

Logistics and Transport Management

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Possibility of Cooperation for Mix Carload to reduce the number of
trucks in the city Center of Gothenburg

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Abstract

There is a tendency for traffic increases traffic in the city by private, public and freight transportation. The importance of reducing traffic has been a priority for the politicians by introducing environmental zones and promoting combined transport.

This report aims to provide the knowledge of retailer's behavior when transporting their goods from suppliers to their shops and to see in which way the coordination of freight transport can be implemented.

In this study, we show that the voluntary freight coordination does not come easily from retailers. From the questionnaire we sent, we found that the retailers are satisfied with the current distribution process and most of the respondents are not willing to cooperate.

The action of freight coordination might come from other actors who are directly facing the traffic situation in the city, which we show in the scenario of suppliers' coordination as a proposal of mix carload.

This research report is the master thesis written to complete the Master Degree of Management of Science in Logistics and Transport at Gothenburg University, School of Economics and Commercial Law. This report is written on behalf of the Göteborgs Köpmannaförbund, the association for retailers in Gothenburg, which was interested to study the possibility of mix carload within the city to deliver consignments to several different retail food stores and restaurants in the same trucks.

Acknowledgement

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We would like to thank Lena Larson from Göteborgs Köpmannaförbund for very appreciable treatment and support throughout the whole process and supplying of useful relevant data about latest situation.

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Special thanks to my parents who always pray for me, my sisters and brother who encouraged me, my sister Jeannie and Torbjörn Helmfrid for your support until I finished this thesis, and also to my two lovely nieces.

Finally, we would like to thank to our tutors Ove Krafft, Senior Lecture at School of Economics and Commercial Law of Gothenburg University, and Lars Mossfeldt, Senior Researcher at Chalmers University of Technology, for guidance, encouragement, support and correction of our thesis work.

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Gothenburg, February 2004

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1. Introduction

1.1 Background

Transport is essential for the society and economy. Transportation is one of the tools that civilized societies need to bring order out of chaos. It reaches into every phase and fact of our existence. Viewed in historical, economic, and environmental, social and political terms, it is unquestionably the most important industry in the world. Without transportation, we could not operate a grocery store or win a war.¹

Gothenburg is Sweden's second largest city the with largest sea port in Scandinavia and important business sector of the country; also faces the same problems. Seventy percent of Scandinavia's total industrial capacity is located within a 500 kilometer radius of the Gothenburg region. As Sweden's important city, government and politicians are concerned with improving the freight and public transportation system of the city. To achieve a sustainable target, there are several projects that have been going on in the city center for improving transportation and environmental situation.

The rapid pace of increasing needs of transport for people and goods within the metropolitan cities has created environmental and traffic problems. Freight transportation can play a significant role in the competitiveness of an urban area and is, in itself, an important element of the urban economy, both in terms of the income it generates and the employment level it supports. However, continuously increasing demand of freight transport is also responsible for traffic and environmental impacts in urban areas such as congestion levels, pollution, noise, fuel use, etc.

Inner city traffic, particularly for heavy goods vehicles, is becoming more and more of a nuisance. The emissions of motorized vehicles are responsible for increased illnesses among city dwellers. To prevent these causes, the traffic and public transport authority developed an environmental zone in the inner city of Gothenburg. The zone was constructed in 1996 by the help of TELLUS

¹ John J. Coyle et al., *Transportation, the supply chain & the economy* (Transportation 5th Edition, South-Western College Publishing, p19)

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg (Transport and Environmental Alliance for Urban Sustainability) for the restriction of diesel trucks in the city center. A plan for enlargement of the environmental zone has also been proposed.

The content of this thesis paper is based upon research carried out by the Gothenburg University School of Economics and Commercial Law and Chalmers University of Technology, which examined daily food freight distribution in its broadest context, so to include not only the delivery of goods but also the retailers and suppliers role and transport activity of the service sector. A major feature of the study was to explore the character of urban distribution by examining the role of the supply chain.

1.2 The role of transport in global economy

Transportation is a vital activity in moving both freight and passengers around the world. The management of transportation is concerned with the overall purchase and control of this movement service used by a firm in achieving the objectives of its logistics process.²

Consumer demand has created, and continues to fuel, prosperous economies that now sustain themselves in many ways in our daily lives. Products from all over the world are almost immediately available at our door step and at affordable prices. This could not happen without efficient and reliable transport. Reliable freight distribution is essential to enable continued growth of the global economy. Curbing transportation needs may effect economic development and the prosperity it brings.

1.3 Basic idea of the thesis

There is a big concern from the politicians in city of Gothenburg regarding the pollution and congestion in the city, made by the increasing numbers of passenger transportation, public transportation and freight distribution for retailers within the city. The idea of reducing pollution and congestion in the city would require a cooperative transportation either between retailers or suppliers.

² John J. Coyle et al., Transportation, p3

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The basic idea of this report is to study the possibilities of consolidated mix carload to deliver consignments to several different retail stores and restaurants in the city in the same trucks in order to reduce the number of trucks. Along with a reduction in truck traffic, other possibilities would be considered such as reducing transportation cost for retailers and the transportation providers for freight distribution.

1.4 Goteborgs Köpmannaförbund

Göteborgs Köpmannaförbund is an independent interest organization for retailers in the Gothenburg region, providing several benefits to their members to develop a sustainable business environment.

1.4.1 The Role of Göteborgs Köpmannaförbund

Göteborgs Köpmannaförbund is an 80-year old retail association. In 1997, they merged with Svensk Handel (The Swedish Retail Trade Association), but left that association in April 2003. Köpmannaförbund provides services for various market situations, they try to influence politicians and authorities to make decisions that are favorable to the retail business. They wish to provide the best business environment possible for the retailer and to develop the retail business in the region. The association has 800 members.

There are a number of retailers and wholesalers that have membership with Göteborgs Köpmannaförbund in Gothenburg because of their support in the retail business. There are some requirements and criteria to become a member of Göteborgs Köpmannaförbund that we discuss later. In the end, Göteborgs Köpmannaförbund provides benefits and support to their members in a variety of ways.

1.5 Purpose of the research

The purpose of this study was to gather case study information about ways in which coordination may develop either between small retailers or suppliers as in the form of combined orders to improve the provision of transportation in the city.

In order to develop better city transportation, one must find the possible way of mixing different consignments in one truck and deliver the consignments to

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different shops and restaurants in the same area in order to reduce the truck traffic in the city, which also reducing pollution.

Furthermore, this study of mix carload is also to analyze the possibility of reducing the cost of freight transport in both retailers and transportation providers or suppliers.

2. Facts about Gothenburg and the Research Area

The city of Gothenburg was founded in 1621 by the Swedish King Gustav II Adolf, but it was developed largely by city planners and canal experts from the Netherlands and Germany. The Gothenburg region has more than 600,000 inhabitants. Gothenburg has everything a modern city should be able to offer, combined with a relaxed and welcoming atmosphere.

Gothenburg has functioned as an urban center with a civic organization and local government, whose purpose has been to care for the welfare of its inhabitants, for 375 years. To this day, the city owes much to the influence of people from abroad. Tourists and other visitors return year after year - the Gothenburg region is one of the most popular tourist areas in Scandinavia.³

In 1987, the City Council decided to implement the City District Committees, and in 1988 the Council formulated their fields of responsibility. The main purpose of the district committees is to promote democratic influence over the City's activities and ensure that the people of Gothenburg obtain the services they need. These services must be of high quality, and they must be easily accessible and fairly allocated.

Since 1990, Gothenburg has been divided into 21 different geographical areas. Each one of them is "governed" by a City District Committee. The City Districts Committees are:

Askim, Backa, Bergsjön, Biskopsgården, Centrum, Frölunda, Gunnared, Härlanda, Högsbo, Kortedala, Kärra-Rödbo, Linnéstaden, Lundby, Lärjedalen, Majorna, Styrso, Torslanda, Tuve-Säve, Tynnered, Älvsborg, and Örgryte. (Göteborgs Stad)

2.1 Location of the study area

The area we selected as a research area is a part of environmental zone in Gothenburg for heavy traffic. This is clearly indicated in the map below. The

³ Göteborgs Stad

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 whole shaded area is under the environmental zone and the area highlight by a broad line is a selected area for research.

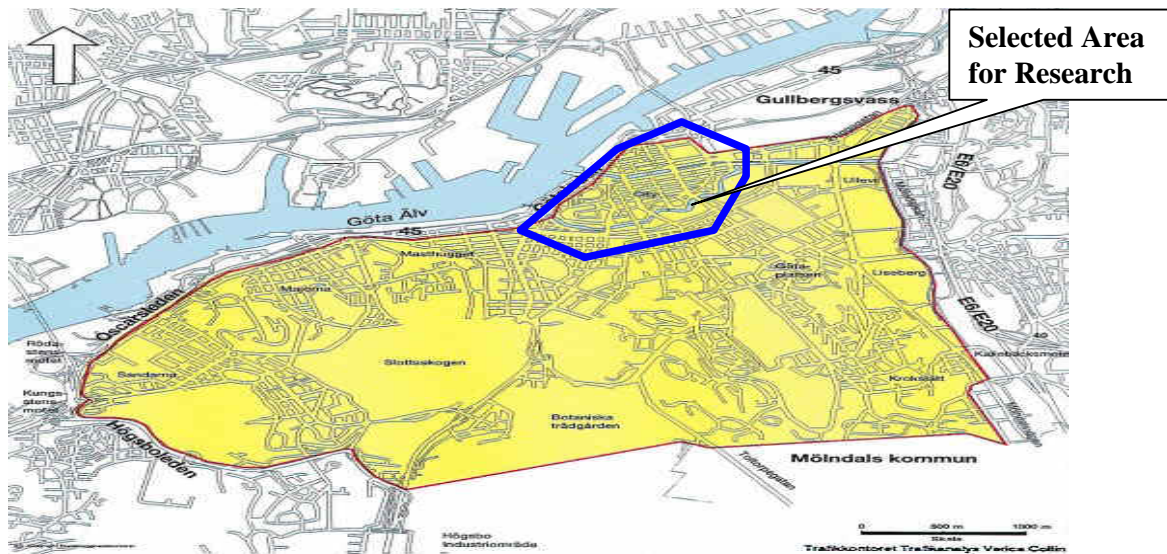


Figure 1: Environmental Zone for Heavy Traffic 2002⁴

2.2 Environmental Zone in Gothenburg

The environmental zone in Gothenburg covers a linked area inside Oskarsleden, Götaleden, the Gullbergsvass area, the roads E6/E20, and the border of Mölndal and Högsboleden. The activity areas between the road E6/E20 and the Mölndal River are not a part of the zone.

Within the zone (approx. 3 x 5 km), about 100 000 persons reside and there are about the same number of work places.

TELLUS is currently producing an information leaflet in Swedish, which will serve as one of the tools for the marketing of TELLUS on a local and national level. They are working for the Gothenburg city environmental zone.

The traffic and public transport authority will develop the existing environmental zone in the inner city of Gothenburg. The zone has existed since 1996, and is an efficient way to minimize the environmental influence from heavy vehicles. In order to further improve the air quality in the central parts of the city, the demands for traffic entering the zone need to be more stringent. A plan for expansion of the zone area is also going to be developed.

⁴ Trafikkontoret

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A proposal of new criteria for rules in the environmental zone has been set up as a result of several discussions between the other concerned cities in Sweden. Gothenburg plans to introduce the new rules in January 2005. Additionally, a plan for enlargement of the environmental zone has been proposed. A new part of Gothenburg, Lundby, is growing on the north side of the river and this new area is proposed to be included in the zone. Information signs are at the moment being placed at all entrance roads to the existing zone, altogether 32 signs. Signs will be placed at all rest areas along the highways with maps showing the zone area. An information leaflet about the environmental zone has been produced in English and Swedish.⁵

2.3 Road user charges in Gothenburg

There was project carried out by PRoGR€SS during 1996 and 1997 in the city of Gothenburg. The initiative was to protect the environment and the result was a set of pricing strategies for road charging.

They introduced the pricing system which contributed to reducing the congestion and the mobility of the vehicle movement. The systems are “Congestion trajectory-based pricing” and “Environment trajectory pricing”. The first charging scenario is only active 1 hour during morning peak hour between 07:30 – 08:30. The pricing was set at two levels for private vehicles and trucks over 3.5 tons. The second one is active 24 hours a day with 3 fee zone levels, where the level of fees increases closer to the city center.⁶

2.4 Incentives for improving the load factor in inner city freight transport

In the inner city of Gothenburg there is congestion of heavy transports and they are not able to find place to load and unload. In some area's, trucks are forced to keep driving to find appropriate space to load / unload and consequently waste time, and sometimes the driver just parks the truck on the detours or other places that hinder the traffic in the whole area. The project aims at designing and introducing a zone for inner-city distribution in Gothenburg. In this city zone, a demand on load rate on the vehicles in addition to the demands

⁵ TELLUS newsletter, 2003

⁶ PRoGR€SS 1996-97

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg on emission levels will be introduced.⁷ This project continues, and in spring 2003 a questionnaire was sent to all operators in the Gothenburg area to see the progress of the activities influenced by this load factor restriction.

2.5 Description of study area

The research area is located in the main city center and a part of the Centrum district. This is also referred to as the old city and a center of new city. As a part of the Centrum district and under the environmental zone consideration, this area has more importance than the others from a transportation perspective.

The magnified map of the selected area is shown on page 9, which gives a better idea of the importance of that area. As a center of the city, this area has a lot of importance due to its location as well as from a business point of view. There are many market places, offices, restaurants, coffee shops and food shops located in this area; this area is one of the busiest areas of the city.

The most important places that are covered under this area are Nordstan shopping center, Domkykan, Grönsakstorget, Kungstorget, Brunnsparcken and Kungssportsplatsen. The restaurants and food shops in a selected area have been selected as a research area for this thesis report. The details of the food shops, restaurants and the coffee shops in that area are given in Appendix C and Appendix D.

This research report covers aspects related to transportation and distribution of food items to retailers stores such as the type of vehicles being used for distribution, the number of trucks used for distribution, the suppliers involved in this area, delivery timings and retailers requirements, etc.

2.6 The focused area of research

In the Centrum district we found about 17 food shops and 146 restaurants and cafés. The number of food shops and restaurants is not 100% correct due to time limitations and access barriers to contact each and every one. But we believe that the numbers of shops and restaurants we included covers most of them and also represents the remaining shops that we were not able to contact.

⁷ TELLUS newsletter, 2003

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 We believe that the number of shops and restaurants we missed is very small.
 The details of these retail stores are given in Appendix A.

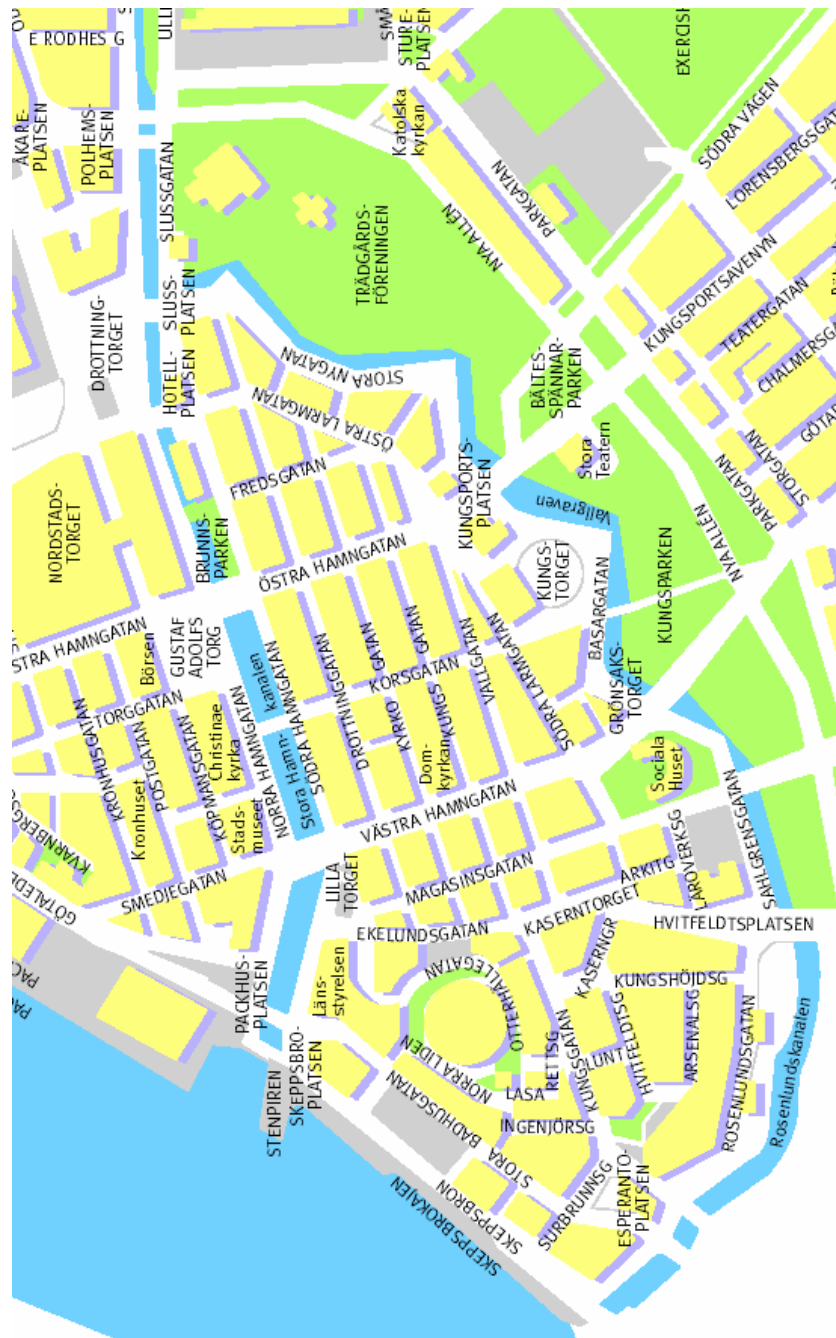


Figure 2: Map of the Research Area, the Part of the Centrum District⁸

⁸ Göteborgs Stad Centrum

3. Problem Analysis

3.1 Main problem

The politicians are concerned about reducing the pollution and congestion in the city by reducing the truck traffic. The main problem in this area is that the freight transportation for food shops and restaurant in the city is not efficient, which creates congestion and pollution in the city. The existing distribution system is a hybrid type that we will discuss in detail in coming chapters.

