITIES TO PERFORM THE TRADE FUNCTION (activity level)	Flow of information	Communication			
		phone, telefax, telex, EDI, representatives, trade journals	collecting data, administration, contracts, transferring product information	collecting and supplying of information and data	adapting of information, advise and promotion
	Flow of goods	Physical distribution and transformation			
		transportation	depots, keeping stocks	collection of goods, combining or dividing goods	service, sorting, grading up or packaging of goods
Flow of money	Payment and credit facility				
	payment, money- transports	credit facilities	collecting commissions	insurance of payment and credit facilities, changing currencies	

Source: compaire Bunt e.a. (red.), 1989, p. 77

Electro-technical distribution channel

The electro-technical wholesale business had a total turnover of f2.2 milliard in 1995. This is approximately 65% of the total electro-technical branch in The Netherlands. In other words, the wholesalers are missing 35% of the turnover of the electro-technical market. Around 80% of the industrial electro-technical goods pass through the electro-technical wholesale business, about 25% of the electro-technical consumer goods such as refrigerators and washing-machines and 17% of the electro-technical consumer goods such as audio and video. In figure 3 this week position of the wholesale branch in the distribution channel of electro-technical consumer goods comes forward.

Figure 4 Distribution channels of electro-technical consumer goods



The role of retailers has increased strongly the last ten years in the branch of electro-technical consumer goods. The retailers can be classified in three groups, the chains, the organised retailers and the independent small retailers. First the chains. They play an important role in the distribution channel, but completely eliminated the wholesale sector. Often they have a central distribution centre in which the goods are delivered directly. The chains take care of the distribution to the chain stores by means of the bar coding system. They form the fastest growing retailer group and show the highest mean turnover per shop. For this reason they have a very strong buying power towards the producers, so that they can force low prices and favourable service and delivery conditions. The electro-technical wholesalers were not able to offer these conditions to the chains and therefore missed an important group of buyers. In 1990 there were 420 chain stores in The Netherlands. Famous examples are “Megapool” and “Scheer & Foppen”. The low prices are passed on to the consumers, in order to face the strong competition in the market for electro-technical consumer goods.

The second group of electro-technical retailers are the organised retailers. They are organised in purchasers or sellers groups or franchisers. Examples are “Expert” or “Electronic Partner”. They still spend 22% of their purchasing expenditures at the wholesale firms, but this percentage is decreasing. There were around 770 stores that participated in an organisation in 1990. The advantages of organised groups are clear:

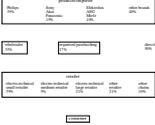
- purchase power towards the producers;
- advantages of scale concerning logistics, marketing, administration and education;
- overall stronger position in the tight electro-technical consumer market.

The reason that still 22% of the expenditures pass by the electro-technical wholesalers is that Philips is still using the wholesalers as an important distributor.

The final group of retailers are the small independent electro-technical shops. They spend approximately 48% of their purchasing expenditures at the wholesale firms. They still play a rather large part in distributing the goods towards the final consumer (see also figure 5). Also, they are the largest group in number, 2200 in 1990, but this number is decreasing as a cause of the merges and take overs by the chains. They do not have purchasing power, nor the knowledge and money to start their own direct distribution systems (Donkers, 1991, p. 16-44). The electro-technical wholesalers can still play an important role towards this group of buyers. The next figure also shows the distribution channels of electro-technical consumer goods, in particular audio and video and home supplies. Of these products the audio and video products constitute 64%, the large home supplies 22%, the small home supplies 10% and the rest 4%. It shows that 33% of these goods passes through the wholesale businesses. Half of

the goods reaches the retailers directly. Also the 17% of the goods that passes through organised purchasing groups could be added to the 50% of the direct flow of electro-technical consumer goods. Also the important position of Philips comes forward.

