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FUA REPORT
INCLUDING SULPITER TOOL FEEDING &
CALIBRATION IN POZNAN

Final
05 2018

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Status (F: final; D: draft; RD: revised draft):	**Final**

1. Introduction

SULPITER project was designed to improve urban freight mobility planning in Central Europe. SULPITER partners supporting policy makers in Bologna, Budapest, Poznań, Brescia, Stuttgart, Maribor and Rijeka in improving their understanding of FUAs freight phenomena in an energy and environmental perspective.

SULPiTER designed and developed a tool aimed at estimating the freight demand generated by the economic activities in the Functional Urban Areas (FUA) individuated by the project partners. The SULPiTER tool is to be intended as a decision support system for policy makers to facilitate the process of elaboration of alternative city logistics scenarios. The tool provides a clear understanding of the urban freight distribution in each FUA and includes a modelling system to feed the evaluation through performance indicators, in this case the Logistics Sustainability Index (LSI).

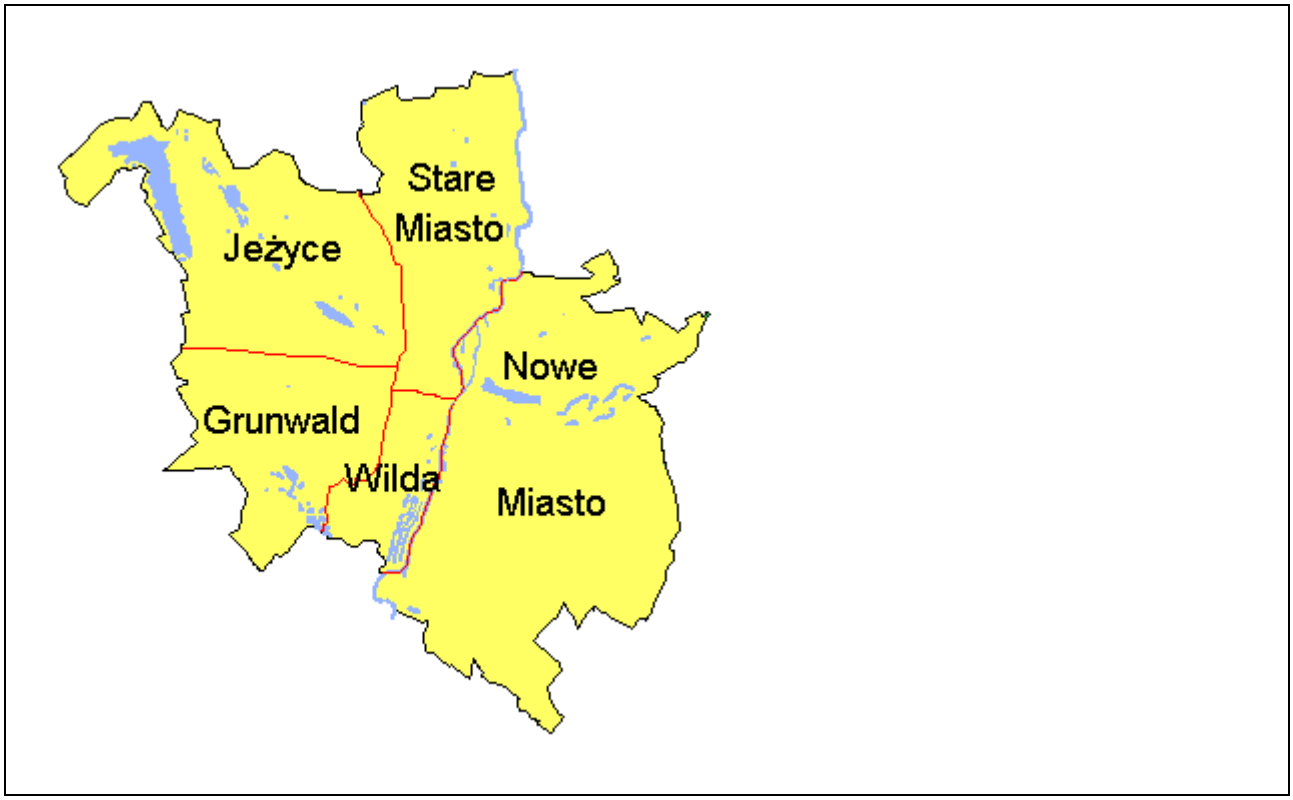
The purpose of the report is to present the results of the analyses carried out within the context of Poznań FUA.

2. The territorial contest

Poznan FUA is located in Central-Western Poland, in the central part of the Wielkopolska Voivodeship. Region Poznan FUA includes 22 municipalities functional related. Poznan is a city with poviat rights in western Poland. It's located on the Warta River. Poznan is the fifth largest city in Poland in terms of population and the eighth largest in terms of area.

FUA name
Poznan Functional Urban Area
Km² involved in the study-area
3082 km2 - area of the entire analyzed Functional Urban Area *source:* *https://poznan.stat.gov.pl/vademecum/vademecum_wielkopolskie/portret_obszaru_metropolitalnego/aglomeracja_poznanska.pdf* 258,66 km2 – area of the surveyed area- City of Poznan
N. of inhabitant
1 022 844 - number inhabitants Poznan Functional Urban Area [GUS 2015] *532 346* - number inhabitants of the surveyed area- City of Poznan

N. of municipalities involved
22 municipalities (Skoki, Pobiedziska, Kostrzyn, Kleszczewo, Kórnik, Śrem, Mosina, Puszczykowo, Luboń, Poznań, Swarzędz, Czerwonak, Murowana Goślina, Oborniki, Suchy Las, Rokietnica, Szamotuły, Tarnowo Podgórne, Dopiewo, Komorniki, Stęszew, Buk)- Poznan Functional Urban Area *5 districts in Poznan (Jeżyce, Stare Miasto, Nowe Miasto, Wilda, Grunwald)*- area of the surveyed area- City of Poznan
N. of working units (employers)
177 865- number of the employers of Poznan Functional Urban Area *25 328 – number of the employers of the* surveyed area- City of Poznan
N. of zones used in the tool and in the o/d matrix
5- In City of Poznan- Jeżyce, Stare Miasto, Nowe Miasto, Wilda, Grunwald
Zoning criteria *(nuts level, all of same nuts dimension or not, all similar dimension or different in dimension, ...)*
The survey did not cover the whole Poznan Functional Urban Area due to financial criteria and earlier arrangements with the leader of the project. A decision was made to carry out a survey only among economic entities conducting activity within the territory of the City of Poznan. The City of Poznan was divided into 5 zones resulting from historical conditions in the city's division – these are the old districts of Poznan. All the districts are included in the NUTS 3 division. The area of the survey is the most logistically inconvenient area within the whole Poznan Functional Urban Area due to a major problem with supplies within the city's area. *In the selection of the criteria of division, a significant factor was the comparability of sizes and of amounts of population of the particular districts so that they could be compared easily. The adopted variant is the most optimal of the possible divisions despite differences in sizes and populations of the zones. The most populated district is "The Old Town", and the district largest in size is "The New Town". An interesting thing is that the smallest district in terms of size is "Wilda", which is at the same time the most densely populated one.*
Please insert a map of the study area (if available please attach also the shape file with area and road graph layer)



3. Current freight mobility impact

Analysis of survey on distribution flows. It may include the following aspects:

- *Total number of interviews (per supply chain)*
- *Number of suppliers (average per category …)*
- *Share of DDP, EX-WORK and OFF TRUCK delivery modes*
- *Frequency of deliveries and type of load units*
- *Number of load units per delivery (minimum, maximum, average)*
- *Usual hours of delivery (distribution)*
- *Share of OWN ACCOUNT COLLECTION*
- *Share of DELIVERIES TO END CUSTOMERS*
- *Problems and suggestions (short analysis and description)*

Please do not include just the figures, but also detail and comment the results.

General information

The survey was carried out between 14 and 28 November 2017. The method applied was the direct interview by means of paper questionnaires filled out by interviewers (PAPI) on a sample of 302 entities from the following fields:

Wholesale trade (excluding the wholesale trade in motor vehicles);

Retail trade (excluding wholesale trade in car vehicles)

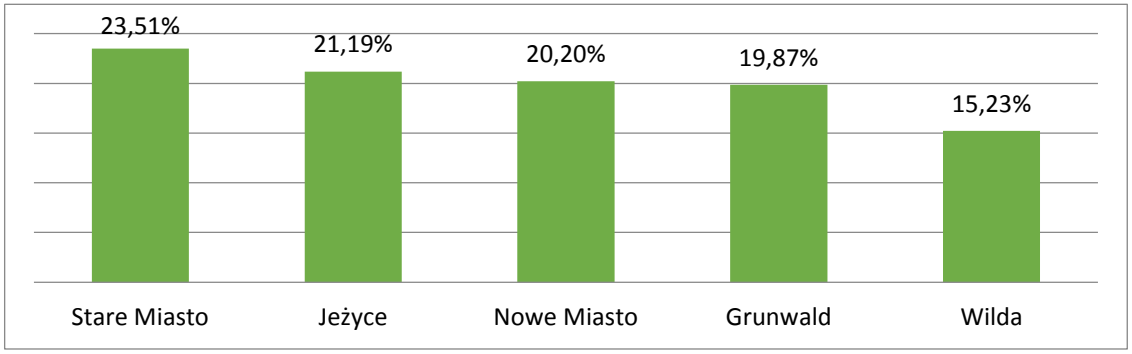
Housing and services associated with alimentation

Services and handicraft

The area of survey was the City of Poznan divided into 5 zones/areas alluding to the former division of the city into districts. The adopted division of the city is presented on the graph below.