3.2 Sub Problems in the mix Carload Construction in Gothenburg

The model of retailers in Gothenburg is just like others in northern Europe, a combination of big retailers and small retailers. Big retailer chains like ICA, Coop Konsum, and IKEA have their own distribution system and their own transportation to serve all the shops in the chain. There are many transportation companies dedicated to transport products for those chain retailers. Other trucking companies have different kinds of services, which serve different types of freight transportation independently or dedicated such as:

- a) Bulk cargos, where the volume of a single consignment can fill a whole vehicle, and general cargos, where the consignment is smaller and therefore has to be consolidated with other goods in the transport vehicle
- b) General cargos of ordinary and small consignment sizes
- c) Small sizes of general cargos and postal parcels

Every trucking company is familiar with route planning to calculate the minimum transportation cost for their truck movement when serving different customers. For big retailers, the schedule of delivery for different shops is part of the distribution planning. Technology supports in the supply chain such as GPS in the truck for tracking and tracing, a replenishment system in the shop such as fixed order quantity (FOQ), and a fixed order cycle (FOC), reduce the lead time and effort of handling and transporting the goods from origin to destination.

Those logistics and transportation concepts give a positive impact in both the trucking company and retailers, where the company can give 'Just in Time'

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service for delivery of the goods to the shops and the shops can keep the availability of the goods in stock.

In general, the concept can reduce the number of trucks in the city. But with time restrictions, rules for truck size in the city, and competition among the trucking companies, the concept is slightly changed. They have to deliver the goods with a Less than Truck Load (LTL) to meet the customer needs; otherwise, customers would switch to another company. The result is that congestion still exists, as we can see in the corner of Gothenburg, different trucks come to the same street at the same time and the second truck has to wait for the first truck to finish their duty so they can continue the journey.

On the other hand, the smaller retailers in Gothenburg prefer to use their own vehicle to buy their supplies and transport them to their shops. They can go to the cash center to buy their supplies, pay with cash and bring the goods to their shops. In fact, there are many small shops and restaurants using their own vehicles. The shops have small consignment and the turnover is too small for them to get a contract with suppliers, therefore is more convenient for them to use their own vehicle instead of using a trucking service. This is unseen, but the fact is, these freight distributions also contribute to congestion and pollution in the city. In this case, it would be a problem to construct mix carload in the city.

The question is, is it possible to coordinate the freight transportation between retailer and supplier in order to reduce the number of freight vehicles in the city by mixing the retailer consignments in one truck from different suppliers, resulting in efficient distribution which will help to reduce the environmental problem in the city.

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The research project can be described on the following figure:

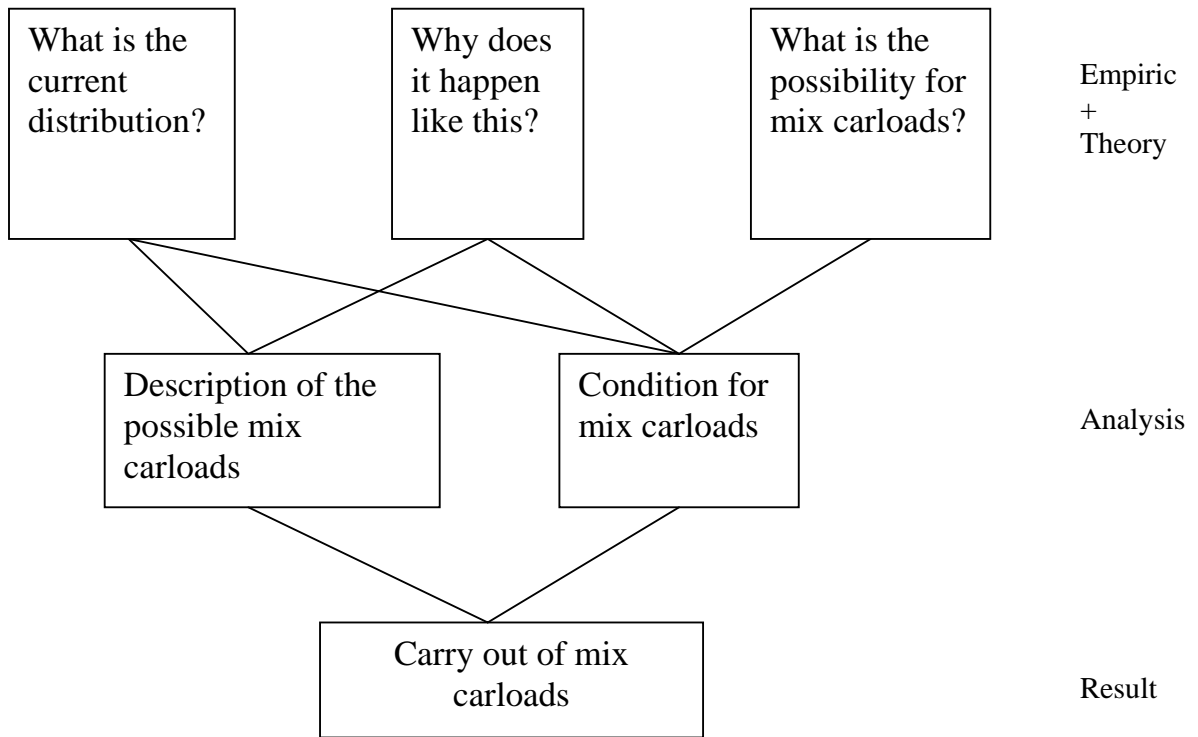


Figure 3: Outline of the Research Paper

3.3 Discussion (about type of retailer/supplier)

The retailer types and size vary, especially in Gothenburg, and like other northern Europe countries, there are big retailers and small.

In this research, the types of retailers/shops that we are going to analyze are the retailers who independently run their shops/restaurants. From our point of view, these types of retailers have the possibility of mix carload. The consignment they need is too small to have one full truck, so it's too costly for one shop to have a truck to transport their small consignment. But it is not too small for several shops to cooperate together to transport their consignment in one full truck, because those shops can share the transport cost, and therefore the cost will be much cheaper.

The type of suppliers will also be analyzed, but not all types of supplier. These suppliers have regular customers with big consignments, but also small customers with small consignments, referred to as Snabbgross which means Cash center. These suppliers use their trucks to deliver the goods to their customer, but also serve the retailer who buys and transports for their small consignment. They only accept payment by cash from their customers, or maximum 10 day terms of payment for big purchases.

4. Theoretical Framework

Generally, theoretical studies form a relation to the project and serve to expand the researchers' knowledge of the subject. Theoretical studies are used to ensure that available theories for finding an answer to the research problem are identified. By the combinations of authentic theories, a theoretical framework is formed that explains the research problem in an appropriate way, and points out the key areas of interest for further studies. The topics and variables we are using in our thesis report with theoretical background are as follows.

- Existing transport pattern of the daily goods by different suppliers
- Political and social issues concerning freight transportation and environmental concerns
- Variables in this research study are delivery vehicles, delivery time, transport mode used for deliveries and type of delivery goods.

The actual situation is always lagging behind the ideal situation, but the purpose of our research is to make it close towards the ideal situation. The discussion is about the existing transport system, sizes and types of vehicles used in the area with environmental zone restrictions and time restrictions. However, the other supportive theories that would have some link with city logistics and our research work are also discussed in this chapter.

4.1 City Logistics

The term logistics was introduced in military support activities, and since the 60's became popular in the economics field. Logistics is the interaction of temporal, spatial, functional, quantitative and qualitative dimensions of the goods flow, whereas transport bridges the gap of distance between places of production, consumption and disposal. Logistics plans, controls and realizes the goods flow. An optimization of the entire logistics chain is the declared goal.⁹ The term of "city logistics" is itself related to the urban goods flow.

⁹ Susanne Strauß, *Extract: City Logistics an Instrument to Decrease Urban Freight Traffic* (City Logistics and Traffic Planning, p8)

Some definitions of city logistics:

1. City logistics can be defined as the balance of supply and demand of storage capacity. This shall include the organizational and technical design of all supply and disposal channels of the city
2. City logistics is the organization of freight transport in order to optimize vehicle utilization and minimize trips in densely populated areas. The goal is to reach synergism by consolidation.
3. City logistics is the attempt to organize freight trips directed to the city enter in order to achieve a transition from a spatially separated distribution of individual commodities (the same kind of foods are sent to several receivers) to a spatially coordinated distribution of several commodities (several kinds of goods/articles are sent to the same receiver)
4. City logistics is a new organization of urban freight activities comparable to vehicle routing procedures of express or parcel service: the delivery of goods to certain parts of the inner city is coordinated and carried out with smaller, specially adapted, environmentally friendly city trucks instead of badly utilized heavy trucks. Another aspect is the implementation of storage facilities in inner cities and to include disposal.
5. City logistics includes all measures that satisfy the demand to supply a city efficiently with goods and articles which are adapted to kind, quantity, time, space and environment.
6. City logistics is the efficient organization of urban freight traffic in order to meet ecological and economical standards. This refers not only to the inner city but the total vicinity including private, public and commercial activities. The aim is an integrated foods transport concept for the entire city.
7. City logistics must plan, administer and control all flows of material, persons, energy and information which can affect the city.
8. City logistics can be defined as a merge of unidirectional freight traffic flows within a city area. The goal is an efficient and sustainable urban freight transport supported by all means of infrastructure, organization, information technology and personal components.¹⁰

¹⁰ Susanne Strauß, p8-9

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In the urban freight traffic many actors are involved directly or indirectly, and it creates a contradiction between the goals and the interest of different actors. The goals of city logistic as mentioned are most likely efficiency and sustainable urban freight transport, which means the sender and receiver of the freight and the transport provider are the actors who are directly affected by any changes of the strategy. The other actors that are indirectly involved but have an influence on the planning and decision process are the municipality and the city administration.

The success of efficient and sustainable freight transportation depends on the willingness of the involved actors to work together to change the current process to be more efficient. The correlation and the influence between the actors can be described per the below figure:

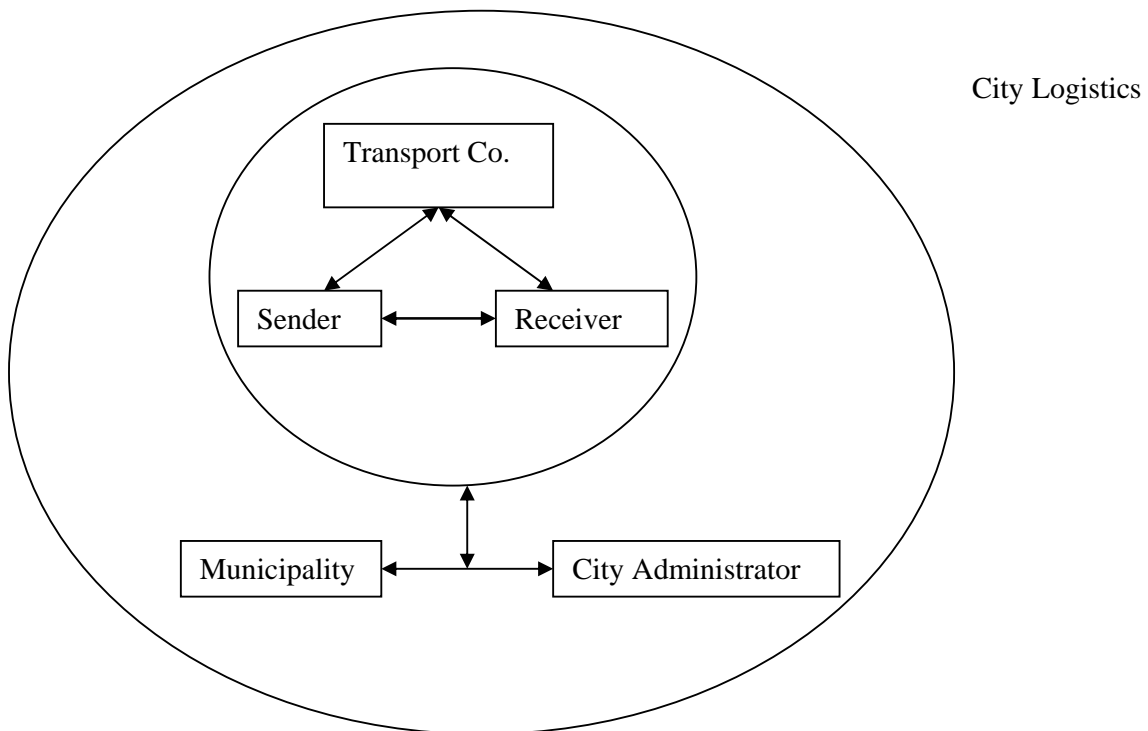


Figure 4: Different Actors Involved in Urban Freight Transport

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4.1.1 Traffic administration and municipality

The Traffic and Public Transport Authority (trafikkontoret) in Sweden has responsibility for the traffic planning transport services and roads within the municipality. Trafikkontoret cooperates with Västtrafik in Göteborgsområdet AB. The office is administered and developed by the municipality as a Traffic and Public Transport Committee. The responsibility includes route tracks for tramlines and infrastructure for motorized and non-motorized traffic. In addition, the committee has ultimate authority in accordance with the Traffic Committee Law. With the National Road Administration (Vägverket), the cooperation includes the major road links in and around Gothenburg as well as with the regional public transport authority (GLAB). This cooperation can coordinate the requirements of the municipality at an early stage, with the traffic and public transport goals of the region.

The task of the committee is to ensure that the transport system meets the requirements of different groups. The task should cooperate with national, regional and municipal bodies and other interested parties and should be based on the needs of wider community.

As a committee, the Traffic & Public Transport Authority carries out and implements the measures of the committee and as a contact person and purchaser for contractors to carry out the work within the traffic and public transport. Outsourcing work to contractors helps them to ensure that the competition among the contractors provides a better service to public users. The result is an improved environment and increased use of public transport.¹¹

Due to European rules and regulations, subsidies, manufacturing and import regulations, the deregulation of the transport market built a framework that cannot be easily changed by local and regional attempts,¹² municipalities' influence on the urban freight traffic are limited, and the city planning must reflect the European rules and regulations.

¹¹ Database, Leda case study city

¹² Susanne Strauß, p17

4.2 Distribution

The distribution is the part of the transportation chain, which brings commodities for the customers' disposal. The producer of the commodity can manage the distribution but quite common practice is the use of some kind of wholesale function between the producer and the consumer. For example, a majority of food and other retail articles are delivered via wholesalers.

The journey of commodity from the producer to final consumer can contain several supplier-customer relationships such factory - wholesaler, wholesaler - retailer, retailer - consumer. In every stage of the chain, the buyer wants commodities at the right quality and demands appropriate customer service. The quality of the product must not diminish in the chain, which sets certain quality demands to the material functions of the whole chain.

4.2.1 Market distribution

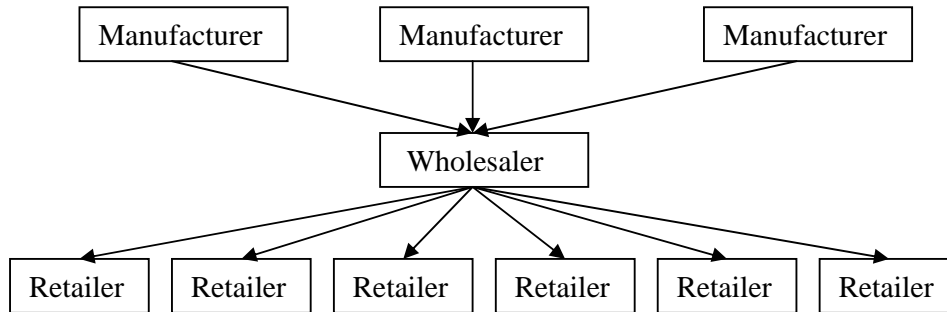


Figure 5: The Principle of Minimum Total Transactions (Redrawn From Supply Chain Management, Donald J. Bowersox)

Retailing is the set of business activities that adds value to the products and services sold to consumers for their personal or family use.¹³ Retailers are the final tires in the distribution channels that link manufactures with consumers. The figure above describes the position of retailers in the channel links.

The functions performed by retailers are:

1. Providing an assortment of products and services
2. Breaking bulk
3. Holding inventory
4. Providing services.¹⁴

Providing Assortments

The functions that retailers perform increased the value of the products and services that they sell to consumers. Supermarkets typically carry 15,000 different items made by over 500 companies.¹⁵ Thus, the consumers feel more comfortable to go to a one stop shop to buy different types of assortments then

¹³ Michael Levy, PhD, A Barton Weitz, PhD, *Introduction to the World of Retailing,*” Retailing Management (The McGraw-Hill Co., 2001, p8).

¹⁴ Michael Levy, PhD, A Barton Weitz, PhD, p9.

¹⁵ Michael Levy, PhD, A Barton Weitz, PhD, p9.

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if they would have to go to different manufactures to buy a different assortment.

Breaking bulk

The “breaking bulk” performed by retailers reduces the transportation cost for manufactures and wholesalers. Retailers basically receive goods in bulk from suppliers and sell the products in smaller quantities to end consumers.

Holding Inventory

A consumer purchases a small size of assortments for their individual needs, and other consumers need different assortment; Thus, retailers has to keep inventory of different assortments in the store, so the products will be available to fulfill consumers’ needs.