Figure 5 Distribution channel of audio and video and home supplies



Source: Verbeek, 1991, p. 203

It is clear that the position of the wholesale branch is rather weak in the distribution channel of consumer electro-technical goods. The electro-technical consumer goods are often only added to make the assortment complete. The competition in the channel of industrial electro-technical goods is strong as well, but the electro-technical wholesalers have a considerable strong position. The industrial goods have broader margins, need more technical knowledge and are used by professional consumers instead of the final consumers. Figure 6 shows the distribution channel of electro-technical industrial goods. The distribution channel of electro-technical industrial goods is much more complicated. There are more suppliers and more (different kind of) buyers. The most important links of this channel will be discussed next.

Figure 6 Distribution channels of electro-technical industrial goods



Suppliers of electro-technical industrial goods

The average number of suppliers of an electro-technical wholesale firm is somewhere between 100 and 150. Almost all of them are located abroad. Only an estimated 20% of the electro-technical industrial goods is produced in The Netherlands by Philips, Wavin or Holec for example. Within certain parts of the assortment, the suppliers try to influence the wholesaler in the preferred brand, so that their particular brand will be sold and not the others (sole agency). Philips has the channel power to do so. Many electro-technical wholesale firms are willing to sell products of Philips because it is a popular brand. Philips is able to choose the wholesale businesses to be their distribution partners. But the producers are rarely able to force sole agencies and brand preferences on several different parts of the electro-technical assortment.

In contrast, the aim of the electro-technical wholesale businesses is to carry a broad and deep assortment with a lot of variety. This way they will be the most attractive for their customers. On the other hand they do also have mutual interests. The wholesalers are in the best position to pass on product information and to promote new products. This way they can create new demand, which is favourable for the producers. The producers do also need the wholesalers as an extra link in the distribution channel. We saw that the electro-technical wholesale firms carry around 70.000 articles in their assortment. Below we will see how many different kinds of buyers need the industrial electro-technical goods to continue their own production or building process. Therefore it is easy to understand the new development going on now, in which producers and wholesalers increase to cooperate in the exchange of information.

Buyers of electro-technical industrial goods

The market for electro-technical industrial goods is characterised by new products, replacement products and products for maintenance of existing machines or buildings. The wholesale companies have on the average 1,000 customers. The bigger, national electro-technical wholesale businesses in The Netherlands have over 10,000 customers. Most customers are located in The Netherlands, about one quarter is located abroad. The buyers of electro-technical industrial wholesalers are:

- production industry;
- industries that produce ready made parts for big building projects;
- electricians;
- governmental institutes;
- hospitals and other large institutes;
- do-it-yourself shops and other retailers.

The electricians are the most important customers. In The Netherlands there are approximately 5000 electricians. They design, install, maintain and repair divers technical installations. As well as with the electronic retailers, there is a strong development of merges, buy outs etc. Especially the small electricians buy their goods at wholesale businesses for electro-technical industrial goods. The bigger ones have the channel power to approach the industry directly (Coenjaerts en Vermeer, 1995, p. 22).

Competition in the distribution channel of electro-technical goods

Now that we know the different links in the distribution channel of electro-technical goods we will set out where most competition comes from, since the competition in the electro-technical branch is strong.

- 1) Most competition is felt from the other electro-technical wholesale firms. For example, the electricians gather their requirements from 2 to 3 electro-technical wholesale firms. This means that a lot of effort must be put in creating favourable conditions to stay attractive to the electricians. The wholesaler needs to compose the right assortment and offer enough service. To beat the competition they can specialize on certain parts of the electro-technical assortment, which demand a lot of know how.
- 2) Besides the fact that the bigger electricians often receive their required goods directly from the producing industry, they do also have the same customers, such as large building projects, with which they can perform trade functions as well.
- 3) We already mentioned the competition of the large scaled retailers for electro-technical consumer goods earlier, such as the chains and the organised purchasing groups, that have eliminated the wholesale branch. They continue to take over the smaller independent electro-technical shops, which still form an important group of customers to the wholesalers.
- 4) Also the large scaled retailers for electro-technical industrial goods, such as the do-it-yourself shops have eliminated the wholesale branch. Moreover, they take over the stock keeping function and the (after sales) service function from the wholesalers. Next to that, they sell (partly) the same products to the same customers, such as small electricians. The large scaled retailers are a rapid growing phenomenon in The Netherlands, now that the Dutch government has loosened the regulations locate large scale retailing at the edges of cities.