In the process of research works, the interviewers interviewed representatives of 302 economic entities, located within the territory of 5 areas/districts of Poznan. In the case of 4 districts, the participation of respondents was relatively balanced and was within the range of approximately 20% of the research sample. The relatively lowest number of entities covered by the survey was located in the district of Wilda (slightly above 15% of the total number of respondents).

The district in which the company operates

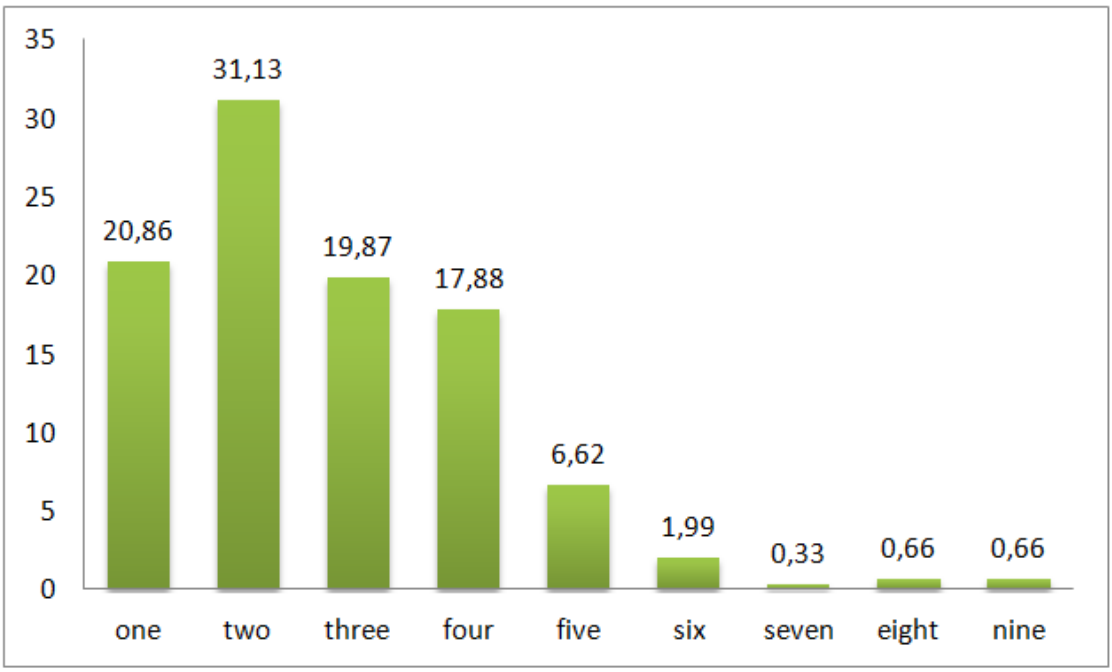


Source: Own survey, n=302

The vast majority of the surveyed entities are micro companies employing only several employees. Almost 90% of the surveyed companies employ up to 4 employees and even half of them no more than 2 persons. Such selection of respondents focused around micro entities results from both the adopted specificity of the surveyed group (small groups of commercial and service profile), and from the specificity of economic entities registered within the area of the City of Poznan. According to the data of the Central Statistical Office (GUS) of 2016, among the general number of companies registered in the city (approximately 110,000), over 95% of them are companies employing no more than 9 employees.

According to the data collected, an average surveyed company employed approximately 2-3 employees, while the relatively highest number of employees was declared by companies from the gastronomy and hotel sector (3.7 persons on average) and trade companies (2,4 persons on average). The lowest percentage of people found job in service companies (2,1 persons on average for every 1 entity).

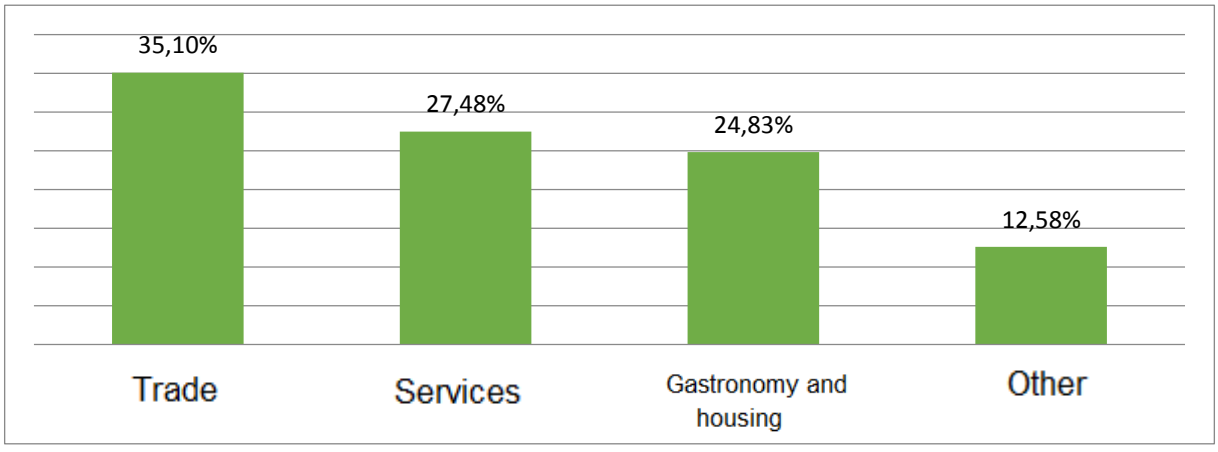
Number of employed persons (in sequence: nine, eight, seven, six, five, four, three, two, one - in percent)



Source: Own survey, n=302

The largest represented entities were companies from the trade sector, which constituted jointly 35.10% of respondents (106 companies). The next positions were occupied by companies from the service/service-trade sector - 27.48% (83 companies) and from the sector of gastronomy and housing (around 25% of respondents, i.e. 75 entities). The remaining 38 entiti es (12.58%), due to limited answer choices, could not be classified; however, these were mixed-activity companies from trade and service sectors, without a specified leading activity

Activity profile (from the left side: trade, services, gastronomy and housing, other)



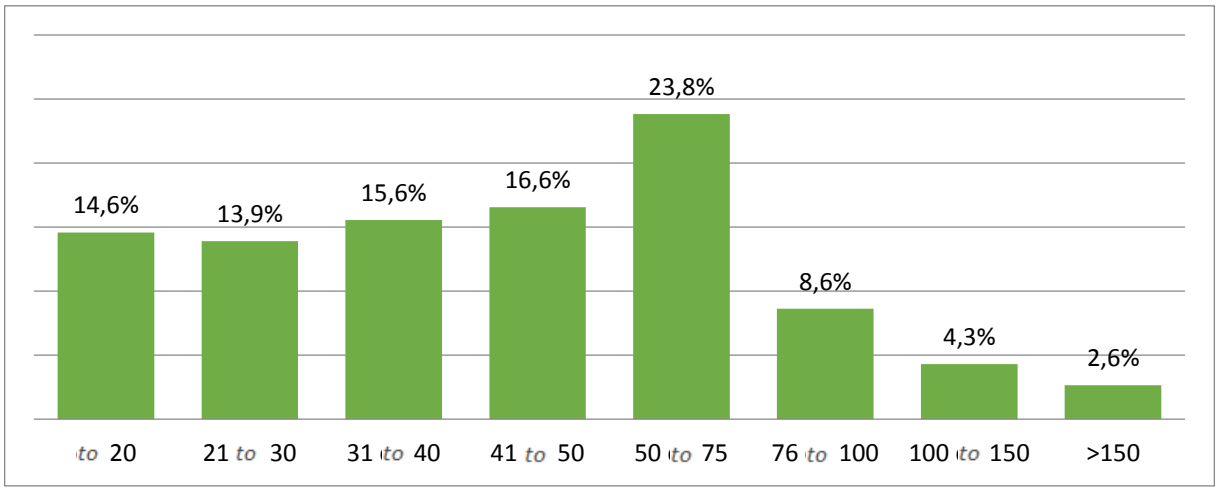
Source: Own survey, n=302

Among the trade entities those with the largest numbers of representatives were clothing stores (8.5%), lingerie stores (6.6%), pharmacies (5.7%) and textile stores (5.7%). From among service/service-trade entities, t he most frequently surveyed were sewing service entities (22.6%), shoemaking service entities (14.3%) and watchmaking service entities (13.1%). In the group of gastronomy and hotel service entities approximately 1/5 was constituted by companies offering accommodation/guesthouses (21.6%), confectioneries (18.9%), restaurants (16.2%) and bistro bars (14.9%).

Resources of companies

The basic surveyed issue from the scope of the possessed resources were the areas of stores/service points/seats of the surveyed companies. On the basis of the collected data it is possible to indicate that an average company possesses premises of about 50 metres of area (the median was 45m2) . At the same time, around 15% of entities possess premises of less than 20m2 of area. Almost every fourth of the surveyed companies possesses an area within the range of 50-75m2 , and only 15% of entities possess a larger area.