Providing service

Retailers add service value in the store, like the display of the products made convenient so the customers can see and to choose the product they want, and even to test the product before they decide to buy it. Some retailers provide a salesperson to help customers to provide additional information about the product.

The distribution model is not strictly the same as it is drawn above. The distribution can be more indirect from manufacture through several layers of channels before the goods reach the retailers, or it can be direct from manufacture to retailer depending on many aspects such the type of the product or the choices of the company strategy. To get a larger market share, some producers choose to deliver directly to customers. That choice eliminates the wholesaler in the distribution chain and makes it impossible to consolidate freight at the wholesaler location. For department stores, the concept of logistics is to consolidate their goods in regional central storages and transport the goods to the branch. It can be said that the cheaper the product the longer the chain. But in some cases like food products, it can be directed from manufacturer to retailer, eliminating the degree of indirectness.

4.3 Wholesaling

Wholesaling is a part of the distribution channel and plays a vital role in city logistics. The wholesaler still remains an indispensable part of the supply process for many thousands of small retailers. The main function is to provide a halfway house between manufacturers and retailers. There are many manufacturers, but they are widely dispersed and undertake the dedicated large-scale production of goods. However, the many thousands of retailers need a convenient means of selecting relatively small amounts of various products to build the appropriate product assortment for their stores. The wholesaler provides a gathering point for many different products and performs a bulk-breaking service for the retailer so that they can make up the required assortment of products. The wholesaler provides warehousing services where this process takes place. These include:

- storage of items until the retailers require them
- picking of items from stock to make the retailer's assortment
- consolidation of the items into a load for distribution to the retailer
- transport of the consolidated load to the retailer's store

The wholesaler may alternatively provide a cash and carry depot as in our case. This still provides storage facilities, but retailers may carry out the other functions themselves.

The wholesaler also takes ownership of the goods and thus assumes some of the producer's risk of non-saleable caused by damage or lack of customer demand. The wholesaler also speeds up the process of payment to the producer. The transport of items to the retailer's store is often contracted out to third party carriers, very few in our case, but larger wholesalers now lease this activity out to dedicated logistics suppliers, much in the same way that manufacturers do. However, a high proportion of independent retailers still make weekly or monthly trips to wholesalers during slack times at their shops, and wholesalers are continuing to streamline their cash and carry provision to reduce costs to the retailer.

Retailers pay for the wholesaler's services by the difference in price per unit that they pay and the price per unit that the wholesaler pays. Part of the difference in price goes to covering some of the costs incurred by selling in

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small quantities. These costs include the extra labor and storage space required and the cost of the money tied up in slower-moving stock. However, there are some buying co-operatives to improve the purchasing power of the independent retailers and reduce their delivery costs. Some of these co-operatives are owned and managed by retailers. Others, such as Spar, are buying co-operatives that are managed by a wholesaler.¹⁶

4.4 Retailing

Retailing is the final stage between the producer and the customer. The role of the retailer is to make the assortment of products available to consumers so that they can make their purchases. However, the presence of large multiple retailers in modern retailing has seen the development of intermediate stages in retail distribution. Large multiple retailers (Such as chain retailers ICA and Coop) now use local and regional distribution centers. Manufacturers deliver to these centers where loads are reassigned and consolidated for delivery to the individual stores. Retailers may contract out the management of these centers to dedicated logistics providers. The retailer may run its own fleet of vehicles to transport goods from its consolidation center, but they are also using dedicated logistics firms to do so plus additional short-term contracts hired to move goods. Retailers carry stocks of products or inventory in order to meet customer demand. As stocks are sold out, the retailer orders more stock according to its own replenishment system. The time taken for the manufacturer to deliver the items is the manufacturing response time. It includes time to process the order, produce the goods and deliver them. Improving the manufacturer's response time can substantially reduce the inventories that a retailer has to carry.¹⁷

4.4.1 Type of retailers

There are different types of retailers involved in the market. Some of them are chain retailers and small or independent retailers and as well as franchise retailers.

Independent Retailers

An independent retailer owns only one retail unit. Most of the independent retail stores are run by the owners and/or their families. The high number of

¹⁶ Logistics and Distribution: Shipping the goods to market, Chapter 15

¹⁷ Logistics, and Distribution chapter 15

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independent retailers is associated with the ease of entry into the market place. Due to low capital requirement or relatively simple licensing provisions, entry for many kinds of small retail firms is easy.¹⁸ Normally these types of stores are small in size with less variety of goods that are expensive, but on the other hand they are convenient, friendly and favorable for small shopping.

Chained Retailers

A chain retailer operates multiple outlets (store units) under common ownership. The strength of chains is great and their popularity is rising, even though the number of retail chains is smaller than the independent shops.¹⁹ Generally, we believe that chain retailers are considered more reliable than independent retailers because of the number of outlets, service quality and variety of products. Chain stores are cheap and offer a large choice but they are not always local or friendly places to shop. Examples of chain retail stores in Gothenburg are ICA, Coop and Willys.

Franchise Retailers

Franchising involves a contractual arrangement between a franchisor (which may be a manufacturer, a wholesaler, or a service sponsor) and a retail franchisee, which allows the franchisee to conduct a given form of business under an established name and according to a given pattern of business. Franchising represents a retail organizational form in which small business people can benefit by being part of a large, multi-unit chain type retail institution.²⁰ McDonald's is the world leading franchisor with nearly 20,000 restaurants around the world; about 80% are operated by franchisees.

4.4.2 Cultural diversity in retail business

As mentioned above that the type of retailers varies depending on who the owner is and how the store is managed. As in our case of the independent retail stores in Sweden, especially in Gothenburg, the owners come from different cultural backgrounds.

¹⁸ Barry Berman & Joel R. Evans. *Retail Management: A strategic approach*. (7th edition, p.104)

¹⁹ Barry Berman & Joel R. Evans, p.107

²⁰ Barry Berman & Joel R. Evans, p.109

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Each business culture differs. Agreements involving diverse cultural backgrounds are often potentially problematic. The mix of western and Russian cultures or the mix of western and Asian cultures could potentially provide a lethal business cocktail if not understood and managed properly because each poses its own unique problems. For example, western business systems consist of sourcing, production, marketing, distribution and customer service. By contrast, in most East European countries, decades of central planning over emphasized production, at the expense of customer related issues. The Far East has other perspectives and the Thais have developed trading a tradition that accepts competition as a nature phenomenon.²¹ Swedes is more direct to business while Japanese first wants to know who the person he wants to dealing with is.

4.5 Freight Transportation

Many types of transport modes have been used as inter-modal and multimodal for freight and passenger transportation from origin to destination such airplanes, ships, trains, trucks, and cars. In this theory, we are not going to describe the entire transportation mode; just the model usually used to transport the goods in urban areas, which is truck.

What is private transportation?

Private transportation is not the opposite of public (government) transportation. Private transportation is defined as the not-for-hire transportation of goods owned by the firm that also owns (leases) and operates the transportation equipment for the furtherance of its primary business.

Private Trucking

Private trucking is the most frequently used and most pervasive form of transportation in developed countries. Numbers of private truck companies are working for the distribution of daily goods. These truck companies have contracts with the suppliers/wholesalers and manufacturers for transportation work and to deliver their products to the retail stores.

²¹ Marc Dupuis and John Dawson. *Aer Rianta International (ARI), European cases in Retailing*. (Blackwell Publishers Ltd 1999, p. 57, 58)

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The primary reasons for a firm having a private truck fleet are improved service and lower cost. In either case, the private fleet operator is attempting to improve the marketability and profitability of its products. Through improved levels of service, the firm attempts to differentiate its products. Lower transit time increases its sales and profits and provides better service.²²

4.5.1 Trucks

The type and the size of this transportation mode are varying in order to meet customer requirements. The restriction in the city limits transport to specific types and sizes of the truck.

Environmental demands to limit the emission can be met with the development of purer engines, the use of more environment-friendly fuel, more efficient distribution system, etc. These demands are not only controlled by regulations, but to an increasing extent also by the transport buyer.

Distribution vehicles operating near the terminals normally consist of smaller two-axle vehicles. The vehicles are equipped with a tail lift which simplifies the loading operations. The general specifications of trucks are given in the figure below.²³

Total weight: 14 ton
Empty weight: 7.5 ton
Loading capacity: 6.5 ton
Volume: 40.5 m³
Platform area: 18.5 m²

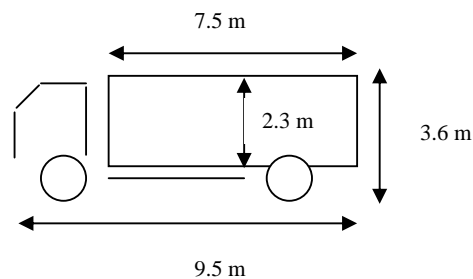


Figure 6: Typical Distribution Vehicle (Redrawn from Lumsden, 1998)

4.5.2 Lower efficiency of transport

A delivery vehicle was able to serve up to 20 stops until a few years ago. The number then reduced to 15 stops²⁴ due to the long journey from the origin of

²² John J. Coyle, et al., *Private Transportation*. (South-Western College Publishing, Transportation 5th Edition, p268)

²³ Fundamental of Logistics (Kent Lumsden)

²⁴ Susanne Strauß, p4.

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goods to the drop off location, traffic restrictions for freight vehicles, waiting times, loading/unloading places and shorter times.

4.5.3 Higher frequency of delivery

The customers' needs of freshness and availability of goods and articles in the stores changes the logistics strategy; the frequency of delivery to the stores is increasing but with smaller consignments. The competition made the retailers willing to accept more trips to the shops in order to compete with suburban shopping centers. This higher frequency is also a tendency to have less storage capacity in the store; the rent is high so instead of using the space for storage, the retailers prefer to use the space for sales. The retailer depends on the reliable and frequent deliveries.

4.5.4 Suppliers and retailers coordination

Almost everything we use and depend on in our everyday life is produced and brought to us by the coordinated actions of many other people and things. Almost everything made by humans is produced cooperatively. So the question arise, if cooperation is so good, why isn't it universal? If cooperative organizations are better in purely evolutionary terms, if they are able to out-compete non-cooperators in evolutionary struggles, why are we surrounded by so many examples of animals that aren't cooperating?²⁵

Research has been undertaken for coordinated transportation to make an efficient transportation system. It is necessary to have good collaboration among the different actors of the market to make an efficient and effective coordinated system.

Retailers and suppliers should work together to avoid store wars and improve on-shelf product availability and greater access to consumer's needs and wants.

The objective of this research study, as we discussed above, is to find possibilities for developing cooperation, either on the retailer's side or the supplier's side, to minimize freight transportation movement and build sustainable environmental conditions for the city. Before developing cooperation between two different market areas, it is necessary to know about relationship between them. As we learned from different report, suppliers,

²⁵ Evolution's Arrow. Barriers to Cooperation chapter 4

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wholesalers and retailers have strong relationships in a market and it can be said that they depend on each other. The retailers depend on wholesalers/suppliers for their goods, and on the other hand wholesalers/suppliers create the make business to sell their products to the retailers.

4.5.5 Coordinated transportation

Coordination is one management strategy for improving the performance of transportation services and increasing overall mobility by wringing inefficiencies out of disparate operations and service patterns. The potential benefits of coordination among transportation providers include more resources applied to transportation, more cost-effective use of those resources, expanded service, more trips taken, lower costs to customers, cost savings for some participating agencies, more centralized management, and improved service quality. When transportation providers are able to coordinate their operations, all activities related to transport and distribution get more benefit by the increased availability and service quality.²⁶

Coordination has its costs. Implementing and maintaining cost is essential for any system and it is not a unique case in coordination. For the long run perspectives, coordination is more benefits, although coordination has often more expensive, more difficult, and more time consuming than most agency representatives initially perceive. Coordination may increase overall cost-effectiveness or reduce unit costs, but it does not necessarily free transportation dollars for other activities.

²⁶ http://research.aarp.org/consume/2000_16_transport.pdf

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4.5.6 Shipment consolidation

Transportation costs are directly related to the type of product, size of shipment, and movement distance. Many logistical systems that feature direct fulfillment depend on high-speed, small shipment transportation, which is costly. A system objective is to achieve shipment consolidation in an effort to reduce transportation cost.²⁷

4.5.7 Route planning

The route planning concept is an important rule within transportation system. The function is to define the minimum transport route for products flow, by planning the route and carrier selection. Route planning provides transport efficiency, cost reductions and a better environment.



Two Way Route Journey

Route Planning (minimum distances)

Figure 7: Clark & Wright's Route Planning Method (Redrawn from Fundamental of Logistics 2002/2003).

²⁷ Donald J. Bowersox et al., "Operation integration," *Supply Chain Logistics Management*. (The Mc Graw-Hill/ Irwin Series, p.165)

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→ Transport flow from origin to customer

←····· Transport flow back from customer

← · · · → Route planning method with minimum transport distances

The rules for Clark & Wright's route planning method are:

1. A customer that may fill a whole lorry with goods is served first. The eventual excess goods are included in the route planning.
2. Calculate the saving-values for all customer pairs (links). Sort them in decreasing order.
3. Link the customers with each another using the calculated saving-values. Ensure that the time and freight capacities are not exceeded. Start with the customer pairing that has the highest savings value. Thereafter, link the customer pairs with the next-to-largest savings-value, etc.
4. The criteria for when the linking has to be terminated is when no more customers may be linked together because time or freight capacities have been exceeded for the concerned lorry.²⁸

4.6 Influence of Information System in Logistics

Considering the size of retailers' business turnover, an information system such as EDI and POS is not really necessary, but when the business is growing, the information system will be needed. Regular electronic appliances such telephone and fax are good enough to communicate with the suppliers and vice versa. It is also necessary to make an order schedule since the information of sold products in the shops/restaurants is not directly provided to the supplier, so the order schedule is more convenience for both retailers and suppliers to remember when to place an order and when the ordered goods should be delivered.

E-commerce and Internet is a good tool for ordering daily goods. As in the case of small retailers/shops, the implementation of a high cost logistical information system does not seem to be feasible. On the other hand, ordering by Internet is cheap and effective and also reduces the transportation and time costs. For instance, Ryan Air (the best low fare European airline) has this kind of system. They receive orders via Internet and confirm by the e-mail receipt.

²⁸ Clark & Wright. *Route planning method*. (Fundamentals of Logistics, 2002/2003)

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of Gothenburg

In that way we are able to reduce one-way traffic flow on the streets by transferring order information by electronic media. Planners and researchers are thinking of introducing advanced technologies in distribution systems for the betterment of the community. Some projects have been working on the usage of e-commerce in grocery product distribution, but it does not seem to be very efficient now but it might have advantages in future.

5. Research Design

This thesis is the result of a research process of roughly half a year. The steps of this process will be described and discussed in this chapter as well as discussion on key points of the research design.

Basically, research design is used in finding an answer to our research questions. The research questions state the broad area of what is going to be studied, while a precise scope is defined for making it more practical for studying. Without focus on a limited area, the research could bulge beyond proportions. If the research question becomes too limited, on the other hand, important aspects in the solution of the problem may be overlooked.²⁹

This thesis report has been written as a starting point for a discussion between retailers and suppliers regarding the development of mix-car loading for daily goods in the 'Centrum of the Gothenburg'. An important aspect of the research questions is a collection of information regarding present distribution patterns and knowing the requirements of the retailers and the suppliers.

²⁹ Julia Suslova, Maxim Galich. *Baltic Sea goods transportation development*. (Master thesis, 2002)

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Examination territory

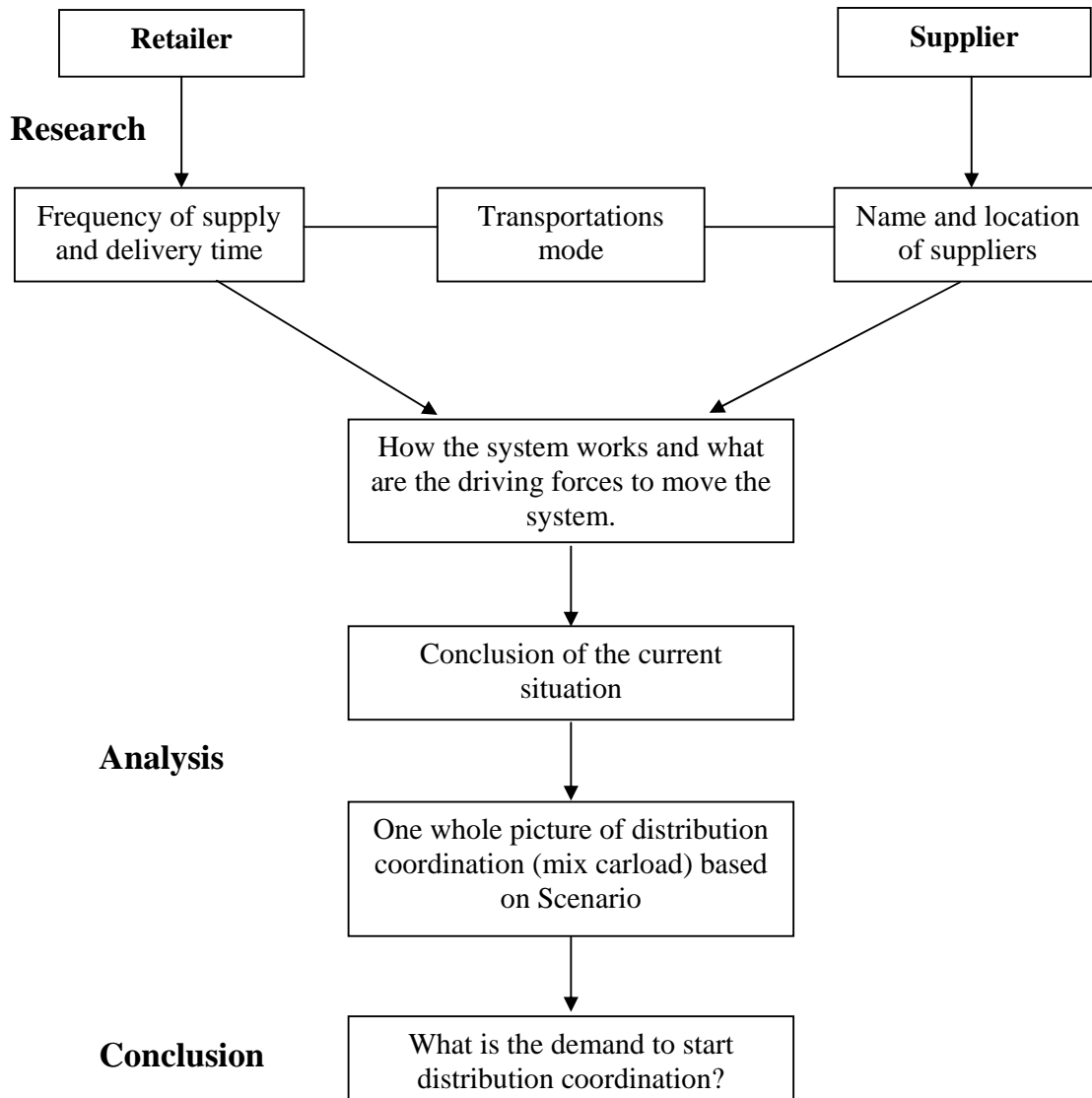


Figure 8: Outline of Research Design

5.1 Research Approach

The process of research design consists of many interrelated decisions. The most significant decision is to choose the research approach, as it determines how the information will be collected, implemented and analyzed (Aaker, Kumar, Day, 1995, p.71).³⁰

³⁰ Aaker, D.A. et al., *Marketing Research*. (John Wiley & Sons, Inc., 1995, 5th ed).