- 5) Competition is also felt from producing industries, agents, importers of both electro-technical consumer and industrial goods, that pass the wholesaling link and deliver the goods directly toward the chains or big electric installation projects.

Next to the competition that is felt directly from the other links in the distribution channel, a lot of competition comes from other kind of companies. The problem for the electro-technical wholesalers is that these companies create a stronger competition with the electricians and therefore indirectly hurt the wholesale business, as the electricians start purchasing to a lesser extent. On top of that they are hardly ever customers of the electro-technical wholesalers.

- 1) Specialised technical engineering offices and telecommunication offices sell to the professional customer, where as electricians could also have specialised in this work.
- 2) New competition comes from the energy distributing firms, that start their own installation activities.
- 3) Professional cleaning businesses that extent their service activities with repairing services.
- 4) Electricians also experience competition from companies that install cables for roads and waterways, contractors and assembly shops.
- 5) Finally, there is, to a lesser extent, competition of the logistic service industry. If these companies start to expand their distributing activities with stock keeping, managing the administration of customers or start using their contacts within the electro-technical market to start fulfilling their own trade functions, the wholesale business will have to confront an other important competitor.

The wholesale companies that still trade in electro-technical consumer goods face the same problem: as do the electricians, the independent small electronic retailers are increasingly confronted with competition from companies from other retail branches. This means that indirectly the wholesale firms feel the lost purchasing power of their only important customers of this part of the electro-technical assortment. Indirect competition is coming from mail order companies, photographers shops, department stores, supermarkets, do-it-yourself shops, big national shopping chains for home supplies, like in The Netherlands “Blokker” and the “Kijkshop”.

Developments within the distribution channel of electro-technical goods

Evidently, the competition is strong, and in some cases the electro-technical wholesale business has been passed over by the other links in the distribution channel. Especially the smaller wholesale firms are not always able to survive. In reaction to this several developments are taking place. Firstly, the bigger wholesale enterprises have improved their information and advising function and started offering more technical service. The smaller electro-technical wholesale firms put more emphasis on the traditional wholesale functions, such as keeping stocks and distributing the goods. In the future, small electro-technical wholesalers might cooperate in the form of a joint central distribution centre. They also search for more cooperation with their clients. Secondly, the electricians, especially the bigger ones, desire direct delivery on the spot where they need it, at exactly the right time. They also desire all different products delivered at once. This coincides with the just in time system used in the building industry. For the smaller electricians one stop shopping is very important. In case the electrician has forgotten to order a certain product, he/she can collect the products quickly at these self service electro-technical wholesalers. This means that the wholesalers really have to put effort into putting the right assortment together. Finally, the buyers of the wholesale businesses demand more variation in the products, more product information and advise. They

demand lower prices and special discounts. Just mentioned before, they demand correct delivery and in smaller amounts, so that they do not have to keep stocks.

This meant that the electro-technical wholesale businesses had to keep up with these wishes. Besides the wishes of the buyers, there are the wishes of the suppliers and the competition of all above mentioned business. People keep stressing the threats of the competition and elimination for the wholesale sector in general. On the other hand, this makes the wholesale sector a very innovative and dynamic sector. They have implied many technological changes in communication, distribution and information. For the electro-technical wholesale business we see the following chances:

- (small) growth in the electric installation market;

- more effectiveness and efficiency in the electro-technical wholesale business;

- the customers of the wholesale firms tend to contract out more activities to be able to focus on their core business, so that the electro-technical wholesale business can take over these activities;

- producers of electro-technical products tend to separate the commercial and logistic activities more often, which gives the wholesalers the chance to increase their part in the logistic process;

- the electro-technical wholesale businesses can play a leading role as 'information supplier', they should be more alert to give market information towards the producers and product information and advise to their customers.

Location pattern of electro-technical wholesale business

The spatial location of the electro-technical wholesale enterprises does not differ a lot from the total wholesale sector shown in figure 2. Amsterdam and Rotterdam are important places. Besides those cities, the electro-technical wholesale is to be found in medium sized towns throughout the country. The concentration in Eindhoven can be explained by the presence of Philips.