Declared area of a store/service point



Source: Own survey, n=302

Entities possessing relatively largest premises are entities from the sector of trade and gastronomy . Companies of a service character possess the smallest premises. A detailed list of the size of premises, expressed in percentage points, is presented in a table below

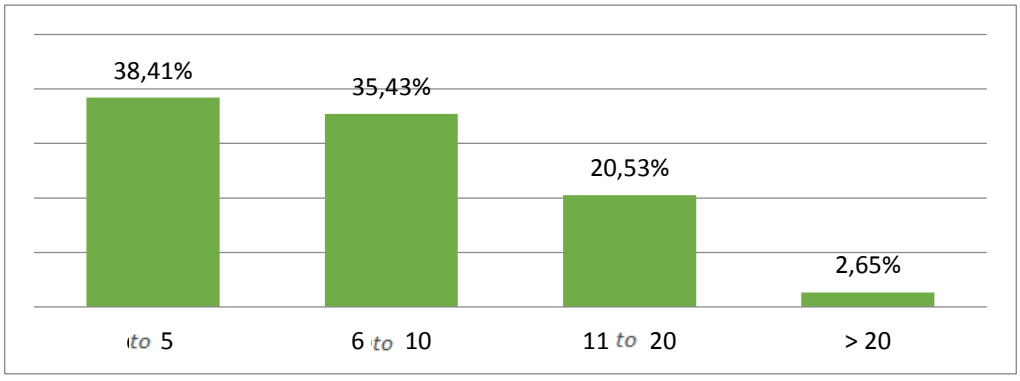
Declared area of store/service point depending on the sector

Area	Trade	Services	Gastronomy	Other
Up to 20	17,9%	21,7%	2,7%	13,2%
21 to 30	11,3%	20,5%	6,7%	21,1%
31 to 40	19,8%	19,3%	6,7%	13,2%
41 to 50	18,9%	10,8%	18,7%	18,4%
50 to 75	21,7%	19,3%	28,0%	31,6%
76 to 100	8,5%	4,8%	16,0%	2,6%
100 to 150	1,9%	2,4%	12,0%	0,0%
>150	0,0%	1,2%	9,3%	0,0%
Together	100,0%	100,0%	100,0%	100,0%

Source: Own survey, n=302

From among the general numer of companies covered by the survey, only 4 of them declared the possession of external warehouses. The remaining entities, to store their supplies, use parts of the areas of the premises they possess. Almost 40% of respondents indicated that their storage area does not exceed 5m2 . A slight number above the 1/3 of the general number of respondents declared they have a separate storage area of 6-10m2 at their disposal. Only every fifth respondent declared having a warehouse not exceeding 20m2 , and only 2.65% declared having larger premises, however, not exceeding 65m2 . The average storage area of the surveyed entities varied around the range of 8.76m2 (the median is 8m2).

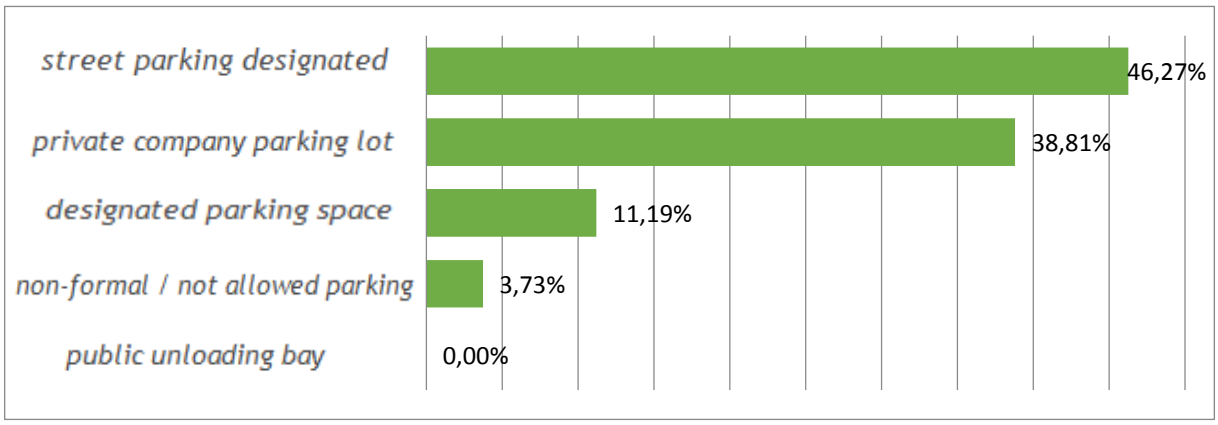
Declared storage area



Source: Own survey, n=302

Around 45% of the surveyed companies declare possession of their own (company) car, used by the company to carry out deliveries. In general, (around 86%) companies possess 1 company car and it is a personal car (74%) or van (26%). None of the surveyed companies (probably because of the profile and size of activity) declared possession of a lorry. During working hours, the cars owned by the companies are parked at indicated street parkings (46%) or private parkings/parking spots of the company (38%). Sometimes these are specially indicated parking spots or informal parking lots (4%).

Parking places of business vehicles during working hours (as in the description above)

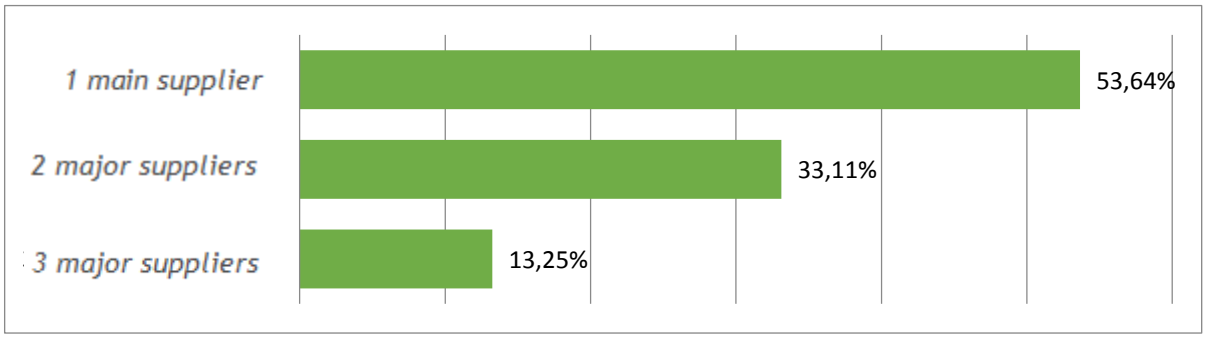


Source: Own survey, n=302

Deliveries

According to the assumptions of the research project, the participants were asked to list the number of major suppliers only, with a reservation that the number could not exceed 3. With such assumptions, approximately half of all surveyed companies declare that they have only 1 main supplier. Approximately 1/3 have 2 main suppliers and around 13 - 3 companies supplying goods.

Number of main suppliers

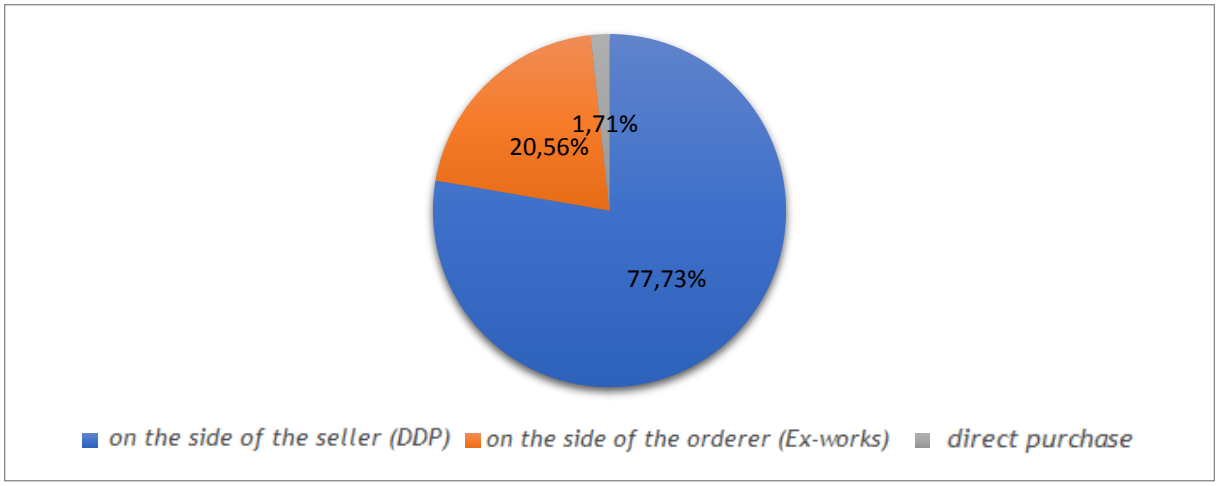


Source: Own survey, n=302

The information collected during the survey shows that most of the external suppliers of the surveyed companies are retailers (about 78% of the total number). Further are manufacturers of ordered materials (15%) or wholesalers (about 5%).

In the next question, the respondents were asked what the form of the delivery was and who covered the costs (insurance, duty, etc.). Approximately 3/4 of respondents declare that the costs of delivery and payment of duties, insurance, etc. remain on the seller's side (they are included in the price of the goods). Another 20% argue that they cover these costs on their own and only 2% of all respondents indicated that they use direct purchases from resellers (eg sales representatives).