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Depending on the combination of the research directions, objectives and limitations, various methods can be used. All research approaches can be classified into three main categories:

- Exploratory research
- Descriptive research
- Causal research

All of these types of researches have their own characteristics; it may depend on type of project and circumstances. In our opinion, the most interesting and informative research approach is the descriptive one, which we will use in our thesis report.

Descriptive research

Descriptive research involves observation and description of variables as they are distributed throughout a population (Crowl, 1993). Quality observation (i.e., measurement) is at the heart of descriptive research (Heppner et al., 1992). Generally, descriptive research designs may be classified as either qualitative or quantitative.³¹ Therefore, descriptive research is used when the objective is to provide a systematic description that is as factual and accurate as possible. It provides the number of times something occurs, or frequency, lends itself to statistical calculations such as determining the average number of occurrences or central tendencies. One of its major limitations is that it cannot help determine what causes a specific behavior, motivation or occurrence.³²

Most descriptive research studies are based on the respondent's interviews as a primary data source as well as the data available from secondary sources. The descriptive research is more suitable in our case. The goal of the descriptive research is to identify and examine significant aspects of the market environment (Aaker, Kumar, Day, 1995, p73) and this is regard our thesis report has several aspects.

- Understanding of existing daily food distribution system from both the retailer's and supplier's perspective

³¹ Crowl, T. K. *Fundamentals of educational research*. (Madison, WI: Brown and Benchmark, 1993)

³² Descriptive research

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- Actors involved in city environmental problems and obstacles in implementing new logistical concept.

5.2 Frequency of Deliveries

The structure of the determination of the frequency of delivery in the Gothenburg Centrum district is taken from various sources like Göteborg Köpmannaförbund, and old theses data helps us to some extent in finding out the number of retailers and their deliveries. Most of the data was obtained by interviewing the personnel of retail stores and suppliers and by posted questionnaire papers to them.

For the analysis, we assume that the frequency of deliveries was related to the annual turnover of the stores that we observed as a result of the questionnaire. For instance, small shops and restaurants have less delivery per week as compared to big stores. More description about delivery patterns are discussed in the Analysis chapter.

5.3 Time of Delivery

There are many detailed international reports available about the time of delivery to grocery stores. For the Swedish area, the period has been analyzed and reported.³³

In this report, it was considered that the time of deliveries also played an important role in the distribution system. To accumulate empirical data for this report, we split time into two time zones, mentioned in the questionnaire papers in Appendix A. The result indicated that most of the deliveries were made in the first half, from 6:00 to 12:00 and fewer were in the second half from 12:00 to 18:00.

³³ Kristiansson, Lena, Petterson, Mona. *Varudistribution I Innerstad*. (STACTH rapport 1996:6 Göteborg, 1996)

5.4 Delivery Vehicles

The information about delivery vehicles was gathered by two major sources; by asking in questionnaire papers and by retailer and supplier interviews. The third most common source was our own observations. Most reliable data about loading capacity and vehicles types in the Centrum district was obtained first-hand from sources that we used in this report. The other supportive information about the type of delivery vehicles in Gothenburg was given to us by TFK Transport Research Institute.

5.5 Suppliers

In this report, we used the term ‘suppliers’ for cash stores and wholesalers. These kinds of suppliers take an important role in the transportation and logistics system in the cities. Normally, they have two-way transportation; one comes from manufacturer and the second goes to retailers. These suppliers work as a sender of goods and influence urban freight traffic by the organization of their transports. They are facing the demand of complete logistics services like speed, reliability, flexibility, safety and low transport prices.³⁴

The willingness of the industry to cooperate and to consolidate shipments to the same destination depends on economic pressure and the transport cost. The share of transport costs has decreased in the last years. The deregulation of the transport market lets one expect a continuous trend. Many business branches have cut their transport cost by outsourcing to less than 3% of their turnover. Hence, only a remarkable increase in these costs would make the suppliers consider alternative transport concepts and to be engaged in vertical cooperation between suppliers- transport carrier- retailers.³⁵

³⁴ Susanne Strauß

³⁵ Susanne Strauß

6. Research Finding

As every thesis report should be based on relevant theoretical background, our report is not an exception. Under the heading of “theoretical framework”, we try to outline applicable theories in order to be able to use them as main tools for research and analysis. Later we discuss methods and measurements for collecting and analyzing gathered data needed for our research. The main part of our thesis report is dedicated to the deep analysis of the problems of the area and finally summarized in the conclusions. But as each research is not one hundred percent complete, there are always new concepts and ideas that arise, and we hope this research will be a good base for the future research.

6.1 Existing Food Suppliers (Snabbgross)

There are many food suppliers and cash stores situated in the city that fulfill the requirements of food shops and restaurants by distributing goods. In this report, there are different food suppliers we included as a part of the research such Axfood, ICAmeny, Privab, Sevensk Snabbmat, Matsäljiaren AB, Partydelikatesser AB, Hebes Frukt and Grönsaker and Grönsaksspecialisten, etc. The main concentration of these kinds of cash stores is at Partihallarna, which is situated between Central station and Gamlestadstorget.

6.2 Existing Distribution System from Supplier’s Perspective

Axfood Snabbgross

The one of largest cash store chains is owned by Axfood and is situated in Partihallarna. We chose Axfood as a sample of ideal Snabbgross distribution systems.

The Gothenburg unit of Axfood is the largest in Sweden and they deal with all kinds of food items. The Axfood cash store works as a wholesale store where different retailers come from around Gothenburg and fulfill their requirements, and then return to their locations. Approximately 3,000 clients come to their place per week. The stores are only for shop and restaurant owners and not for individual customers. They have a kind of system where they can check if the customers who come to purchase are from retail stores or private customers.

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The company structure of Axfood is given below:

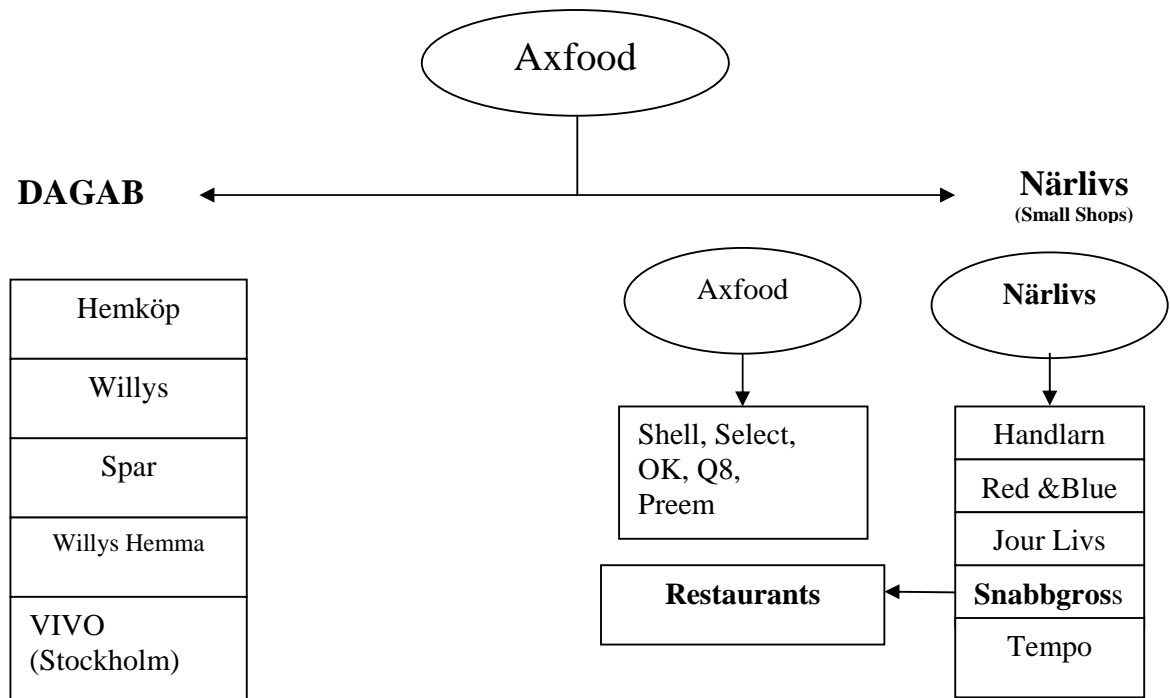


Figure 9: Axfood Company Structure

The mother company, Axfood, is divided into two sister companies: Dagab and Närlivs. Dagab mainly deals with big retailer stores and Närlivs works with small shops. Axfood snabbgross is involved in dealing mainly with restaurants. In this report, we are only focused on small shops and restaurants, which we consider ‘snabbgross’.

The supplier also has their own transport system for the distribution of goods to the retailers, but they only provide free delivery for those retailers who order more than 8,000 SEK per week, based on agreements with them. Otherwise, they charge extra if the deliveries are more than 2 times per week. They have different criteria for transport charges for the small orders.

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Sell Cost (SEK)	Transport charges (SEK) per Delivery
0-4000	500
4000-8000	250
+ 8000	Free (based on agreement)

Table 1: List of Transport Charges Taken by Axfood snabbgross

Out of total deliveries, only 25% of deliveries have been made by suppliers and the rest of them are made by retailer’s own vehicles; 10% of customers have 10 day credit terms while 90% are cash and carry. Due to a smaller percentage of deliveries by suppliers, they don’t have their own trucks. They use outsourcing truck companies depending on their requirement. Mainly, they use medium-sized with a trucks having capacity of six Euro pallets and all them have refrigerated facilities to keep the product fresh.

For those retailers that have independent shops, there is no fixed way of distributing their consignments from the suppliers to the shops.

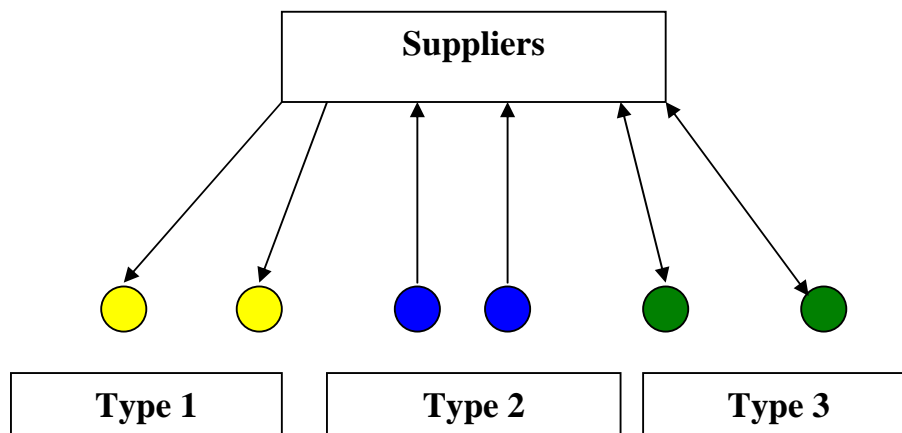


Figure 10: Types of Retailers in Existing Market Dealing with Suppliers

- Type 1:
Big shops and restaurants, have large consignment, the order can meet the suppliers’ minimum requirement to get the free deliveries.

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- Type 2:
Small shops and restaurant are the retailers who use their private vehicle to bring their goods from the 'snabbgross'.

- Type 3:
This is the combination of restaurant that mostly get the goods delivered by suppliers, but still using their private vehicle when they need to buy extra supplies from 'snabbgross'.

ICA Chain Food Store

ICA is one of the biggest and most well known chain food stores in Sweden, due to high quality and customer satisfaction. They deal with all kinds of grocery things and food products like other chained stores. ICA's environmental awareness regarding transportation and distribution is very high. ICA is constantly and actively working to rationalize transportation to and from their stores, both for environmental and financial reasons. This can be achieved by filling the deliveries to full capacity as possible (Full Truck Load), and by environmental friendly fuel used in the vehicles.

The distribution system of ICA is unique. They mostly use their own trucks for distribution while they sometimes use dedicated trucks from transport companies. ICA has their own logistics and transportation department with experienced people involved in route planning with the help of current computer software. The retail stores are located in different areas of the city, and they make their own route planning for the transportation of goods with respect to the location of the regional warehouse. In regional warehouses they perform loading and unloading operations before delivering to the retail stores. The retail stores are not totally owned by ICA; they have franchise owners. The product supply and distribution is part of ICA from warehouse to retail stores. For this purpose, they use their own trucks and dedicated transport from transport outsourcing companies.

7. Methodology

In our report, we are going to describe the retail behavior in transporting their goods, where they buy the goods, and who is in charge of transporting the goods and how the goods will be transported. The behavior is based on the current situation of the retailers in Gothenburg.

Looking at the current situation, we can also describe the driving force that creates this behavior of distribution in Gothenburg and explain why the current situation is not so efficient. Based on the results of the research, we will analyze an improvement by introducing cooperation of mix carload and we will give advice on how to achieve the cooperation of mix carload in the city of Gothenburg.

To get the information of the current situation of the retail behavior in Gothenburg, we reviewed the situation by interviewing supervisors and the Göteborgs Köpmanaförbund. Then we studied the existing market situation and problems and finally collected data according to their needs. To support the discussion, we collected the data by various methods of data collection depending on the nature and the type of data we wanted. The data collection methods we followed through the entire research process were to study the literature, past research thesis reports, internet journals, questionnaires, interviews, possible surveys and research with interactive respondents. More about the methodological methods are described in the next paragraph.

The methodology is one of the most important chapters in any research thesis as it is the approach to get reliable data by various sources in different forms and sort out selected data and use in a precise direction as described in this chapter. There are several methods to get information and data, but all of them have their own characteristics. In this thesis report, we used all possible methods of data collection to make our report more reliable and up to standard.

7.1 Literature and Internet study

There were several books that we have used to gather the theory about logistics and transport management. The efficiency of freight transport has been changed by improving the transport system. Shipment consolidation and

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coordination of transport has resulted in the reduction of unnecessary vehicle movement. The communication system and vehicle improvement have encountered the needs of faster and reliable shipments to customers.

The process of goods distribution from the manufacture to end customer has also been adjusted along with the change in the transportation utilities. Retailers no longer keep the goods on the shell for so long by increasing the number of order with smaller consignments, while the number of deliveries has also increased. The information we have gathered from books has given us the theory of market distribution, the retail business and the different types of retail management from chain to independent.

Other freight transportation projects in other areas and other countries were also studied through internet and other thesis projects. Literature and internet study is the foundation of our project, and the result of our research will be combined with the literature and internet study results to make an analysis and conclusion.

7.2 Data Collection

There are many ways to collect data: indirect and direct observation, archival records, interviews, and questionnaires. Each method provides different types of information.

Selecting the best method depends on your evaluation questions, your target population, and your available resources. For gathering authentic and appropriate data, it is not better to restrict any one form of data collection source, as it may change with the requirement and the value of data that you are looking for.³⁶

In our research project, we have used several ways to collect data that we have needed through interviews with several key persons in the related areas to find the first piece of information, the problem. The next step was to distribute the questionnaire to retailers and suppliers to look in depth and find the facts and to see the current processes. The result of the questionnaire will be supported again by interviewing the key persons in the related areas and discussing

³⁶ Aaker, Kumar, Day, 1995

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg possible improvements. More of the steps will be described in the next paragraphs.

7.2.1 Questionnaire survey

The questionnaire was the main data collection method used in our research, which was made possible by the Göteborg Köpmanaförbund. A questionnaire survey is a good choice if you plan to gather information from a large group. They allow individuals ample time and privacy in which to complete their responses.³⁷ As in our case, we focused on a large group of retailers and suppliers. And we conducted a mailed questionnaire survey (unfortunately the return rate was low, even though we offered a free return delivery of questionnaire). The advantages of using questionnaire surveys were that they were relatively inexpensive, easy to administer and less time consuming.

We sent questionnaire papers to almost all retailers in the research area to get maximum and accurate data of retail stores. Due to a shortage of time, we used this approach to collect data from retailers and suppliers instead of taking interviews with everyone.

A number of questions were required in order to fulfill the purpose of the study and for a better understanding of the problems from different views. Similar questions posed to the different stakeholders involved usually get a varied angle of approach, in order to get a more balanced picture of the problems.