The following location factors are of big importance to the electro-technical wholesale business:

- the location should give the possibility for quick deliveries;

- the site should be close to the buyers;

- the place must be well accessible by the national highway system.

These conditions of a suitable site of the electro-technical wholesale business does not differ much from the total wholesale sector. Also the general location factors, such as the availability of proper sites and buildings (with possibilities of expansion), parking place, good personnel, the price of the ground and whether the site is representative are of the same importance. Not important at all to the electro-technical wholesalers are the locations close to a market or auction, governmental and financial institutes, logistical service centres and the suppliers of electro-technical goods. Some wholesalers pointed out the location close to other electro-technical wholesalers, in order to keep an eye on each others suppliers and buyers.

Electro-technical wholesale businesses are mostly found on industrial or business sites for 'light' business, well accessible by truck.

Figure 7 Spatial location of electro-technical wholesale firms in The Netherlands in 1997,
absolute numbers

One dot equals one electro-technical wholesale firm

Source: cd-rom Reach, based on data from the NV Databank, Dutch Chambers of Commerce

Spatial pattern of electro-technical wholesale firms related to the distribution channel

How do the developments in the distribution channel of electro-technical goods influence the location pattern of the electro-technical wholesale firms? In this final part of the paper we will anticipate on some consequences to the spatial network.

Wholesale companies that only trade in electro-technical consumer goods do not exist anymore in The Netherlands. Nevertheless, these products form around 18% of the assortment of the electro-technical wholesale firms that do still carry these products (see table 2). We saw that the customers of these goods were mostly the small independent retailers. They do not have large centrally located distribution centres, but need to be delivered in their stores, located all over the country, even in small villages. Therefore, a close-meshed distribution pattern is needed. This means that the electro-technical wholesale companies should be located near by the customers.

The situation in case of the electro-technical industrial distribution differs when we look at the position of the wholesale companies. This position is still strong. The location pattern however, is also determined by a close-meshed distribution network. The wholesale firms have on the average a thousand customers, of which the electricians form the most important group. They are also located at all kinds of places, ranging from small to large scaled cities, and have to be able to reach the wholesale businesses easily. The other buyers, such as production industries, institutes, retailers and new building construction areas, are located all over the country as well.

The most important location factors, the possibility for quick deliveries and short distance to the customers, point out that the spatial network of the distribution channel of electro-technical goods is orientated on the final links in the channel, the customers of the wholesale firms. This is strongly related to the high demands of the customers. With the highly managed just in time systems in the construction industry and the production industries and the bar coding systems of the retailers, the wholesale firms have to fulfil the need of distributing the goods quickly and without mistakes, at the right time and place. Just in time works more efficiently when distances are smaller. Also the increased information, advise and service functions of wholesale business require personal contact with the customers. Therefore, the spatial network is not expected to become of a larger scale.

If small electro-technical wholesale firms do start to work together in building up a large distribution centre that will function for each participant, this will still be on a regional scale. The strength of the small firms is exactly the fact that they are located close to their customers and fulfil an important role in the ends of the close-meshed distribution of goods. At the same time, the development of merging and scaling up of the businesses has brought about very large, nationally operating electro-technical wholesale businesses, such as the "Technische Unie". With one central distribution centre and 35 sales offices, the Technische Unie can still reach the outer regions. These sales offices are located in the large and medium scaled cities, and therefore will not reach the close-meshed distribution as the small scale electro-technical wholesale firms.

The repercussion of the electro-technical distribution channel on the map of The Netherlands shows three pictures. One of regional operating wholesale companies, that have their customers only scattered around them in the same region. The second picture in fact also shows the regional orientation and close-meshed distribution of the previous picture, but in this case of the regional sales offices of the large national wholesale chains. The third picture is that of nationally operating wholesalers that have clients located over a bigger part of the country, but not in the whole country. From here we would like to conclude with the final remark that of all location factors, the location close to the customers is the second most important (after quick deliveries). This indicates the link between the way the distribution channel is set up and the spatial pattern of the wholesale branch.

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