Responsibility for the supply (dark blue: on the seller's side, orange: on the purchaser's side, grey: direct purchase)



Source: Own survey, n=302

The decision on the form of liability and cost bearing of deliveries in 2/3 cases is a common decision of the seller and the buyer. In less than 1/3 of cases, this is a result of imposing conditions by the supplier of the goods, and only 3% of the decisions results from the requirements of the purchaser. Such a distribution of responses may be due to the fact that approximately 60-80% of total deliveries are made by means of transport belonging to the suppliers of goods (or purchasing companies) and the remaining 20-30% are deliveries by shipping companies and couriers (the share in the percentage of individual deliveries results from the form of liability for supplies - a higher delivery rate with one's own fleet is indicated in the case of liability of the supplier, lower in the case of liability of the recipient. Most often mentioned courier companies, responsible for the delivery of goods to the surveyed companies are: DHL, DPD, UPS, Poczta Polska and GLS.

Frequency and course of deliveries

The question of deliveries, their course and frequency was divided in the survey according to the intention of the authors of the research into several elements:

delivery to the store / company,

delivery to external warehouses with the use of external suppliers,

delivery to the warehouse by the company itself,

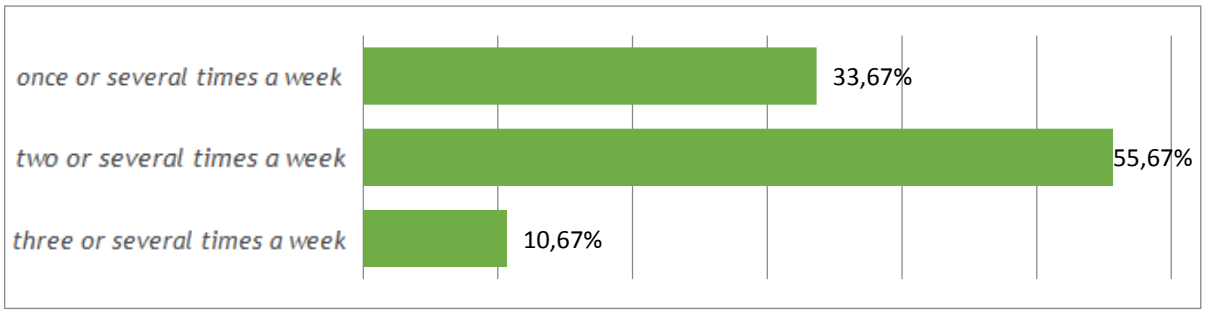
delivery to final recipients (customers).

At the same time, due to the almost total absence of warehouses possessed by the surveyed companies (only 4 audited entities possess external warehouses), the presented survey results do not contain this component and are focused exclusively on issues related to deliveries to the company premises and deliveries to final customers.

Deliveries to store/seat of the company

More than half of the surveyed companies use supplies at least once a week. More or less every third of them does it once or several times a month. Each of the 10 surveyed entities replenishes stocks more often - daily or even several times a day - as a result of the specificity of the activity or of very small warehouse backgrounds that were discussed in earlier chapters.

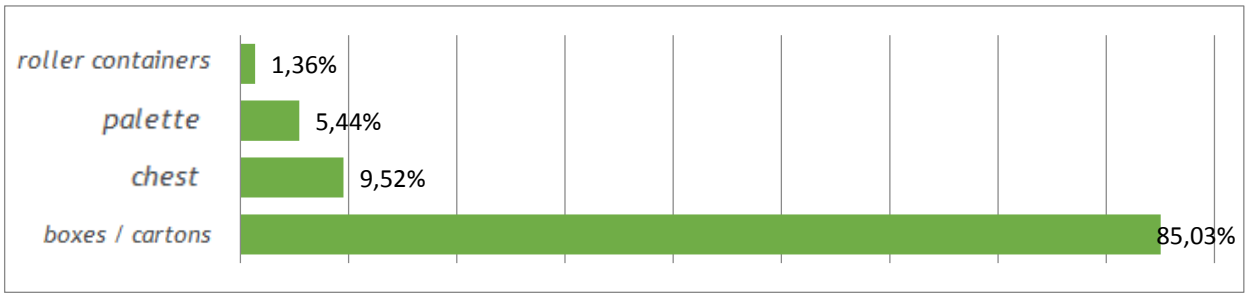
Frequency of deliveries



Source: Own survey, n=302

Over 80% of all delivered goods are imported in boxes or cartons. About 10% are chests. Rarely, pallets (5.44%) o roller containers (1.36%).

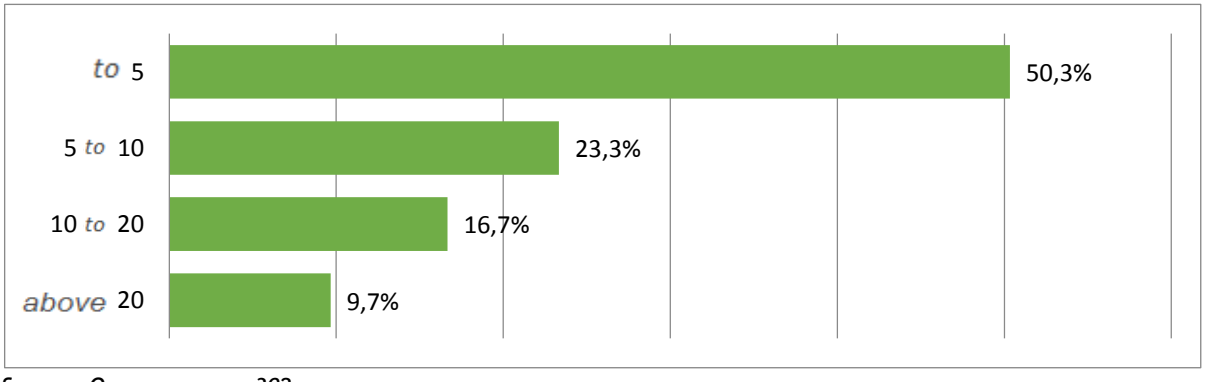
Means of delivery of goods - containers



Source: Own survey, n=302

Usually at 1 delivery to each of the recipients less than 5 packages / packages are delivered. Half of the respondents indicated this value. In the case of every fourth delivery, the number of delivered packages falls within the range of 5 to 10. Also, for every fourth delivery, the number of delivered packages exceeds 10, of which less than 10% of deliveries are aimed at receiving more than 20 cargo units. It follows from the statement that the deliveries are rather the supply of individual items rather than wholesale supplies.

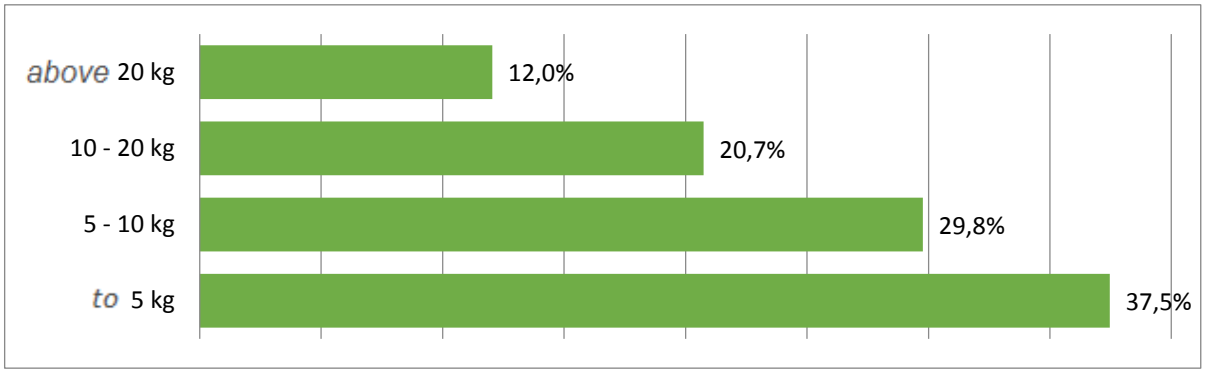
Number of packages delivered one time



Source: Own survey, n=302

Another issue examined is the weight of a typical delivery to the store. Among the delivered goods, the most are lightweighted items - the weight of a single piece does not exceed 5 kg in the case of 38.5% of the delivered items or falls within the limits of 5-10 kg (29.8%). Occasionally, single packages weigh more than 20 kg - these types of items account for only 12% of the total number of delivered goods to the surveyed stores.

Weight of single items



Source: Own survey, n=302

Based on the above statements, it can be assumed that on average, about 100 kg of goods are delivered during one delivery, but this is a misleading value. More accurate in this respect is the median weight of the delivered goods, which is 55 kg. It is estimated that every second delivery delivered to the investigated entities weighs less than 55 kg and every second exceeds this limit. The average weight of individual deliveries is shown below. The result is the product of the average declared number of delivered parcels and average weight of a single parcel.