7.2.2 Interview

Interviews involve collecting facts about people and exploring their opinions and attitudes. Careful planning is essential to a good interview. Interviews can range from unstructured or semi structured, in which the interviewer ad-libs a good portion of the discussion, to completely structured (resembling a questionnaire), in which the interviewer essentially reads from a script.³⁸

The two main types of interview questions are closed-ended and open-ended. For a close-ended question, the respondent is asked to choose from prepared answers. For an open-ended question, the respondent is free to answer in any way he or she chooses. Close-ended questions allow you to tally answers

³⁷ http://itiincorporated.com/Assets/pdf%20files/08-Chapter_06.pdf

³⁸ http://itiincorporated.com/Assets/pdf%20files/08-Chapter_06.pdf

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg easily. However, open-ended questions may yield information that is more complete because they allow respondents more flexibility in expressing responses. The degree to which an interview is structured depends on your need to explore different issues and the skill level of your interviewer(s).

In this research report, we conducted open-ended questions to interviewees because our area of research was wide and we did not want to restrict the interviewer to any extent. From a city logistics perspective, many things should be considered to acquire the most information from interviewees. In order to get awareness and expert opinion with a current market situation for distribution system, traffic situation and for retailers & suppliers perspective in the research area, we made several interviews with different people.

- The interview was done with chain retailers in Gothenburg such as ICA distribution centre in Kungälv, as well as by sending a questionnaire to Coop to get data about the distribution system for chain retailers in Gothenburg.
- To get data about small shops and restaurants in Gothenburg, the interviews were conducted several times with Göteborgs Köpmannaförbund, also through telephone and email.
- An interview was taken with Nordstan's marketing manager (Mr. Anders Larsson), who described about the shops and restaurants as well as the distribution system for their customers in the Nordstan buildings.
- For a supplier's point of view, we had an interview with the manager of Axfood (Mr. Tommy Fougner). He informed us about the Axfood distribution system for daily food deliveries to small shops and restaurants and the current market situation. He also informed us about the problems and gave his expert opinion and ideas to make it better. The interviews were done with other suppliers through telephone calls.
- Several interviews took place with food shops and restaurants in order to get their opinions about their current business and traffic situations.

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- With Gothenburg traffic administration, who's working on several transportation projects, to get the knowledge about current projects and barriers they have. This is needed to link the current project with the study that we are working on.

7.2.3 Survey

The physical survey of the distribution area at Nordstan was done on August 27, 2003, and accompanied by the Nordstan marketing manager, Mr. Anders Larsson. During this survey, we visited the underground transportation system of Nordstan Shopping Centre, which is made for deliveries of goods to the retailer's stores in Nordstan. The existing transport system works very efficiently for the Nordstan consumers because they have no need to pay extra money to use this facility and there is no time restriction for receiving deliveries.

The problem comes when the trucks go in and go out of the Nordstan shopping area to the roads around Nordstan. The roads already have high traffic flow, so when the trucks come to join the main road they interrupt the ongoing traffic flow, causing congestion.

Another area that we surveyed was the area of Partihallarna, an area for different type of snabbgross, to see the different type of buyers and type of vehicles that came to that area.

7.3 Limitations of the Research

Due to the size of the task and constraints such as time and cost, some limitations were established on what would actually be treated in this project work. There are several limitations in our thesis report that will be discussed in coming paragraphs.

As we mentioned above in this report, our study area is the Centrum district including Nordstan Shopping Centre, which is the busiest area in Gothenburg with a lot of activities such as business, tourist, shopping and other movements. The main emphasis of this study is to focus on daily deliveries of food goods to several retailers' stores and restaurants that have almost the same kind of goods requirement.

Due to many activities in this part of the Gothenburg, the high traffic volume has created many problems, so it seems to be very difficult to cover all of them due to limitation of time, cost and long waiting times for collecting data. We had a limited time period of six months to complete this study.

In this research, we do not cover all retailers in this area and not consider all kinds of transportation activities in the selected vicinity. In relation to the distribution of the goods to the retailers, we only cover the daily food freight transportation. The passenger transports are not considered as a part of study but they would be considered an environmental concern, to some extent, like congestion, noise & other pollution concerns.

7.4 Validity, Reliability and Flexibility

7.4.1 Validity

We sent 126 questionnaires to retailers and 14 to suppliers. However, only 16% of the retailers have answered and no reply from suppliers. There is a question of the validity of the questionnaire results. However, we will discuss how this 16% response can represent the 84% non response, so the result would not make a big difference if all 100% had replied.

The retailers we chose were independent retailers that, as discussed in the beginning, are located in the city Center. The categories of retailers in our research are restaurant/café 88, food shop and konditori/bageri 38, some of which can be in two categories.

The result of the questionnaire came from restaurant/ café 15, food shop 2, kiosk 1, and konditori 1. The number of suppliers they are dealing with varies from 1 to 10, the number of deliveries from 1 time per week to 10 times per week, and the time of delivery is applied to the two different times we mentioned before, from 06:00 to 12:00 and from 12:00 to 18:00. The details of the results will be described more in the Chapter 9 summary of the questionnaire results.

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Since the type of the retailers is only the independent retailers and the area of study is limited to the city Center, the variety of the responses is applicable to other non- responses. We could say that the 16% of the respondent result can represent the 84% non response, although the result could be different if all 100% had replied.

7.4.2. Reliability

The researches we have made are to analyze the retailer's activity in the distribution of their supplies to their shop, how the goods will be delivered, who will deliver the goods, and when the goods should be delivered. This research was also to find out the willingness to change their behavior regarding the distribution process of their supplies, and the questions were also supported by the information gathered through telephone with some retailers and related suppliers. The information we have collected is enough to draw a conclusion whether the mix carload is possible or not from the retailer's perspectives, therefore we say that this report is reliable for future study.

7.4.3 Flexibility

Our research focused only in the city Center and specifically on independent food shops and restaurants. The results may not apply to retailers other than food shops and restaurants, but the methodology will be fine. It may also be fine for other city Centers with the same patterns like Gothenburg, but of course it is not 100% the same. In the urban area or smaller community, the effort to follow all the methods may not need to gather information, as for such areas with small numbers of shops; interviews would be the most important way to gather information as opposed to a questionnaire. The result in the urban area could also differ with city Center as the Axfood snabbgross manager told us that 80% of the goods distribution is done by the retailers with their own vehicle. The evidence of distribution with a self-owned vehicle is rather low in the city Center but could be high in the urban area.

8. Other Freight Distribution Projects

Several research projects have been made in different cities about the freight distribution system to reduce the congestion and environmental problems. The growing numbers of freight in cities is a hot issue all around us, and planners and decision makers are eagerly looking for their solutions. Several agencies and departments are working on these issues to take control over these increasing problems. Some similar kinds of projects are presented here to give the reader a brief understanding of freight distribution. Projects that are carried out by different educational centers in different cities are given as examples.

8.1 The City Freight Transport Project of Finland

In the case of Finland, there are a number of examples of Finnish companies co-operating in goods deliveries. These companies are producers, wholesaling companies and logistics companies. Consolidation of distribution saves time for receiving the goods in stores and improves the capacity usage of the vehicles, which in turn reduces the number of vehicles needed for the deliveries, emissions, noise and congestion. The initiative is easily transferable to any company, which distributes similar kinds of goods to similar customers.³⁹

8.2 The City Freight Transport Project of UK Cities

The U.K. is one of the dominating countries in Europe that has a number of metropolitan cities. Research has been made on freight transportation in different cities of UK; here we present a summary of freight transportation in UK cities.

Generally the UK, carriers operate hub and spoke transport networks, trucking consolidated freight to a central hub in the evening, reconsolidating around midnight, and then trucking back to the spoke depots in the early hours. Since the hub and spoke network creates extra handling and opportunities for loss and damage (as well as cost), networks will try to avoid this and if possible will operate overnight trucking. Some UK retailers are operating driver drop offs of goods at shops. The drivers will have a key to the shop and deliver the goods directly into the store. Many supermarkets operate 24 hours in the UK as a side

³⁹ City freight

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effect of their night distribution networks. Supermarkets are restocked at night and since there is staff, the shop also opens for customers. The UK road networks are full of Lorries at night, but many towns have lorry bans preventing access through residential areas. In effect, these can be varied; the London Lorry Ban has been varied many times to support an industrial or commercial activity.⁴⁰

8.3 Freight Distribution Project of the Linnestaden Area of Gothenburg

Much research has been done on reducing freight transportation problems and environmental concerns, or clean city transport. In respect to this, there was one well known project carried out in the Gothenburg Linnestaden area (Gothenburg) during 1996-98 by Mona Pettersson. It was based on a voluntary participation by the suppliers. The project gave an idea of coordinated freight transportation on voluntary basis but unfortunately that was not successful in reality due to several reasons. The project also indicated that exchange of knowledge and communication is not enough to implement a coordinated distribution.

It might be necessary to set some restriction on actors involved in this system that push these actors to come and use the coordinated transportation. Otherwise, the implementation of coordinated distribution seems to be very difficult.

8.4 Environmental Zone and Load Rate for Distribution

This project was carried out in Gothenburg by TFK. The objective was to introduce an environmental zone restriction for inner-city distribution including demands on load rate for the vehicles operating in the city in addition to beside the demands on emission levels for the existing environmental zone in Gothenburg.

The criteria for the distribution vehicles should be a 70% load factor of all vehicles concerned, and vehicles with a total weight of 2.2 tons and above should be included in the restriction when entering the environmental zones in Gothenburg. The restriction is followed by giving positive incentives to the operator that fulfills certain demands such as access to public transport lanes

⁴⁰City freight

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that would make the distribution easier for many operators, better stop zones for loading and unloading of goods in the city center, and the time in the morning and evening to enter the city limited to distribution vehicles that fulfill the demands. The positive incentives are highly valued when the demand for environmental vehicles comes from the customers so the operators can utilize the vehicles with better load factor, which strive for a better environmental performance.

The project was determined that there were not many that coordinated their transport in this area, but the potential and the possibility exists. Many businesses just focus only for their internal environmental improvements. Such improvements in freight transport in a wider area which could affect operators and their external environment is to implement kind of restrictions with the negative incentives such as:

- Prohibition to drive on certain streets during certain timeframes
- Prohibition to load/unload on certain extra beneficial stop zones
- Fees for congested traffic⁴¹

⁴¹ Maria Ottosson. *Milestones 1, definition av kriterier för systemet*. (TELLUS, 2003-11-25).

9. Summary of Questionnaire Results

From the questionnaire that we have sent to the 126 respondents through post mail and 1 through fax in the city Center, we received 20 responses, of which 18 are answered responses, 1 unanswered questionnaire by post, and 1 answered response by fax. The types of respondents were divided into:

Restaurant/Café

Matbutik

Kiosk

Konditori

The type of the retailers chosen are independent retailers, which means they do not belong to any chain, although some of the shops/restaurants have the same owners but each shop/restaurant has their own specialty.

The advantage and disadvantage of independent retail will be described further at the end of this chapter.

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S.no	Retailers	Type of Retailers	Delivery/Week	Time of Delivery	Name of Suppliers	Type of Transport		
						Always	Partially	Occasionally
1	Kompaniet Underground	Restaurant/Café	1	12:00 to 18:00	Spendrup	S.T	-	O.V
			1	12:00 to 18:00	IC.Ameny	S.T	-	O.V
			1	12:00 to 18:00	PAC production	S.T	-	O.V
			1		WTBO			
			1		Heselius			
1		Johan I Hallen						
2	Jamesons	Restaurant/Café	??	6:00 to 12:00	Servera	S.T	-	-
3	Restaurant Palace	Restaurant/Café	3-5	6:00 to 12:00	IC.Ameny	S.T	-	-
			3-5	6:00 to 12:00	Johan I Hallen	S.T	-	-
			3-5	6:00 to 12:00	Fiskeboden	S.T	-	-
4	Kaffe & Co	Restaurant/Café	2	6:00 to 12:00	Axfood	S.T	-	O.V
			2 times a month	6:00 to 12:00	Svensk Snabbmat	S.T	-	O.V
					Dafgård	S.T	-	O.V
5	Restaurang Tien Hung	Restaurant/Café	Once a month	After 14:00	IC.Ameny	S.T	-	-
			1	After 14:00	Carlsberg	S.T;	-	-
			1		Asian Livs	O.V	-	-
			1		Hung Fat AB			
			1		Saigoon AB			
		Grönsakstorget			S.T;	-	-	
					O.V	-	-	
					Njöd Kond	S.T;	-	-
						O.V	-	-

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6	Fiskekrogen	Restaurant/Café	3		06:00 to 12:00	IC.Ameny	S.T	-	-
			5		06:00 to 12:00	Aroma Frukt och Grönt	S.T	-	-
7	Restaurant Sirtaki	Restaurant/Café	3 3 3		12:00 to 18:00	Koppar Berg Bryggri Grönsaksspecialisten Falk Vask food	-	S.T, t.s	-
			Some times??		??	So Larson Fina Fisk Shapmän Bageni Axfood	-	-	O.V
8	Hilda Ost	Matbutik	2-4 2-4 2-4 2-4 2-4		06:00 to 12:00	Kron Ost Jonslunds Mejenprodukter Falbygdens Ostnederlag	S.T	-	-
9	Pak-Svengebutik AB	Kiosk	1 1-2 1-2 1-2 1-2 1-2		06:00 to 12:00 06:00 to 12:00	Swedish mate Axfood IC.Ameny Privab På Patrhalarna Ali godis	t.s, O.V t.s, O.V	- -	- -
10	Manana	Restaurant/Café	2		06:00 to 18:00	Servera, Carlsberg	O.V	-	-
			7		06:00 to 18:00	Aroma, Nordsjofisk, Johan I Hallen	O.V	-	-
			1		06:00 to 18:00	Spendrups	O.V	-	-
11	Café Festival	Konditori	1-2		06:00 to 12:00	Axfood	S.T	-	-
12	Japan Shop	Restaurant/Café	1		06:00 to 12:00	Tingstad	S.T	-	-
			2		06:00 to 12:00	Fina Fisken	S.T	-	-

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13	Gamleport	Restaurant/ Café	5-6	06:00 to 12:00	IC.Ameny Fiskda Nordsjöfisk Pac produktion	S.T	-	-
			1	06:00 to 12:00	Cariberg Åbro Dafgård Dennfodd Kahls Kals, M.M.	S.T	-	-
14	Sakura	Restaurant/ Café	1	06:00 to 12:00	Axfood	O.V	-	-
			1	06:00 to 12:00	IC.ameny	S.T	-	-
15	Swedish Taste AB	Restaurant/ Café	10	06:00 to 18:00 depends on reservation	IC.Ameny Grönsaksspecialisten Ole Fiskeboa	-	S.T	O.V
16	El Toro Bravo	Restaurant/ Café	3	06:00 to 12:00	Matsäljaren AB	S.T	-	-
17	Dohse Kenneth AB	Matbutik	10	06:00 to 12:00	Olofssons Åkeri Plus Näspa till Stenvinsunds Åkeri	S.T	-	ts
18	Incontro/ Hotel Gothia Towers	Restaurant/ Café	7	06:00 to 12:00	IC.Ameny Grönsaksspecialisten	S.T	-	-
19	Cappuccino AB	Restaurant/ Café	4	06:00 to 11:00	Kåka, Matsäljaren AB	S.T	-	O.V
			1	06:00 to 11:00	Spendrups Coca Cola Wibo Arfa	S.T	-	O.V

Table 2: Summery of Questionnaire

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From the table, it's described that each retailer mostly gets their supplies from suppliers for different articles of products. The consignment is transported by different actors and different transportation types such as own vehicle (OV), supplier's transport (ST), trucking service (ts) and others (O). Each retailer is not strictly using their cars or suppliers truck or a trucking service. It depends on many aspects such as time limitation in suppliers and retailers, type of products, consignment size required, urgency and the retailers behaviors, and their way of doing business.

The description and the explanation of the table will be given in different chapters.

9.1 Frequency of Delivery

The data we received from the questionnaire survey for the measurement of frequency of deliverers is not reliable and incomplete. Due to this reason we couldn't able to calculate frequency of delivers, we even couldn't make an assumptions about which deliveries came from by which transport mode and by which suppliers. Generally, what we got from the survey result the frequency of deliveries varying from 1 per week to 10 per week.

9.2 Delivery Time

The delivery time chosen by most of the respondents is between 06:00 to 12:00, about 84%. The shops and restaurants prefer to receive the supplies in the morning because there is plenty of time to handle the inventory as there are fewer customers in the morning, so workers can focus on receiving the deliveries of new supplies. Due to the needs of freshness for lunch supplies, morning delivery is preferred. The delivery time between 12:00 to 18:00 is best for about 26%. This delivery time is mostly preferred to get supplies for dinner. However, another reason is that the shops or restaurants missed the reservation to get the delivery in the morning.

9.3 Percentage of Transportation Uses

From the big table, we summarize the percentage of types of transportation used to transport the goods to the retailers. The table is describing the goods movement from different suppliers to each customer. The total of the

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percentage in every column is not 100% since the retailers can use different transportation modes for the same suppliers.