*Average weight of single delivery (average amount of items*average weight)*

Source: Own survey, n=302

Only 10% of surveyed companies declare that during the year they notice the so-called peak delivery periods, i.e. the period during which deliveries are more than average. The periods in which according to the declaration there are more deliveries are:

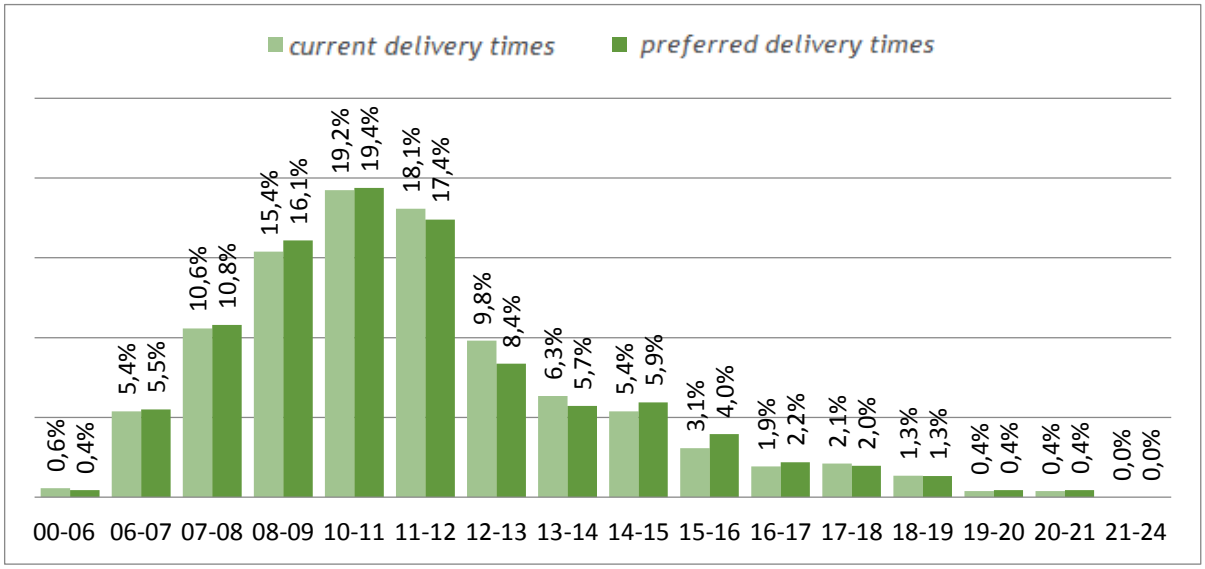
Christmas / winter period - 56% of indications,

Holiday period - 34%

Spring / Christmas period - 9%.

In subsequent questions respondents were asked to indicate the current and preferred delivery hours. The answers are illustrated below. It is noticeable that, the indications of both the current hours and preferred delivery hours very strongly correspond with each other, which may mean that the respondents are unlikely to notice the need for changes in this area. Onecan also point out that the delivery peak of goods to stores / points of business takes place between 8 am and 12 pm. Out of these hours, the frequency of delivery is significantly lower. At the same time, more than 80% of respondents believe that there is a possibility of receiving deliveries in different hours.

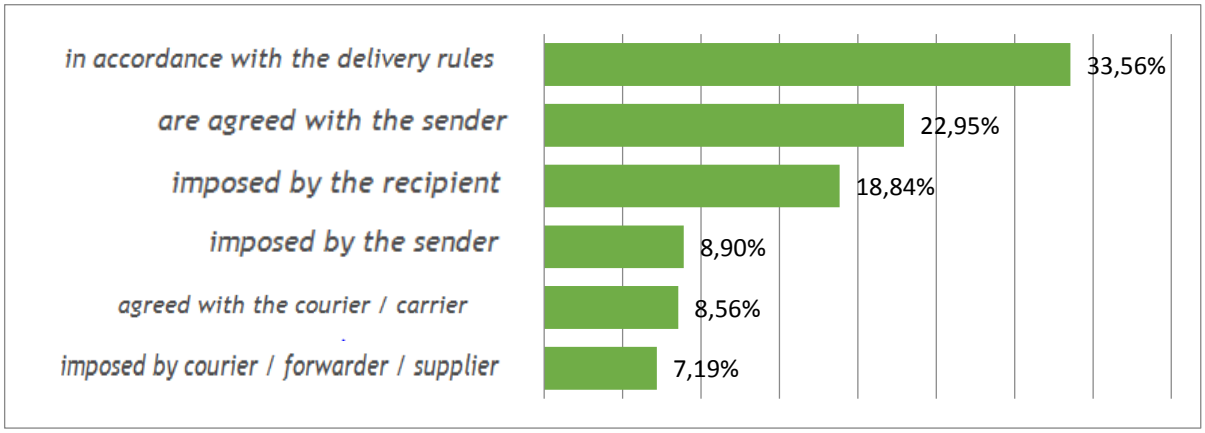
Current and preferred hours of delivery



Source: Own survey , n=302

The delivery time in the opinions of 33% of the respondents is based on the rules binding within the area of the activity. Nearly every 4th respondent indicates that it depends on the contract with the sender / deliverer. Almost 10% of the respondents claim that the time of receipt is imposed on their own, and less than 10% points to the sender. Nearly the same number of respondents indicate that the delivery time depends on the arrangements with the courier, or is imposed by the courier.

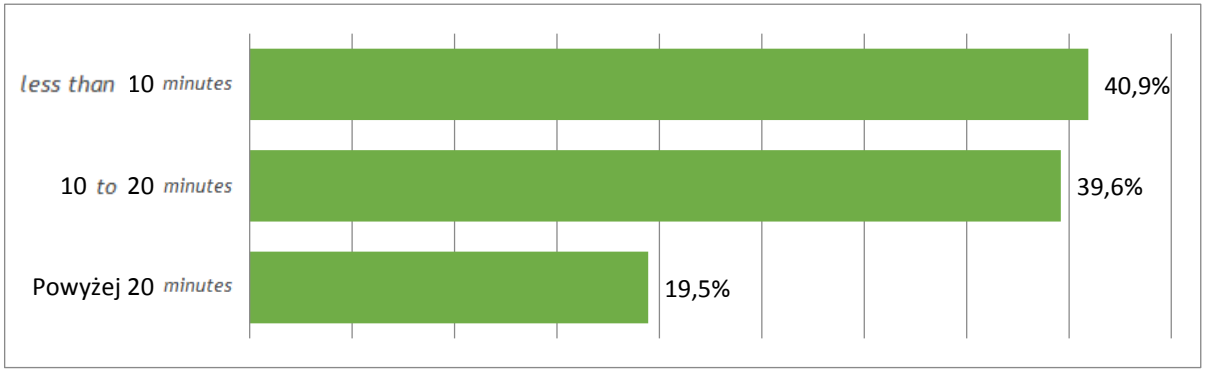
Who determines the time of delivery?



Source: Own survey, n=302

The vast majority of deliveries (80% in total) do not exceed 20 minutes. Only 5 of them last longer. At the same time, as much as 40% of supplies are delivered within 10 minutes.

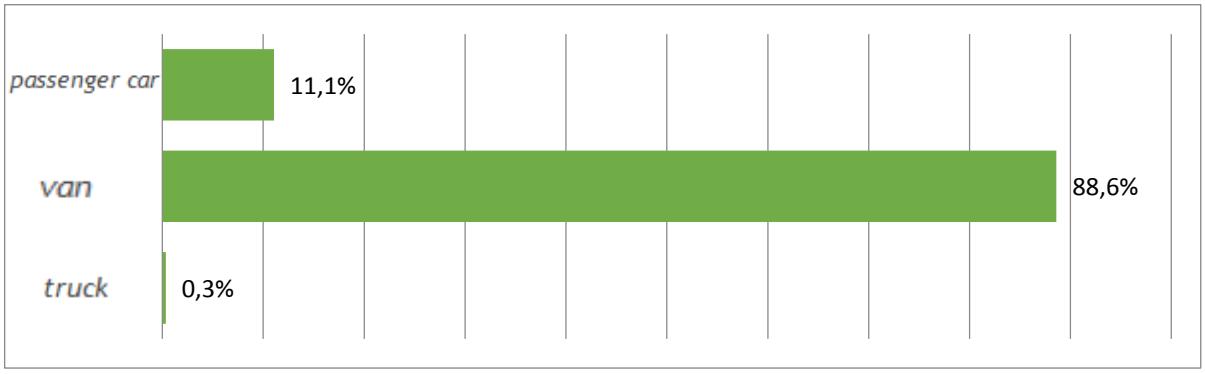
How long do deliveries last usually?



Source: Own survey, n=302

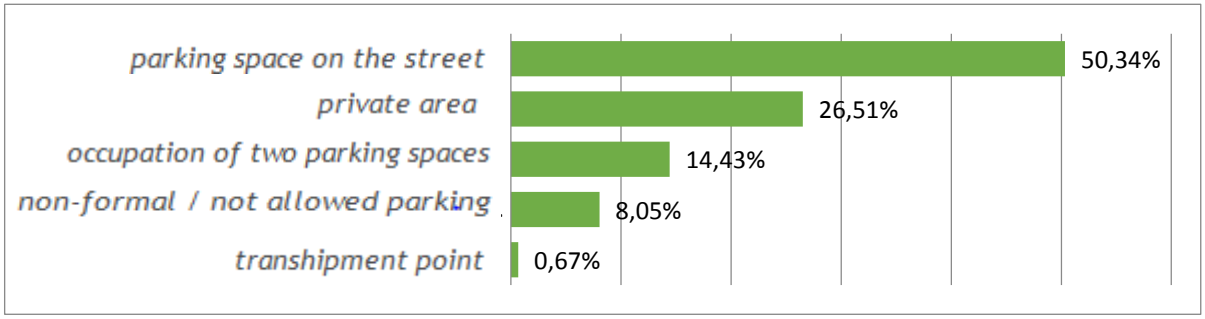
The companies that supply goods to stores, most often use vans (almost 90% of cases). Cars account for about 1/10 of the used fleet. It's different in the case of deliveries carried out by the surveyed entities themselves. Most of the supplies are carried out using passenger cars.

Vehicles used for deliveries



Source: Own survey, n=302

In the course of deliveries, cars are usually parked at parking lots located along the street (50%). A quarter of the surveyed companies use private parking facilities for this purpose. According to the respondents, suppliers also sometimes happen to occupy two parking spaces for delivery (14%), or park in prohibited places (8%).



Source: Own survey, n=302

Deliveries to end recipients

From among the total number of the surveyed companies, only 18 declared delivery of goods to end recipients. This represents about 6% of all surveyed entities. In this group 12 companies deliver goods using their own transport (2/3 of the respondents), the next 6 use courier services.

About 3/4 of surveyed companies deliver goods to customers at least once a week or more often. Another 4 entities carry out this type of service once or several times a month.

Problems indicated and suggestions on deliveries

The last question in the questionnaire was the question of what problems / difficulties the trader encounters in loading and unloading goods? A total of 154 responses were given to this question, which are presented in the table.

Problems encountered in loading and unloading of goods

Problem indicated	% indications	Numer of responses
Difficult access to loading site	35%	54
Safety of loading	34%	53
Time of delivery	16%	25
Time of loading/unloading	7%	11
Lack of loading stations	3%	5
Difficult transport of goods from the parking to the client's premises	3%	4
Lack of coordination of deliveries	1%	2
together	100%	154

Source: Own survey, n=302

Summary

Below are presented key findings and observations from the research.

• The vast majority of the surveyed entities have a small number of employees, which may be due to the specific nature of the analysed industries and result of the Poznan enterprises structure. There is no difference in terms of employment compared to other surveyed companies from gastronomy and hotel sectors

• The surveyed companies have very limited areas. The premises of almost every 4 companies surveyed were less than 20 m2. At the same time, the largest premises belong to the trade and gastronomy sector.

• The surveyed entities generally do not have external warehouses. The stock-keeping function is performed by almost exclusively small premises located in companies.

• Less than half of the respondents indicated that the company owns a company car / car used to carry out its statutory tasks and supplies of goods. Passenger cars dominate the fleet. Every 4 company has a van.

• Most companies have 1 main supplier. Evry 3 indicates 2 suppliers, and only 13% of the surveyed entities have 3 suppliers. In a sense, this situation illustrates the level of dependence of major suppliers of goods.

• The delivery, security, customs coverage, etc. is usually the responsibility of the outside company, who is the supplier of the goods to the store / seat of the company. This implies that most of the supplies are made by means of vehicles owned by major suppliers or courier companies.

• Most deliveries are made at least a few times a month, with one third of the companies using more frequent deliveries, which may be due to very limited warehouse space.

• Delivered goods are usually imported in boxes and cartons. The declarations of the surveyed companies show that the delivery is generally short (up to 10-20 minutes) and the delivered goods do not exceed several tens of kilograms.

• Sometimes, companies notice fluctuations in supplies. They usually perceive it in the holiday season (winter / spring) or holiday. Also relatively constant are delivery hours, the peak of which is between 8am and 12 pm

• Only a small proportion of respondents sell directly to customers. They usually use their own vehicles or use courier services.

• Among the most frequently reported supply problems, respondents indicate difficulties in accessing loading and unloading sites. The sense of security of the goods suffers from that and delivery times are prolonged.

Analysis of survey on transport operators flows. It may include the following aspects:

- *total number of interviews*
- *type of vehicles*
- *sequence of movements (number of movements, number of stops per trip)*
- *typical quantity*
- *frequency of movements*
- *parking during deliveries*
- *main issues*

Please do not include just the figures, but also detail and comment the results.

Total number of interviews: 6
We spoke with 29 transport companies 6 agreed to complete the survey 23 declined because of too sensitive informations needed, transport companies also complain that a lot of time takes to complete information on the trip.

Type of vehicles: most popular Light truck and truck

Sequence of movements (number of movements, number of stops per trip), the most popular:

- type of consignors: factory 45%, warehouse 36%
- type of consignee: warehouse 25%, end user 33%
- loading area: Tarnowo Podgórne 18%, Komorniki 12%
- unloading area: Swarzędz 20%, Luboń and Śrem both 12%
- number of stops: directly delivery or one stop 45%
- types of goods: large variety, processed foods and electrical equipment and components both 12%, drinks 11%, tobacco products and Clothing 10%, textiles 10%, leather and sports requisites 10%,

The survey shows that between 12 and 4 deliveries are rarely made at night. The demand is highest between 6 am and 6 pm. When it comes to use on individual days of the week, it is clear that Saturdays and Sundays are the days when goods are delivered in small quantities.

Typical quantity: Surveyed transport operators most often deliver cargoes above than 1t, frequency: always, 67%

Frequency of movements: one or more a day 60%
The respondents indicated periods of intensive distribution activity in particular months and weeks. The holiday period (July and August) and the beginning of the year are times when there is less demand for

vehicles for distribution processes. In terms of the highest load on distribution vehicles per a month, it is in the 4th week, and on Monday.

Parking during deliveries: In most of the studied cases, transport operators unload the goods using the customer's private parking area 63%.

Main issues: the main problems with transport of goods in the city of Poznań are these three:

- difficulty to access loading/unloading space 30%
- delivery hours 15%
- others: high traffic in Poznań area 23%

Analysis on traffic counts. It may include the following aspects:

- *AADT (average annual daily traffic)*
- *Total and for different categories of vehicles*

Please do not include just the figures, but also detail and comment the results.

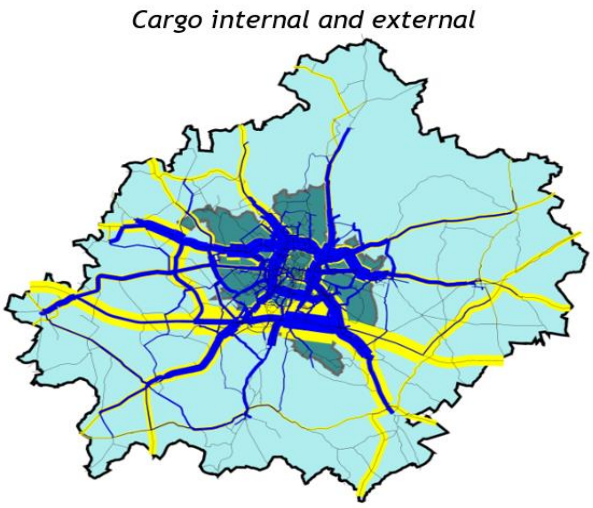
Below data was acquired from the traffic model prepared for Poznan agglomeration in VISUM program

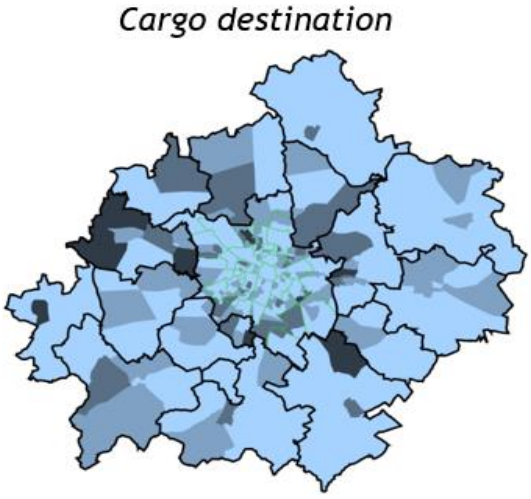
Vehicle-kilometres annually:

- *Heavy-goods vehicles: 316 904 543*
- *Supply vehicles: 528 174 238*
- *Passenger cars: 4 436 663 604*
- *TOTAL: 5 281 742 385*

Vehicle-kilometres daily:

- *Heavy-goods vehicles: 868 231*
- *Supply vehicles: 1 447 052*
- *Passenger cars: 12 155 242*
- *TOTAL: 14 470 527*





Source: own elaboration

The above presented data proves that Poznan is dominated by traffic produced by passenger cars - 84%. The traffic produced by supply vehicles constitutes 10%, and that produced by heavy-goods vehicles - 6%. It is necessary to pay attention to the fact that passenger cars can also be used as vehicles transporting goods, which results from the surveys that were carried out.

Please report below the 3 matrixes (quantity, deliveries, vehicles) from the tool, for each considered supply chain

The matrixes were developed on the basis of data taken from general flows of supplies concerning the broadly understood trade without its division into particular categories. Due to numerous refusals to provide answers or lack of clarification of answers of the respondents did not allow for detailed analyses with division into subcategories. The respondents represented mainly small economic entities conducting activity on their own, which at the same time meant that they sourced their supplies on their own, which resulted in a problem in the determination of the transit route. Another obstacle was the belief that the storage facility/warehouse from which the entrepreneurs source their supply can constitute a commercial secret in fear of commercial interest of the competitors.

Matrix quantities, e.g.: are some relations predominant among the others? Do you see an homogeneous distribution or a concentration in some zones? Do you see some unexpected phenomena?

In the quantitative model, on the basis of average values concerning the tonnage of transported goods in particular districts covered by the survey, the greatest amount of kilograms is transported between "Wilda" and other districts - 2702.2 kg per day. This suggests that the largest amount in terms of weight remains related to this district. The smallest value, however, is on the side of the "Jeżyce" district and the remaining zones that depend on it - 238.84 kg. The values are very diverse and large differences in the amount of transported goods can be noticed (see figure below).