Transportation mode	Always	Partially	Occasionally	Never
Own Vehicle (OV)	21%		26%	53%
Supplier's Transport (ST)	79%	11%		10%
Trucking Service (ts)	5%	5%	5%	85%
Others (O)	0%	0%	0%	0%

Table 3: Usage of Transport Mode Percentages

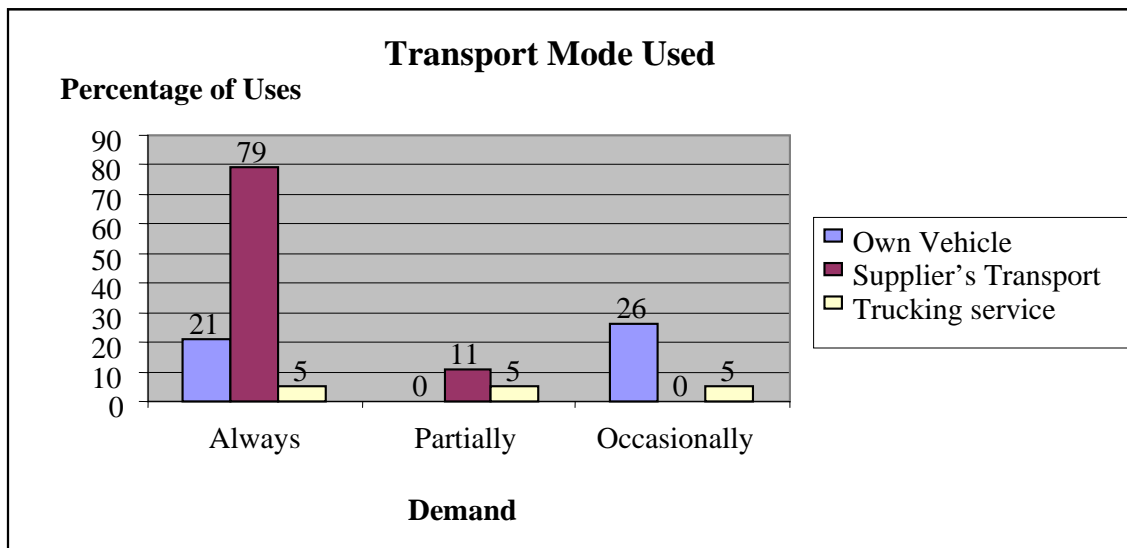


Chart 1: Transport Mode Used

The biggest mode of transportation used in the freight distribution from suppliers to the respondent is the supplier's transport, at 79%. This is because to the consignments delivery is the supplier's service to their customers. It is more convenient to their customers; customers just need to order and to pay what they ordered and the supplier will make the delivery. This service is less time consuming for the retailers, because they don't need to make an effort for picking up and transporting the goods from suppliers to the shops, just place

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the order and pay an extra cost for transportation and the supplier will deliver the goods to their stores. The transport service for every order is part of an agreement between supplier and their customers but they have some specific order size requirements and they provide free deliveries if the customers meets the requirement. There are no additional costs for freight transportation when the retailers meet the supplier's requirement. From the percentage of transportation uses we can say that most of the retailers can meet the requirement of each supplier.

The second mode is occasional private car use at 26%. This comes from the respondents who have their goods delivered by suppliers but are still doing self transport. This type of retailer is dealing with different suppliers for different products and/or assortments. For restaurants or cafés, special food on their menu is a value added; the availability of food on the menu is the service for customer. The supplies needed in the restaurant are basically delivered by each supplier and the size of the consignment meets the requirement from the supplier. But there is a situation where the restaurant runs out of the stock before the next delivery, and it is not possible to wait for the suppliers to deliver the goods because it takes time and is costly for an urgent delivery, it is not worth to hire trucks only to bring a small consignment. As mentioned above, the uses of private cars depends on certain aspects, in this situation the retailers using their own vehicle in the urgency matter. For example, from the answers collected, the owner or employee will go to supplier, do the picking and bring the goods with their own vehicle simply because they need extra supplies at lunch or dinner time.

The percentage of use of private car for each delivery is 21%. From the interview with Axfood snabbgross, we identified that about 80 – 90% of the retailers come to them with their own car. According to Axfood snabbgross, this type of retailer buys a small size of goods from them; therefore they prefer to bring their own car instead of using Axfood snabbgross service which is too costly for them. But in other cases there are retailers who prefer to use their own vehicle but have no problem with transport costs. From the answers we have received, the owner prefers to use their own vehicle going from one supplier to other supplier. This activity has nothing to do with avoiding delivery cost; this is a matter of the self satisfaction of doing the shopping.

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For the trucking service, the percentage is rather small in the number of respondent and number of uses. The average is 5% which means the trucking service is not common in retail business, at least not in food retailing. The trucking service commonly uses in the higher level industries such as supplier, wholesaler and manufacturer.

10. The Current Situation and the Driving Force

As described in the previous chapter, we can see that the current situation of the goods being distributed can vary depending on some factors which are:

- The system design by suppliers/wholesalers
- The retailers being served
- The variety of the product
- The time of deliveries

This factors influence the goods movement and from the interview and answers that we've collected, the process can be seen from two perspectives; the wholesalers/suppliers as a shipper and retailers as a receiver:

Shipper perspective:

1. Delivery made by supplier's truck

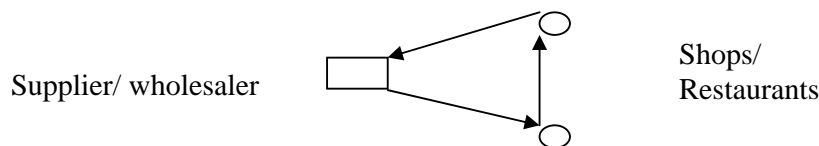


Figure 11: Delivery by Supplier's Truck (Shipper Perspective)

→ The figure describes how the goods are delivered by supplier's truck and the goods movement from supplier to different customers. The delivery route is not fixed; it is based on daily planning depending on daily order from customers.

→ The truck can be the supplier's owned trucks but can also be from a trucking service, depending on the supplier's policy, like Axfood snabbgross which using trucking service to deliver the goods to their customers.

→ The type of retailer being served is the independent retailer in which the reorders qualify to meet the minimum quantities. Mostly, this type of retailer has an agreement with their suppliers.

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2. The goods are delivered by private vehicle

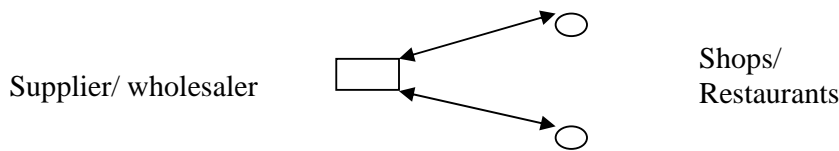


Figure 12: Delivery by Private Cars (Shipper Perspective)

→ On this point, the retailers make the effort to pick and bring the goods from supplier to the shop/restaurant. This happens because the suppliers require a minimum consignment in order to give free delivery and it is too costly if small consignments have to be delivered with trucks while they can utilize the truck to deliver bigger consignments.

→ Retailers can use a trucking service to transport their consignments, but in this case the initiative of using a truck service comes from the retailer themselves.

Receiver perspective:

1. Receiving goods from supplier(s)

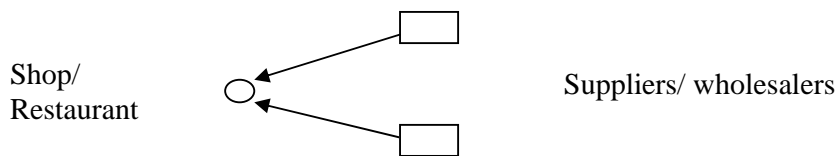


Figure 13: Delivery by Supplier's Truck (Receiver Perspective)

→ The shop/restaurant receives the delivery from at least one supplier or more, sometimes at the same time, as the shop/restaurant needs different assortments and suppliers have their own specialty of product that require the shop/restaurant to order from different sources.

→ This type of retailer:

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- Has low flexibility of time, the shop/restaurant wants to receive the product on time, the assortment variety could be high and the size of the consignment is big.
- The shop/restaurant relies on the supplier's services.
- Has some area of management such marketing and purchasing, but the layers of management personnel are minimized.
- The turnover of the business is considered large according to number of supplier they are dealing with and the number of deliveries per week.
- Has an economy of scale because the cost per unit is lower at one time delivery.

2. Receiving goods from supplier(s) and own transport

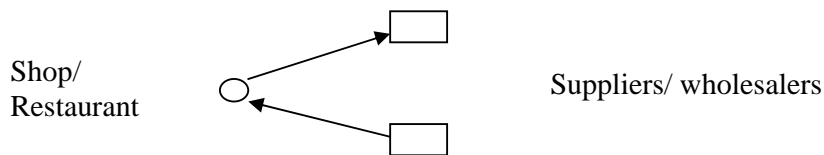


Figure 14: Delivery by Supplier's Truck & Own Vehicle (Receiver Perspective)

→ The shops/restaurants get a delivery from suppliers regularly, but occasionally they handle transport themselves for urgent matters. In other cases, the retailers go to different suppliers to buy products that can't be found at the regular supplier(s).

3. Self transport routine

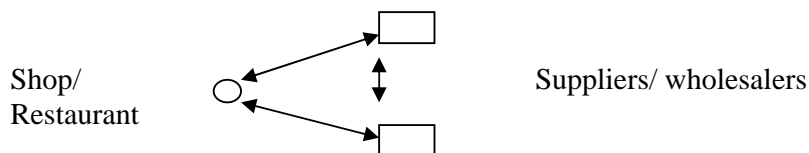


Figure 15: Delivery by Own Vehicle

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg

→ These types of retailers always do the picking up and transporting of their supplies, because:

- Flexibility of time is high; they can go shopping at any time of the day. Mostly, the shop is run by the owner and family members.
- The products variety is rather small and but the size of the consignment is small.
- The size of this retailer is relatively small and the capital requirement is low, relatively simple, licensing provision, entry to and out of the market is easy.⁴²
- They have low economy of scale for transporting goods one at a time.

→ The cost of freight delivery is assumed cheaper by using own vehicle.

⁴² Barry Berman & Joel R Evans, p104

10.1 Advantage and Disadvantage of Independent Retail Business

Independent retailers have a variety of advantages and disadvantages.

Advantages:

1. Flexibility for entry in the market due to low capital requirements and relatively simple.
2. A great deal of flexibility in choosing retail formats and locations, and in devising strategy.
3. Have specialization and consistency in the product/service offered and has a store image where they provide a comfortable atmosphere in which to shop.
4. Have direct and strong control because independents run only one store. Centralized decision making and minimum layers of management personnel.
5. The market segment is selected among overall market rather than the mass market.
6. Consistency in the effort, since only one geographic market is served and just one strategy (store hours, product assortment, prices, sales personnel, promotion, etc.) is carried out.
7. Owner operators tend to be in full charge and do not have to fret about stockholders, board of directors meetings, and labor unrest, and often are free from union work and seniority rules which can enhance labor productivity.
8. Owner operators usually have a strong entrepreneurial drive, success or failure has substantial implications and there is a high degree of ego involvement.⁴³

⁴³ Barry Berman & Joel R Evans, p105

Disadvantages:

1. Limits in bargaining power due to small quantities of the consignment they buy.
2. Low economy of scale in buying and maintaining inventory.
3. Labor intensiveness because ordering, taking inventory, marking merchandise, ringing up sales and bookkeeping may be done manually. For some small firms, investment in hardware and software may not be necessary and is too costly.
4. The shop is run by the family, overdependence on the owner and little time and few resources for planning.
5. Reordering may be tough if minimum order requirements are too high for them to qualify.
6. Due to financial constraints, number of purchases buying is high with small size rather than large orders at one time.⁴⁴

⁴⁴ Barry Berman & Joel R Evans, p105

10.2 Suppliers

There are 43 suppliers mentioned on the answers from retailers, 29 supplier locations are identified and they are mostly located in the form of group in different areas. We can see the location of different suppliers in the map and the name in the table below.

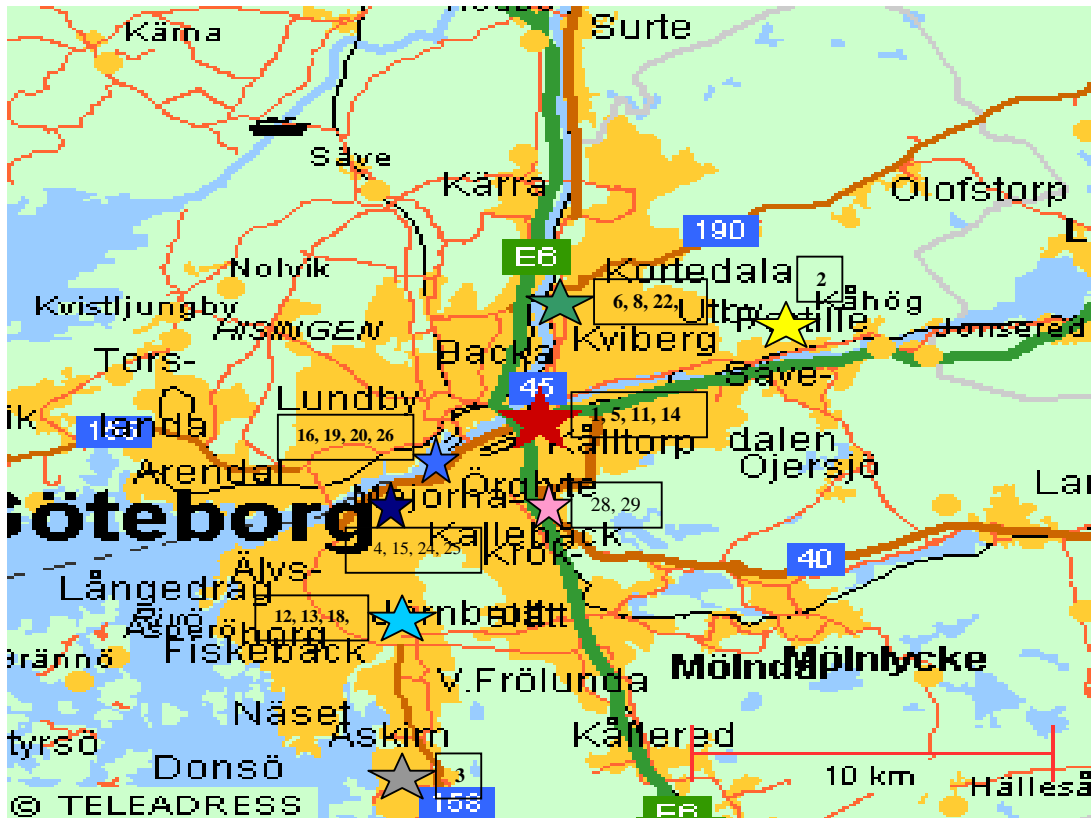


Figure 16: Map of Supplier Location⁴⁵

⁴⁵Gulasidorna

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg

Number	Name	Area
1	Axfood Snabbgross	Partihallarna
2	ICA Meny	Partille
3	Matsäljarna	Askim
4	PAC Production	Majorna
5	WIBO Frukt & Grönt	Partihallarna
6	Servera	Hisings Backa
7	Fiskboden	Sävedalen
8	Svensk Snabbmat	Hisings Backa
9	Carlsberg	J.A Pripps
10	Grönsakstorget	Grönsakstorget
11	Aroma Frukt & Grönt	Partihallarna
12	Kopparbergs	Västra Frölunda
13	Gronsaksspecialisten	Västra Frölunda
14	Falkväst Food	Partirhallarna
15	S.O. Larson	Majorna
16	Fina Fisk AB	Fiskhamnen
17	Swedish Match	Växel
18	Privab	Västra Frölunda
19	Nordsjöfisk AB	Fiskhamnspiren
20	Fisk Idag	Fiskhamnspiren
21	Åbro	Mölndal, Källered, Kalkbruksg.
22	Denn Food	Hisings Backa
23	Khals & Kaffehandel	Kungsbacka
24	Kals Åden	Majorna
25	Mat M.M	Nordhemsg. Majorna
26	Fiskeboa	Fiskhamnen
27	KåKå AB	Gårda
28	Coca Cola	Kallebäck
29	Arla	Kallebäck

Table 4: Name and Location of Suppliers⁴⁶

⁴⁶ Source: Questionnaire Survey

11. Analysis

From the research supported by the theories, it is evidenced that the current freight transport today is characterized by several very important situations:

Lots of projects have been carrying on but in reality, the freight distribution still lacks structured and organization. The previous freight distribution projects based on voluntary involvement in Gothenburg didn't make any changes. There is also evidence in our research that most of the retailers refuse to voluntarily cooperate because the distribution is arranged by their supplier and the cost of transport is hidden in the price of the goods. Since the supplier/wholesaler arranges the distribution, the possibility of cooperation is more possible on the supplier side rather than on the retailer side.

As in the theory, coordination and consolidation gives a benefit of higher utilities for means of transport, cost effective use of resources, more trips taken, and lower cost to customers. Suppliers and wholesalers are aware of this benefit but each of them just focuses on the improvement of their own distribution system which results in the suppliers and wholesalers serving the same customer, resulting in the existence of uneconomically organized networks. In the discussion with suppliers, they don't believe that such cooperation will come easily, either on the retailer and the supplier side, especially due to the diversity of retail business in Gothenburg. The mixture of different cultural backgrounds is potentially problematic and it may become a barrier to cooperation. One should take action to propose this idea. Restrictions are also needed to make such cooperation more visible.

Increasing fragmentation of deliveries to retailers (smaller shipments and higher frequency of delivery rather than fewer big ones) to get fresh goods and less storage to keep the stock increases the number of truck movements. On the other hand, the traffic restriction in the city limits the access for big trucks to enter the city, which lowers the efficiency of transport. Limitation of the loading and unloading areas in the city forces the trucks to stop in inappropriate areas. The congestion and shorter time window on the retailer's side then reduces the number of distributions per truck.

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of Gothenburg

The other characteristic of the current freight transport today is the outsourcing of transport and logistic services by many firms, due to the specialized nature of transport and increased time sensitivity, growing competition and conflict between freight, public and private transport for network resources (e.g. road/track space, loading vs. parking zones), the multitude of uncoordinated transport operations by different actor who are directly involved in freight transport. Diverse unit loads mean many empty return runs,⁴⁷ and a rather high of number of freight movement by private vehicles. All these characteristics contribute to an increase of pollution and congestion in the city.