Origin-destination destined quantity goods matrix					
Origin/Destination	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald
Jeżyce	55,81571	522,4399	613,0648	631,4486	489,1686
Stare Miasto	35,49197	332,2080	389,8343	401,5242	311,0515
Nowe Miasto	56,15657	525,6304	616,8087	635,3048	492,1559
Wilda	65,48759	612,9696	719,2981	740,8675	573,9329
Grunwald	25,90531	242,4759	284,5369	293,0693	227,0340
Total	238,85714	2235,72381	2623,54286	2702,21429	2093,34286

On the basis of the Q_ matrix, it can be noticed that the largest value of transported goods is transported within the "Wilda" district - 2529.75 kg, the smallest in the Grunwald district - 833.49 kg, and this value is a significant deviation; other values are rather comparable, although lower than in the "Wilda" district. The remaining values are as follows: "Jezyce" - 2133.56 kg, "Old Town" - 1496.6 kg, "New Town" - 1832.15 kg. The value in the "Wilda" district may result from high population density in this area, the largest in the entire analysed area.

The remaining values are rather comparable, without major deviations, which is visible below:

	Q_{od}					
Origin	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald	Total
Jeżyce	498,57	349,72	428,13	591,15	194,77	**2 062,34**
Stare Miasto	317,03	222,38	272,24	375,90	123,85	**1 311,40**
Nowe Miasto	501,61	351,86	430,75	594,76	195,96	**2 074,94**
Wilda	584,96	410,32	502,32	693,58	228,52	**2 419,71**
Grunwald	231,40	162,31	198,71	274,37	90,40	**957,18**
Total	2 133,56	1 496,60	1 832,15	2 529,75	833,49	**8 825,56**

Matrix deliveries, e.g.: are some relations predominant among the others? Do you see an homogeneous distribution or a concentration in some zones? Do you see some unexpected phenomena?

The general average results for broadly understood trade show that the largest number of deliveries, as much as 58%, is carried out by retailers on their own account. This is most likely due to the sample selection, i.e. mainly the selection of small business entities conducting their own business activity on their own account. A total of 32% of respondents declared that they carry out their deliveries via third parties. The sizes of shipments are very comparable if standardisation using a volumetric weight, i.e. approx. 60 kg for each category is adopted.

Transport service share - p[r/od]	Retail
Retailer on own account (%)	58
Wholesaler on own account (%)	10
Third party (%)	32
Total (%)	100

Shipment size - q[r] (kg)	Retail
Retailer on own account	59
Wholesaler on own account	55
Third party	66

The greatest amount of deliveries per day made by retailers on their own account is brought to the "Wilda" district - 24.87. Interpreting this result for the right conditions one can come to the conclusion that not only the highest density of population in this district affects the number of deliveries, but so does also the possibility of free parking in this area.

retailer on own account [deliveries/day] - NDod [r]						
Origin	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald	Total
Jeżyce	4,90	3,44	4,21	5,81	1,91	**20,27**
Stare Miasto	3,12	2,19	2,68	3,70	1,22	**12,89**
Nowe Miasto	4,93	3,46	4,23	5,85	1,93	**20,40**
Wilda	5,75	4,03	4,94	6,82	2,25	**23,79**
Grunwald	2,27	1,60	1,95	2,70	0,89	**9,41**
Total	**20,97**	**14,71**	**18,01**	**24,87**	**8,19**	**86,76**

In the case of deliveries carried out by wholesalers, again most of them are carried out to the "Wilda" district - value 4.6. Considering the supply relations, the largest number of shipments is transported along the "Wilda" - "Wilda" section - 1.26. The section between "Nowe Miasto" - "Wilda" is also important, which may be due to the fact that in the "Nowe Miasto" district there is a large wholesale store in which orders for delivery are placed.

wholesaler on own account [deliveries/day] - NDod [r]						
Origin	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald	Total
Jeżyce	0,91	0,64	0,78	1,07	0,35	**3,75**
Stare Miasto	0,58	0,40	0,49	0,68	0,23	**2,38**
Nowe Miasto	0,91	0,64	0,78	1,08	0,36	**3,77**
Wilda	1,06	0,75	0,91	1,26	0,42	**4,40**
Grunwald	0,42	0,30	0,36	0,50	0,16	**1,74**
Total	**3,88**	**2,72**	**3,33**	**4,60**	**1,52**	**16,05**

In the case of deliveries carried out through third parties, again most of them are carried out to the "Jeżyce" and "Wilda" districts. There are dense developments in both districts, which contributes to difficulties in finding parking spaces (despite the creation of special bays for supply vehicles and a prepaid parking zone in a part of the Jeżyce district), therefore some retailers decide to transfer the logistics of deliveries to third parties.

third party [deliveries/day] - NDod [r]						
Origin	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald	Total
Jeżyce	2,42	1,70	2,08	2,87	0,94	**10,00**
Stare Miasto	1,54	1,08	1,32	1,82	0,60	**6,36**
Nowe Miasto	2,43	1,71	2,09	2,88	0,95	**10,06**
Wilda	2,84	1,99	2,44	3,36	1,11	**11,73**
Grunwald	1,12	0,79	0,96	1,33	0,44	**4,64**
Total	**10,34**	**7,26**	**8,88**	**12,27**	**4,04**	**42,79**

Matrix vehicles, e.g.: are some relations predominant among the others? Do you see an homogeneous distribution or a concentration in some zones? Do you see some unexpected phenomena?

On the basis of the survey, it can be estimated that approximately 79% of economic entities carry out deliveries in the morning hours, understood as 6.00 am to 12.00 pm, while approximately 21% declare deliveries in the afternoon, i.e. in the hours after 12.00 pm until the evening. The surveys served as a base for the calculation of probability of the type of vehicle used. Light-goods vehicles up to 1.5t are used by approximately 88%. Medium size vehicles of the Van type - by 12%. Due to the specifics of the respondents' activities (small economic entities, often working on their own account), there were no large vehicles of the truck type.

Transport service - p [τ/od]	retail
Morning (%)	79
Afternoon(%)	21
Total (%)	100

Vehicle type - p [v/τod]	Probability
Light Goods Vehicle (LGV, < 1,5 t) (%)	88
Medium Goods Vehicle (MGV, 1,5 - 3,5 t) (%)	12
Total	100

The largest number of vehicles delivering goods per day reaches the "Wilda", "Jeżyce" and "Nowe Miasto" districts. In the Grunwald district there is the smallest number of deliveries, and thus the smallest number of supply vehicles.

Table 4 - total vehicle/day - VCod						
Origin	Jeżyce	Stare Miasto	Nowe Miasto	Wilda	Grunwald	Total
Jeżyce	41,12	28,85	35,32	48,76	16,07	**170,11**
Stare Miasto	26,15	18,34	22,46	31,01	10,22	**108,17**
Nowe Miasto	41,38	29,02	35,53	49,06	16,16	**171,15**
Wilda	48,25	33,85	41,43	57,21	18,85	**199,59**
Grunwald	19,09	13,39	16,39	22,63	7,46	**78,95**
Total	**175,99**	**123,45**	**151,13**	**208,67**	**68,75**	**727,98**

Please provide a comment (qualitative description) for you tool's results, e.g.:

- *Vehicle-km travelled by each type of vehicle within the study area*
- *Traffic pollutant and greenhouse emissions*
- *Network assignment*
- *Other?*

J. Merkisz, J. Pielecha, P. Lijewski, A. Merkisz-Guranowska & M. Nowak in the scientific article titled „Exhaust emissions from vehicles in real traffic conditions on the example of Poznan Agglomeration" prepared the following charts on aspects related to ecology in the Poznan Agglomeration.