⁴⁷ Roseta, Work areas

12. Scenarios of the Mix Carload Solution

From the data collected, we are going to make a concept based on a scenario. This scenario is to show the concept of mix carload. The mix carload is not based on retailer's cooperation but the supplier's cooperation. In this scenario, the cooperation is between the supplier in the same location and their customer in the same area. The situation also includes other customers in other areas, but the result should be the same, which is a mix carload concept.

As shown in the map, the suppliers are located in the same area, represented by the stars on the map. Each supplier has their own specialty of products offered. Retailers deal with different suppliers for different supplies. In this scenario, we are not considering the consignment size since there was not enough data about the consignment size ordered were collected. The time of delivery is included in the scenario and the name of the supplier and retailer will be chosen.

Scenario 1: Distribution by each supplier truck to customers in different area

Suppliers:

For this scenario, we chose the suppliers (1)Axfood, (5)WIBO frukt & Grönt, (11)Aroma Frukt and Grönt and (14) Falkväst Food, all located in the same area of Partihallarna. Each supplier has customers in the city Center.

Retailers:

For the retailers, we have chosen Kaffe & Co (Axfood), Fiskekrogen (Aroma Frukt och Grönt) and Restaurant Sirtaki (Falkväst food, Axfood). Each retailer has one delivery per week, five times a week and three times a week, respectively.

Those retailers prefer to have their consignment in the morning between 06:00 and 12:00.

Each supplier distributes based on the route planning, where the customer that may fill the whole lorry with goods is served first and customers that have the highest saving value will be served in the same truck.

The situation of the individual distribution by each supplier in Partihallarna to their customers in different areas can be seen in this figure:

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg

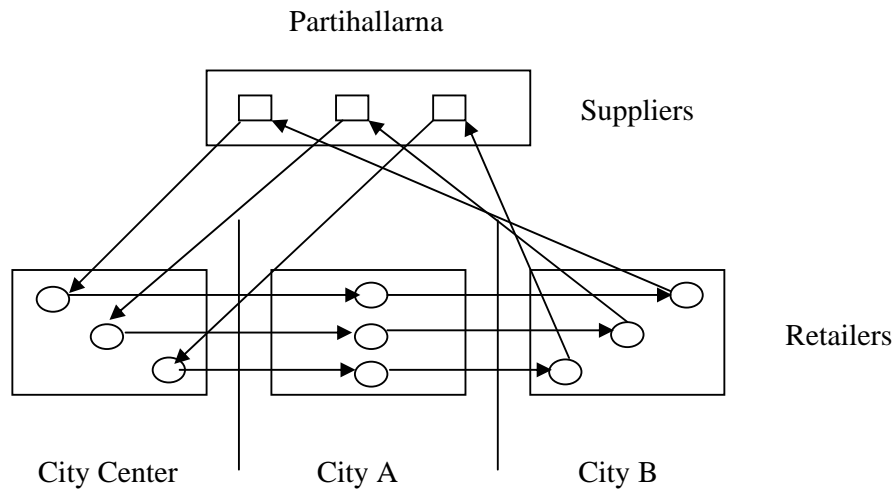


Figure 17: Scenario of Individual Distribution by Supplier

The results of individual distribution by supplier are:

- Number of trucks into the city Center = 3, to city A = 3 and city B = 3
- Number of areas for each truck visit = 3
- Number of customers served by each supplier's truck = 3

Scenario 2: Mix carload proposal for different suppliers serving customers in the same area

The suppliers and the retailers are the same as in the first scenario, the different is in this scenario the supplier's truck doesn't deliver the goods for their own customer in different areas instead each supplier mixes their consignment into one truck and each truck only goes to one area to deliver the goods to different customers.

Those retailers prefer to have their consignment in the morning between 06:00 and 12:00.

Suppliers first find out which customer may fill the whole lorry, and this customer will be served first, and then the rest will be mixed with other consignments from other suppliers to have a full truck delivery to one area.

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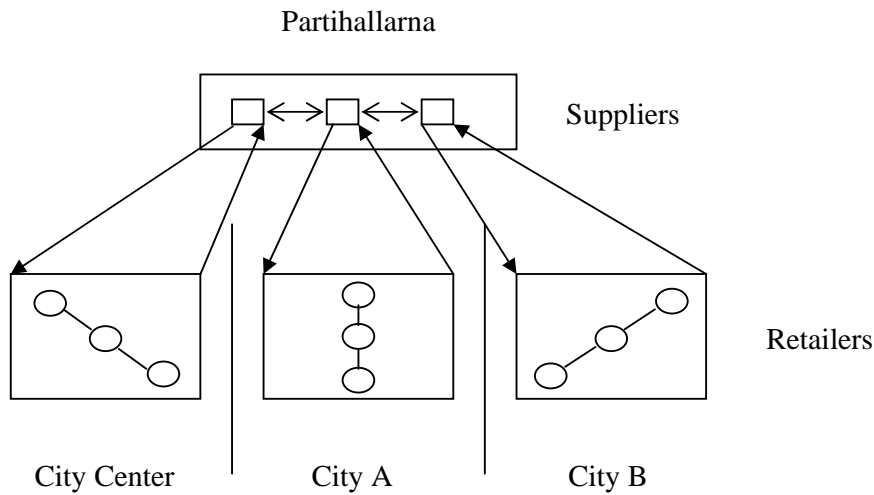


Figure 18: Scenario of Mix Carload by Distribution Coordination

The result of the mix carload concept is:

- Number of trucks into city Center = 1, to city A = 1 and city B = 1
- Number of areas for each truck visit = 1
- Number of customers served by each truck = 3

From the two scenarios with distribution by each supplier and mix carload, we can see that with mix carload:

- The number of trucks entering the city is reduced to only 1, which means a reduction in the congestions in the city Center and other city areas.
- No inter city truck movement
- Number of customers being served is the same but it can improve the service time by less competition for parking place and waiting time between trucks
- The pollution in the city may be reduced by fewer trucks in the city

12.1 Possibility and the Obstacles of Cooperation for Mix Carload

12.1.1 Possibilities of cooperation

From the questionnaire results we found out that the retailers who were interested to cooperate is very low. However, we cannot assume that this cooperation is impossible to perform. From the 16% who responded, there are two retailers who are willing to cooperate in order to reduce the freight transport cost. The strange thing is these two retailers receive the goods by a supplier's truck and we found out that they are only dealing with one supplier for all the supplies they need.

From the interview with Axfood snabbgross, the numbers of retailers who pick up the goods from the supplier is up to 80%. The percentage varies for other suppliers, but we found that this number is rather small in the city Center. So, the cooperation for mix carload is not a matter of whether the retailer uses their own vehicles, truck service or a supplier's truck, but it is about willingness.

In our analysis of the mix carload solution, there was interest to cooperate freight transport within suppliers in the same area, this kind of cooperation can be a good marketing tool to attract more customers to buy the supplies from the area of Partihallarna. Each supplier nowadays is trying to improve their internal work, but transport coordination is a possibility, suppliers just think it is not the time to implement such cooperation. Like retailers, the suppliers also think their current freight transport system seems good enough to follow the environmental zone in the city. Such new regulations for freight transport in the city might force them to cooperate between suppliers and may necessarily be implemented, but currently, the competition between suppliers and between retailers is a nature in business which such cooperation would simply not come up.

To cooperate, the freight transport does not just involve one or two persons or one or two departments, but the whole company; this is something which not easy to accept for every company. The image of the company is important for their customer, and if such cooperation fails, they have to start over from the beginning.

12.1.2 Obstacles to cooperation

1. Most of this kind of cooperation is voluntary either on the supplier side or retailer side, so the members can leave at any time.
2. The actors directly involved in the freight transport believe the current system is just fine; they don't want to change the system.
3. The retailers don't like to have their goods mixed with other goods. They feel irritated.
4. Suppliers find out this system will have lack of communication between the group members. For example. One doesn't know when the other supplier will deliver the goods to their customer.
5. Retailer feels that this is not flexible; they want to order the goods when they want and from which suppliers they want.
6. The cost of the freight transport is included in the goods per delivery so they don't believe that this kind of cooperation can reduce the transport cost.
7. The different level of service given by different suppliers is one of the reasons. Retailer chooses to buy the goods from one supplier because of the service they provide.
8. The different national backgrounds of the retailers could be one of the problems for cooperation (information from Axfood). This might happen, as different people from different nations have their own way of doing business.

12.1.3 Prerequisites

1. Before implementation, either from the retailer or supplier, the administrator has to find the benefit of cooperation for the members. So far, the project is introducing the benefit for reducing pollution and congestion. Reducing pollution by implementing regulations for truck size and the emission levels in the city forces them to change an old vehicle to a more environmental friendly one. This gives benefit for the society but has little effect for the retailer and supplier. Reducing congestion in the city benefits both the society and the supplier and retailer, it means the trucks can get a better access; the distribution will be faster and less time consuming.
2. The regulation for more environmental friendly trucks has been introduced in the city, and whether the operators of the trucks like it or

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg

not, they have to fulfill the demand for the environmental friendly truck. New regulations for mix carload are needed that force the operator to cooperate with their freight distribution so the efficiency of freight transport in the city can be achieved for a better environment. Göteborg Köpmanaförbund needs to influence the politicians for any regulations according the implementation of mix carload.

3. As a retail organization, Göteborg Köppmanaförbund can be a promoter of communication between retailer, supplier and society. Working together with the traffic administration to introduce the new system and for the negotiation between supplier, retailer and society for any possibility of achieving a win-win solution in the implementation of mix carload.

13. Conclusion

Congestion and pollution is gradually increased every time by increasing the demands of private vehicle, freight transport and public transport. There is no doubt that transportation is vital in the fast moving economy, but it is also critical in creating environmental and traffic problems. The introduction of an environmental zone in Gothenburg has been successfully reducing pollution, and the trucks entering the city are environmental friendly.

Competition is a nature of business to exist in the market; the company has to be more efficient and reliable for their customer. Each business then focuses on optimizing their distribution system. Food suppliers optimize their distribution systems by consolidating the goods and coordinating the transportation before delivery to customer. Retailer chooses the distribution system created by the supplier. They can use the supplier's truck or they can use their own vehicle for small consignments. But when we see the whole picture of freight transport in the city, the existing system still lacks structure and is an uneconomically organized network. These are driven by aspects which were described in Chapter 10.

This research identified that retailers feels the current distribution is flexible. Retailers can choose which supplier they want to deal with and the types of vehicles they are going to use. This means that cooperation for mix carload between retailers is not easy to build. From other previous projects carried out in Gothenburg, we could see that the project was based on volunteering of stakeholders. It is necessary when starting such coordination, but the coordination won't last for long if the benefit is only on one side while others carry the cost. In our project, the retailer found there is no benefit for such cooperation, because the distribution system is set up by the supplier and the freight cost is included in the goods price.

Göteborg Köpmannaförbundet needs to have a strong communication with supplier to introduce cooperation for mix carload. Köpmannaförbundet also needs to communicate to retailers about mix carload and the benefit to the environment in the city. In many ways, the supplier cooperation for mix carload

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg also affects the retailer, so Köpmannaförbundet needs to sit together and discuss with the retailers to find the benefit of this cooperation.

In the scenario of cooperation between suppliers in the same area developed a theory of reducing the number of trucks coming in to the city. This seems to be more possible if the cooperation between suppliers can mutually support their business. Like the case of Finland, the cooperation is between companies in different scopes of business, nevertheless supporting each other and benefiting them by improving the capacity usage of vehicles.

Communication between different actors is important for such cooperation; lack of communication is created by nature of competition, especially because the diversity of culture in retail business in Sweden makes the approach to such cooperation even harder. The communication can happen if one takes action to be a mediator. As a retail association close to the retail business, Köpmannaförbundet and public authorities can be a mediator and manager for freight coordination like mix carload. It is also crucial to discuss with the politicians and to implement such regulations and restrictions to make this cooperation more visible.

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15. References

Published Sources:

John J. Coyle, Edward J. Bardi, Robert A. Novack. *Transportation, the supply chain & the economy*. (South-Western College Publishing, Transportation 5th Edition)

TELLUS newsletter. 2003. Sustainable urban transport for the Europe of tomorrow,

Susanne Strauß, “Extract: City Logistics an Instrument to Decrease Urban Freight Traffic,” *City Logistics and Traffic Planning*

Michael Levy, PhD, A Barton Weitz, PhD, “Introduction to the world of retailing,” Retailing Management, The McGraw-Hill Co., 2001

Barry Berman & Joel R. Evans. *Retail Management: A strategic approach* (7th edition)

Kent Lumsden. *Fundamental of Logistics* (Compendium, 2002/2003)

Aaker, D.A., Kumar, V., Day, G.S. *Marketing Research*. (John Wiley & Sons, Inc., 1995, 5th ed)

Donald J. Bowersox, David J. Closs, M. Bixby Cooper. “Operation integration,” *Supply Chain Logistics Management*. (The McGraw-Hill/ Irwin Series)

Clark & Wright. *Route planning method*. (Fundamentals of Logistics, 2002/2003)

Julia Suslova, Maxim Galich. *Baltic Sea goods transportation development*. (Master thesis, 2002)

Possibility of Cooperation for Mix Carload to reduce the number of trucks in the city Center of Gothenburg

Crowl, T. K. *Fundamentals of educational research*. (Madison, WI: Brown and Benchmark, 1993)

Kristiansson, Lena; Petterson, Mona. *How to implement a coordinated city distribution?* (Gothenburg, 1996-7)

Patton, M. *How to use qualitative methods in evaluation (Program evaluation kit)*.

(Thousand Oaks, CA: Sage Publications, 1987).

Susanne Strauß. *City logistics-An Instrument to Decrease Urban Freight Traffic*

Maria Ottosson. *Milestones 1, definition av kriterier för systemet*. (TELLUS, 2003-11-25)

Logistics and Distribution: Shipping the goods to market, Chapter 15

Marc Dupuis and John Dawson. *Aer Rianta International (ARI), European cases in Retailing*. (Blackwell Publishers Ltd., 1999)

Internet:

Göteborgs Stad:

(<http://www.goteborg.se/prod/sk/goteborg.nsf/1/english?OpenDocument>)

Trafikkontoret: (<http://www.trafikkontoret.goteborg.se/>)

PRoGR€SS: (<http://www.progress-project.org/Progress/got.html>)

Goteborgs Stad Centrum:

([http://www.centrum.goteborg.se/prod/Centrum/dalis.nsf/system/filer/Goteborgs_stad_Centrum.pdf/\\$file/Goteborgs_stad_Centrum.pdf](http://www.centrum.goteborg.se/prod/Centrum/dalis.nsf/system/filer/Goteborgs_stad_Centrum.pdf/$file/Goteborgs_stad_Centrum.pdf))

<http://www.thomsonlearning.co.uk>

Evolution's Arrow. *Barriers to Cooperation Chapter 4:*

(<http://www4.tpg.com.au/users/jes999/4.htm>)

Descriptive research:

(<http://www.ryerson.ca/~mjoppe/ResearchProcess/DescriptiveResearch.htm>)

http://itiincorporated.com/Assets/pdf%20files/08-Chapter_06.pdf

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of Gothenburg

City freight, Case of Finland, UK cities: (<http://www.cityfreight.org>)

Gulasidorna: (<http://www.gulasidorna.se/>)

<http://www.thomsonlearning.co.uk>

Database, Leda case study city: Gothenburg, Sweden:

(<http://www.ils.nrw.de/netz/leda/database/cities/city0113.htm>)

Work areas, area 8: Freight transport services, progress report:

(http://www.trg.soton.ac.uk/rosetta/workareas/8_fts/fts_pr1_vision.htm)

Personal Interviews:

Mr. Kent Månsson, Manager of Logistics, ICA, Kungälv (July 8th 2003)

Mr. Anders Larsson, Marknadsdirektör, Nordstan (August 27th 2003)

Mr. Tommy Fougner, Manager, Axfood Snabbgross (October 23rd, Dec 11th 2003)

Mrs. Lena Larsen, Göteborgs Köpmanaförbund (Several times)

Mr. Magnus Blinge, TFK, (November 25th 2003)

Mr. Lars Mossfeldt, Department of Urban land use and Transport planning
(several times)

Telephone Interviews:

Mrs. Lena Larsen, Göteborgs Köpmanaförbund (Tel. 031-708 94 60)

Mr. Tommy Fougner, Manger, Axfood Snabbgross (Tel. 031-707 97 60)

Mr. Lars Ohlsson, Owner "Palace Brunsparken" (Tel 031-80 75 50)

Mr. Anders Roth, Trafikkontoret, (Tel. 031- 61 37 03)

Mr. Jean Pier, Owner Delikatesshörnan AB, (Tel. 031-711 67 91)

Mr. Bjorn, Aroma frukt and Grönt, (Tel. 031-338 76 60)

16. Appendices

Appendix A: Questionnaire for Retailers

Frågor till detaljhandlare/restaurangägare

Namn på butik/restaurant.....

Vem svarar? Ägare anställd.....

Markera dina svar med (X)

Butikstyp

- a. Matbutik b. Bageri/ konditori c. Restaurant/Café
 d. Kiosk

1. Vem eller vilka leverantörer används?

- a. Axfood e. Privab h. Svensk Snabbmat
 b ICAMeny f. Partydelikatesser AB i. Livs Grossisten AB
 c. Matsäljaren AB g.Grönsaksspecialisten j. Andra
 d. Hebes Frukt & Grönsaker AB

Om svaret är "Andra", skriv gärna namnet på leverantörerna

.....
.....
.....

2. Hur transporteras varorna till butiken/butikerna?

Mark (X) in a suitable box:

Transport modell	Alltid	Ofta	Ibland	Aldrig
Egen bil				
Leverantör transport				
Truck service				
Andra sätt				

3. Hur många gånger i veckan levereras varor till butiken/restaurangen

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Antal leveranser per vecka	Namn på leverantörerna

4. Vilka produkter kops från ett snabbgross?

Varugrupper	Volym/storlek på sändningen	Leveransdag	Namn på leverantören	Kvalitet, som färskt, fryst, ömtåligt, tåligt etc
Frukt & Grönt				
Mejeri				
Kött				
Fisk				
Öl & läsk				
Bröd				
Färdigmat				
Total				

5. Hur dags på dagen behöver du få varorna till butiken/restaurangen?

- a. 06:00 to 12:00
 b. 12:00 to 18:00
 c. annan tid

Om du valt flera olika tidpunkter, förklara gärna varför

.....

.....

.....

.....

6. Hur beställer du varorna från leverantörerna?

- a. telefon/fax
 b. dator/internet
 c. EDI/POS
 d. andra sätt

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Om du använder andra sätt, förklara gärna vad dessa är

.....
.....
.....
.....

Önskar du göra beställningar i samarbete (kollektivt) med andra butiker/restauranger för att minimera leverans kostnaderna?

7.

a. Ja

b. Nej

Om inte, varför?

.....
.....
.....
.....
.....
.....

Appendix B: Questionnaire for Suppliers

Frågor till leverantörer

Företagsnamn.....

Position i företaget:.....

Markera dina svar med (X)

1. Är företaget specialist på vissa varor?

a: Ja

b: Nej

Om ja, beskriv gärna specialiteten

Om inte, eller om företaget har andra produkttyper, fortsätt till fråga nr 3

.....

Speciell produkt	Genomsnittlig volym/leverans	Leveransdagar på veckan	Antal leveranser på veckan	Kvalitet, som färskt, fryst, ömtåligt, tåligt etc
Total				

2. Vilka produkter säljer ni?

Varugrupper	Genomsnittlig volym/leverans	Leveransdagar under veckan	Antal leveranser Under veckan	Kvalitet, som färskt Fryst, ömtåligt, tåligt etc
Frukt & Grönt				

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mejeri				
Kött				
Fisk				
Öl & Läsk				
Bröd				
Färdigmat				
Total				

3. Vilka typer av kunder får leverans varje dag? I procent

- a. Matbutiker..... b. Bageri/ konditori
..... c. Restaurant/Café d.
Kiosker
- e. Kedje restauranter och butiker, (t ex Mc Donald,7 eleven,Pressbyrån).....

Varför?.....
.....
.....
.....

4. Erbjuder ni transport service till era kunder I egna truckar?

- a. Ja b. Nej

Om ja, vad är kriterierna för att leverera varor i er egen bil?

Kostnader per leverans

Förklaring.....
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.....
.....

Storleken/volymen på sändningen/leveransen

Förklaring.....
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.....

4.3 Antal leveranser

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Förklaring.....
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.....

4.4 Beroende på avtal med detaljhandlaren/restaurangägaren

Förklaring.....
.....
.....

4.5 Andra orsaker

Förklaring:.....
.....
.....

5 Har ni kunder som använder andra bilar?

Hur transporteras varorna till deras butiker/restauranger?

- a. Egen bil b. annat transport företag

Kan ni förklara i procent hur många av era kunder som inte använder er transport service?

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.....

6 När på dagen levereras varor till kunder?

- a. 6 till 12 b. 12 till 18 c. Andra tidpunkter

Om ni valt mer än en tidpunkt, specificera gärna

här:.....
.....
.....
.....

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- 7 Vilken biltyp använder ni för att transportera varor till era kunder?
- a. Liten bil/van b. medelstora truckar c. stora truckar d. andratyper

Om ni valt mer än en transporttyp, förklara gärna varför här:.....
.....
.....

- 8 Vilket kommunikationssätt använder ni för att kommunicera med era kunder?
- a. Telefon/fax b. dator/internet c. EDI/POS d. Andra sätt

Om ni valt andra sätt, förklara gärna hur kommunikationen går till.....
.....
.....

- 9 Om ni tillhandahåller leverans service, skulle ni kunna ge lägre leverans kostnader till mindre kunder om dessa kunder samarbetade för att fylla en enda leverans truck?
- a. Ja b. Nej

Förklaring
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- 10 Har ni förslag och rekommendationer för att kunna förbättra det befintliga distributionssystemet för dagligvaror?

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Appendix C: Name and Address of the Shops in the City Center

Andersson Albert, Charkuteri AB St. Saluhallen 95 Göteborg 411 17	Flickorna Kanold Choklad o. Konfekt S. Larmg. 14 GÖTEBORG 411 16
Alexandras Utländska Delikatesser St. Saluhallen 138 Göteborg 411 17	Frick & Co AB, Frisörgrossisten Drottningg. 7 GÖTEBORG 411 14
Araz Chark St. Saluhallen 33-34 Göteborg 411 17	Fruktlarsson Stora Saluhallen, GÖTEBORG 411 17
Candyshop Fredsg. 4 Göteborg 411 07	Frukt Källar'n Kungstorget 12 GÖTEBORG 411 10
Capris St. Saluhallen 65-69 Göteborg 411 17	Godishuset Kungs.26 GÖTEBORG 411 19
Delikatess Hörnan St. Saluhallen 117-118 Göteborg 411 17	Hassela Göteborg Korsg. 7-9 GÖTEBORG 411 16
Dohsé Kenneth AB Stora Saluhallen 102-110, GÖTEBORG 411 17	Hasselbackens Chark St. Saluhallen 102 GÖTEBORG 411 17
La Maison Francaise Södra Larmg. 18, GÖTEBORG 411 16	Nilsson Ostaffär, Hilda St. Saluhallen 98, GÖTEBORG 411 17
Life Hälsobutiken i Nordstan L. Klädpressareg. 7 (Nya Gatan), Box 11436, GÖTEBORG 404 29	Ericson Hugo AB Ost 99 St. Saluhallen GÖTEBORG

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Naturapoteket Femmanhuset GÖTEBORG	Hälsosamköp St. Saluhallen Kungstorget, GÖTEBORG 411 17
New Thai Livs Basarg. 10, GÖTEBORG 411 10	Indiska Te & Kaffe Magasinet Korsg. 11, GÖTEBORG 411 16
Nobelius Viltaffär AB St. Saluhallen 4-6 , GÖTEBORG 411 17	Ingelsta Kalkon Saluhallen 96, GÖTEBORG 411 10
Nordstans Konfektyr Postg. 39, GÖTEBORG 411 06	Jam Jam RundEllen AB Postg. 26-32, GÖTEBORG 411 06
Ost-Anders St. Saluhallen 17, GÖTEBORG 411 17	Josefin The, Kaffe & Kryddspecialisten St. Saluhallen 1-3, GÖTEBORG 411 18
Pak-Sverigebutik HB Basarg. 6, GÖTEBORG 411 17	Otterhällans JOUR LIVS Lasarettsg. 2, GÖTEBORG 411 19
Shayan Livs Saluhallen 70-74, GÖTEBORG 411 17	Kerstins Delikatesser Feskekörka GÖTEBORG 411 20
Tubbies St. Saluhallen 7-8, GÖTEBORG 411 17	Kungsfrukt Kungsportsplatsen 2, GÖTEBORG 411 10
Satco Sweden Asia Trading Company HB S. Larmg. 6, GÖTEBORG 411 16	Kungsgodis Kungstorget 14, GÖTEBORG 411 10
Orientaliska Delikatesser St. Saluhallen 93, GÖTEBORG 411 17	Kungstorgets Fisk & Delikatessaffär AB St. Saluhallen 13, GÖTEBORG 411 17

Source: <http://www.gulasidorna.se/>, Nordplan ab, Göteborg Köpmannaförbundet

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Appendix D: Name and Address of the Restaurants in the City Center

65-ans Minilivs Södra v. 65, GÖTEBORG 412 54	Café Fyrkanten Kungstorget 1, GÖTEBORG 411 10	Fredrico's Café Nordstan, GÖTEBORG 404 25
Ahlströms Konditori, Wiktor Korsg. 2, GÖTEBORG 411 16	Café Kaos Drottningg. 31, GÖTEBORG 411 14	Fructus Fruktkonditori Trädgårdsg. 2, GÖTEBORG 411 08
Amanda Boman Restaurang & Bar St. Saluhallen, GÖTEBORG 411 17	Café Mekka Kungsg. 27-29, GÖTEBORG 411 15	Galini Kungsg. 20, GÖTEBORG 411 19
Asien Köket Spannmålsq. 16, GÖTEBORG 411 05	Café Nicolina Drottningg. 71, GÖTEBORG 411 07	Gameonline AB Magasinsg. 26, GÖTEBORG 411 18
bagatelle café Kungsg. 40, GÖTEBORG 411 19	Café Cappuccino Ö. Larmg. 19, GÖTEBORG 411 07	Gamle Port Restaurang Ö. Larmg. 18, GÖTEBORG 411 07
Baker Boys Korsg. 5, GÖTEBORG 411 16	Cassels Café Postg. 39, GÖTEBORG 411 06	Café George du Wal Kyrkog. 32, GÖTEBORG 411 15
Bar Centro Kyrkog. 31, GÖTEBORG 411 08	China Garden/Peking AB Ö. Larmg. 13, GÖTEBORG 411 07	Gretas Bar, Restaurang & Nightclub Drottningg. 35, GÖTEBORG 411 14
Berså bar Kungsportsplatsen 1, GÖTEBORG 400 14	Ching Palace S. Hamng. 2, GÖTEBORG 411 06	Grönsakstorgets Gatukök Grönsakstorget, GÖTEBORG 411 17
Bistro Brasseri Bar AB Ö. Hamng. 36, GÖTEBORG 411 09	City Kebab N. Hamng. 36, GÖTEBORG 411 06	Hallå bar St Saluhallen, GÖTEBORG 411 17
Bliss Combo Magasinsg. 3, GÖTEBORG 411 18	Coffee cup AB Postg. 26-32, Box 11187, GÖTEBORG 404 24	Herr Dahls Mat & Martinis Kungstorget 14, GÖTEBORG 411 10
Bliss Resto Magasinsg. 3, GÖTEBORG 411 18	Coffeeshop diPF Kungsg. 19, GÖTEBORG 411 19	Jameson Pub Kungsportsavenyen 32, GÖTEBORG 411 36

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Bookmaker, The Nils Ericsonsg. 23, GÖTEBORG 411 03	El Toro Bravo Drottningg. 29, GÖTEBORG 411 14	Japan Shop Kungsg. 9 C, GÖTEBORG 411 19
Brasserie Ferdinand Drottningg. 39, GÖTEBORG 411 07	Emre's Pizzeria Bar & Kök Kungsg. 7, GÖTEBORG 411 19	Jonny På Hörnet Hvitfeldtsg. 13, GÖTEBORG 411 20
Café Avec Postg. 26-32, GÖTEBORG 411 06	etc.grande Kungsg. 12, GÖTEBORG 411 19	Johnséns Konditori (Östra Nordstan) Fältspatsg. 3, VÄSTRA FRÖLUNDA 421 30
Café Brulé Korsg. 11, GÖTEBORG 411 16	Fair Play Box 11433, GÖTEBORG 404 29	Jord, Restaurang Vallg. 8, GÖTEBORG 411 16
Café Caprese Kungsg. 25, GÖTEBORG 411 19	Restaurang Figaro Kungsparken, (Stora Teatern) GÖTEBORG 411 15	Kafé Vallgatan Vallg. 35, GÖTEBORG 411 16
Café Kosmos V. Hamng. 20, GÖTEBORG 411 17	Fiskekrogen L. Torget 1, GÖTEBORG 411 18	Kafé Epok Kungsg. 58-60, Kompassens övre plan GÖTEBORG 411 08
Festival Café & Konditori Postg. 39, GÖTEBORG 411 06	Frank's Coffee Co Kungstorget 10, GÖTEBORG 411 10	Kaffe & Co Ö. Hamng. 46, GÖTEBORG 411 09
Sushi Kansai Kungsg. 25, GÖTEBORG 411 19	Kompaniet Underground Kungsg. 19, GÖTEBORG 411 19	Restaurang Alysa N. Hamng. 36, GÖTEBORG 411 06
Kinesiska Muren Skeppsbron 4, GÖTEBORG 411 21	Tien Hung Restaurang Kungsg. 10 B/Lasarettsg., GÖTEBORG 411 19	Carles Matsalar AB Nordstadstorget 6, Box 11433, GÖTEBORG 404 29
Göteborgsoperan Restaurang Christina Nilssons gata, GÖTEBORG 411 04	Kungsgatan 34 Bar & Kök Kungsg. 34, GÖTEBORG 411 19	Restaurang, Nya Lydias Dinner Nordstadstorget 2, GÖTEBORG 411 05
Sakura Drottningg. 60, GÖTEBORG 411 07	Pir 31 Fiskrestaurang AB Kungssportsplatsen 1, GÖTEBORG 411 10	Pasta Prego Nordstan, GÖTEBORG 404 25

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Sushi-Do AB Drottningg. 60, Box 5097, GÖTEBORG 402 22	Yammy Yammy Kungstorget 3, GÖTEBORG 411 17	Warehouse Nordstan, GÖTEBORG 404 30
Ölvalvet i Göteborg AB Drottningg. 46, GÖTEBORG 411 07	Barsidan Kungstorget 7, GÖTEBORG 411 17	Marieholm S/S Restaurang Packhuskajen 8, GÖTEBORG 411 13
Thai Isaan Restaurang Drottningg. 21, GÖTEBORG 411 14	Ölhallen 7:an Kungstorget 7, GÖTEBORG 411 17	Kajskjul 8 Packhuskajen 8, GÖTEBORG 411 13
Atlassi of Sweden AB Drottningg. 39, GÖTEBORG 411 07	Kungstorgskaféet AB Kungstorget 11, GÖTEBORG 411 10	Casino Cosmopol Göteborg Packhusplatsen 7, GÖTEBORG 411 13
Eggers Restaurang o. Bar Drottningtorget, Box 323, GÖTEBORG 401 25	Restaurang & Bar 99:an HB L. Korsg. 1, GÖTEBORG 411 17	Restaurang Bei Jing Postg. 26, GÖTEBORG 411 06
Pullman Bar & Kök Drottningtorget 1, GÖTEBORG 411 03	Restaurang Sirtaki L. Kungsg. 1, GÖTEBORG 411 08	Taste Five Postg. 26, GÖTEBORG 411 06
Palatset Biljard, Bar & Restaurang AB Ekelundsg. 11, GÖTEBORG 411 18	Sukhothai Restaurang L. Kyrkog. 2, GÖTEBORG 411 15	Murveln, Restaurang Postg. 26-32, Box 11433, GÖTEBORG 404 29
Gabriel Fisk- o. Skaldjursbar Feskekörka, GÖTEBORG 411 20	Thailändska Restaurang Sukhothai AB L. Kyrkog. 2, GÖTEBORG 411 15	Restaurang Båten RIORIO Rosenlundsplatsen, GÖTEBORG 411 20
swedish taste AB Kaserntorget 6, GÖTEBORG 411 18	Taverna Agora L. Nygatan 2, GÖTEBORG 411 09	Restaurang Huset S. Hamng. 47, GÖTEBORG 411 06
Sticky Fingers Bar & Grill Kaserntorget 7, GÖTEBORG 411 18	Smittska Krogen L. Torget 3, GÖTEBORG 411 18	Palace Brunnsparken S. Hamng. 2, GÖTEBORG 404 30
Södra Liden Bar & Kök Kungsg. 8, GÖTEBORG 411 19	Mañana Lasarettsg. 6, GÖTEBORG 411 19	Golden Days, The S. Hamng. 31, GÖTEBORG 411 14
Noor Restaurang Kungsg. 6 A, GÖTEBORG 411 19	magnus & magnus (m2) Magasinsg. 8, GÖTEBORG 411 18	Atrium Bar & Restaurant S. Hamng. 59-65, GÖTEBORG 411 06

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Fontana Di Trevi, Restaurang Kungsg. 6 B, GÖTEBORG 411 19	Heaven 23 Restaurang & Bar Mässans Gata 24, GÖTEBORG 402 22	Victors Hotel & Restaurant Skeppsbroplatsen 1, GÖTEBORG 411 18
Cattleman Kungsg. 54, GÖTEBORG 411 08	Incontro Mässans g. 24, GÖTEBORG 402 22	Bamboo Restaurang Skeppsbroplatsen 1, GÖTEBORG 411 18
Belkis Café & Krog Smedjeg. 1 C, GÖTEBORG 411 13	Swea Hof Restaurang & Bar V. Hamng. 3, GÖTEBORG 411 17	Othello Ristorante, bar Ö. Hamng. 5, GÖTEBORG 411 10
Restaurang La Vue St. Badhusg. 26, GÖTEBORG 411 21	MI noodleba V. Hamng. 24, GÖTEBORG 411 17	Malaysia Saté Restaurant Ö. Hamng. 19, GÖTEBORG 411 10
Bangkok Restaurang St. Nygatan 3, GÖTEBORG 411 08	Pharmacy Restaurant V. Hamng. 15, GÖTEBORG 411 17	Ping Pong Kitchen Ö. Larmg. 20, GÖTEBORG 411 07
BOMMEN Restaurang & Bar Torgg. 1, GÖTEBORG 411 05	Dubliner, The Ö. Hamng. 50 B, GÖTEBORG 411 09	Sun Wall Restaurang Ö. Larmg. 10, GÖTEBORG 411 07
Restaurang Office Food Torgg. 15, GÖTEBORG 411 05	Restaurang China Avenue Ö. Hamng. 27, GÖTEBORG 411 10	Källarkrogen i Göteborg AB Ö. Larmg. 20, GÖTEBORG 411 07
Pauls- Billiard & Sportsbar Trädgårdsg. 4, GÖTEBORG 411 08	Andrum AB Ö. Hamng. 19 A, GÖTEBORG 411 10	Restaurang Kopparmyntet FöreningsSparbanken Östra Nordstan, GÖTEBORG 411 13

Source: <http://www.gulasidorna.se/>, Nordplan ab, Göteborg Köpmanaförbundet