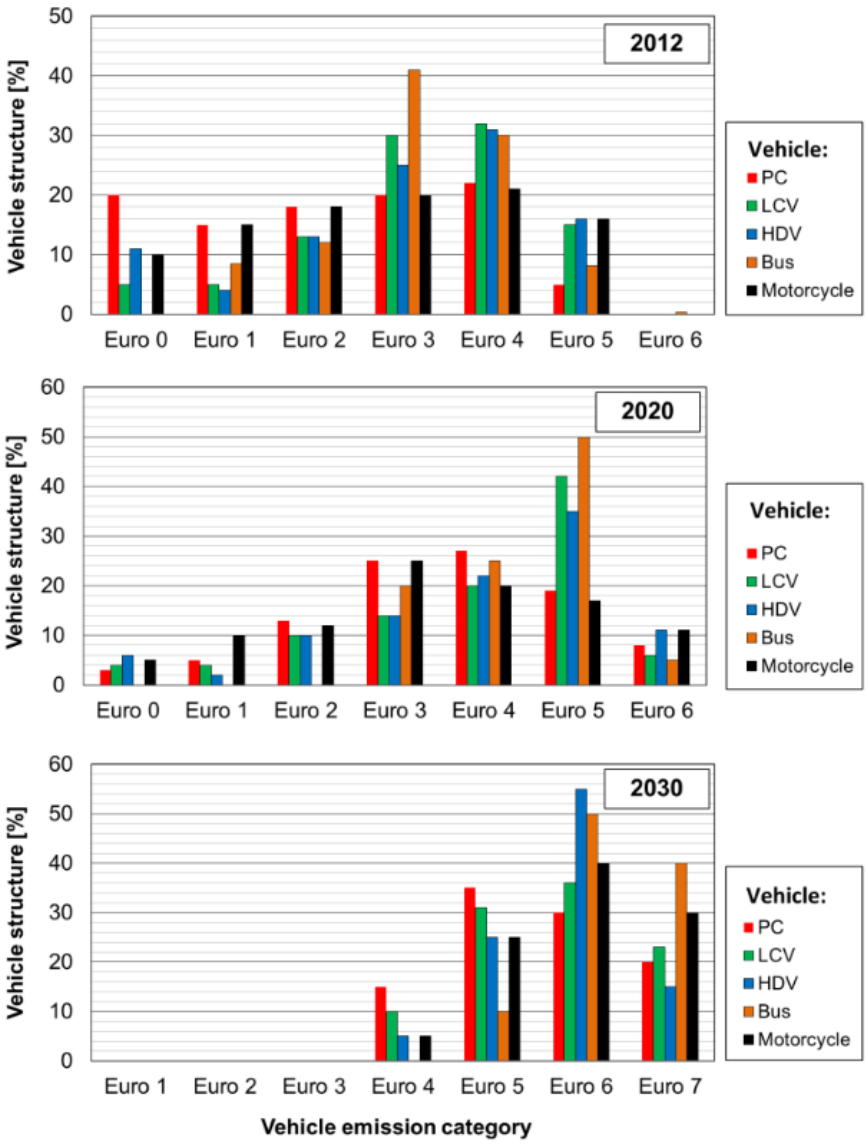
The following abbreviations are used in the charts:

PC - passenger cars,

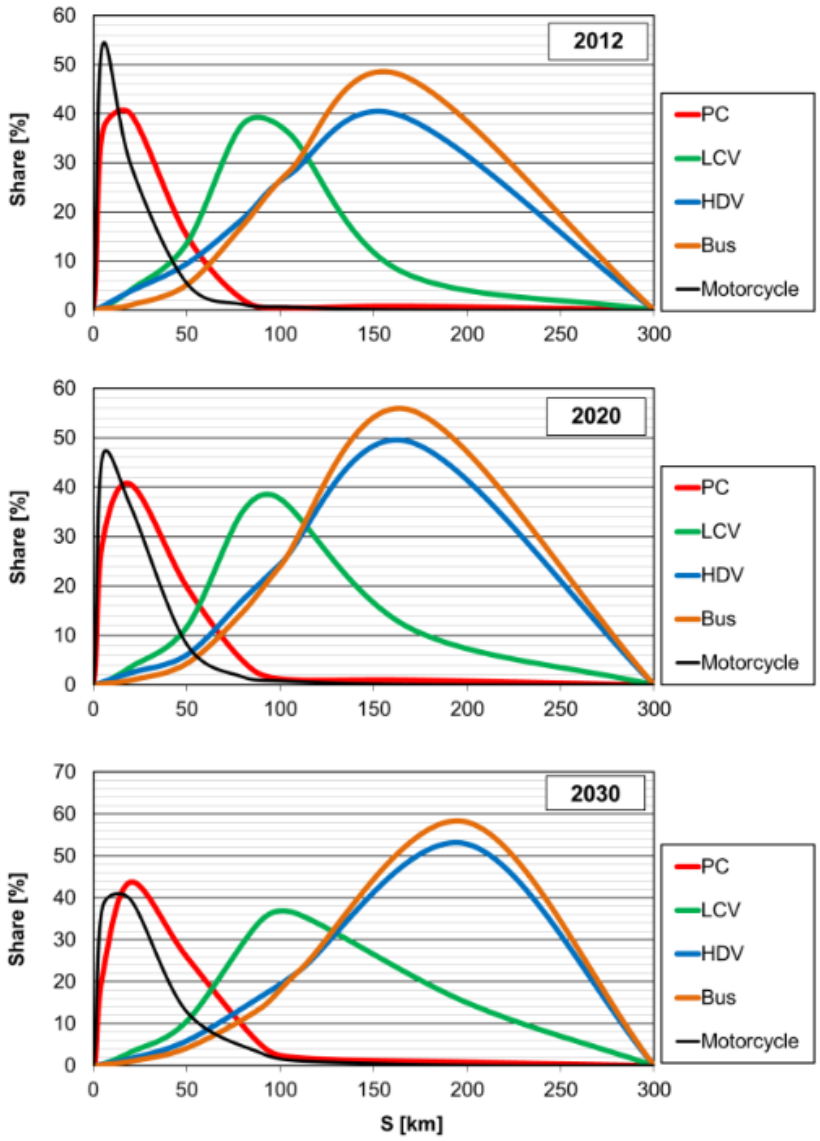
LCV - light commercial vehicles,

HDV - heavy duty vehicles

On the basis of the charts below, it can be concluded that the share of environmentally friendly vehicles (both those with more restrictive exhaust standards as well as the hybrid and electric ones) will be greater in the following years. What is more, the number of kilometers covered by supply and heavy-goods vehicles will also increase, which may be caused by the growing demand for goods in the city.

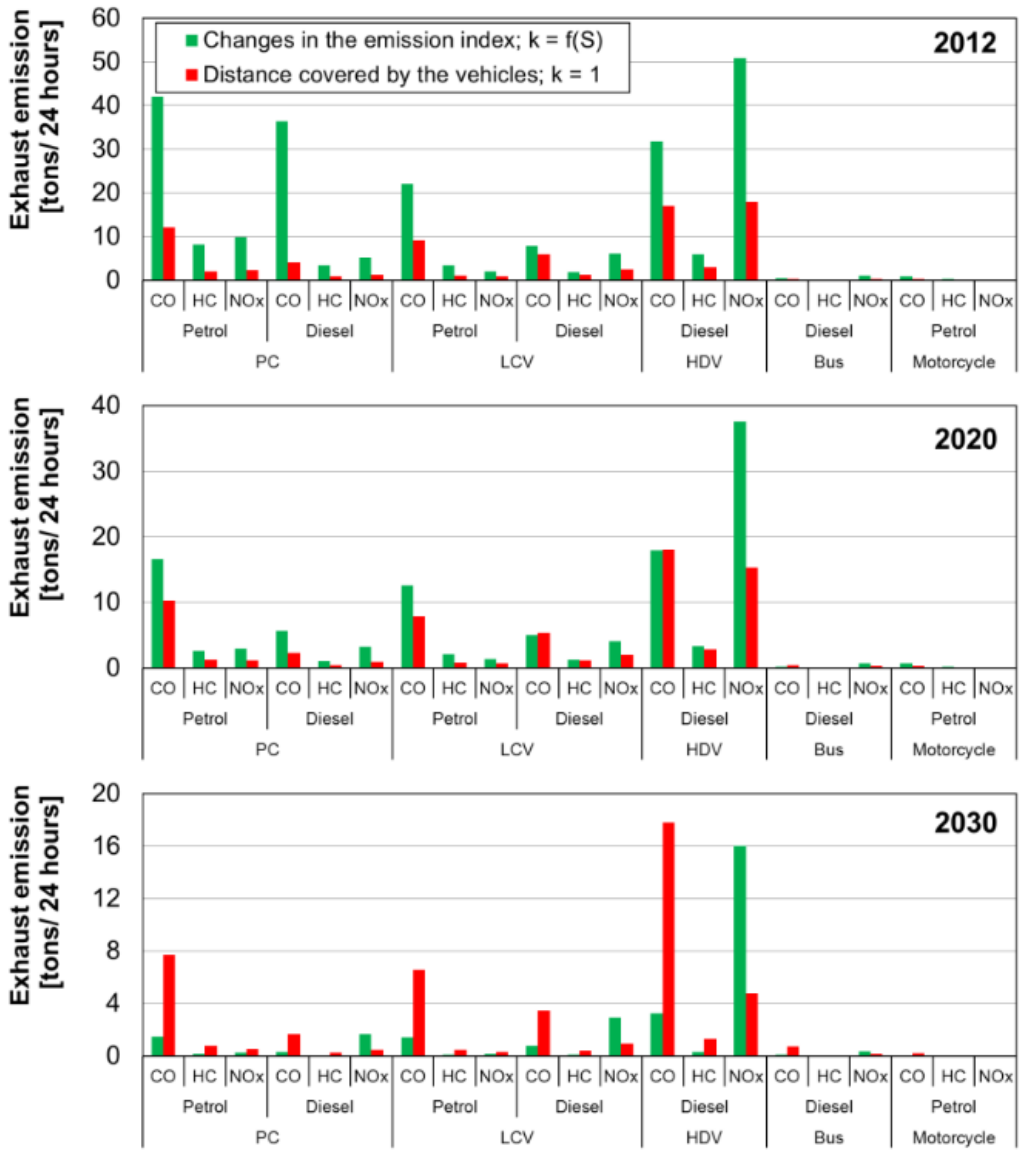


Change in the vehicle structure in the Poznan agglomeration in the years 2012-2030.
Source: [1]



The assumed characteristics of daily distance covered by various vehicles.
Source: [1]

"On the basis of the above data, the daily emission of pollutants from vehicles in the Poznan Agglomeration was determined assuming that the emission from vehicles depends on the length of the route that is covered and changes according to the curve of variations of the indicator of emission. These values were calculated consecutively for each group of vehicles, divided into the type of propulsion and the type of pollution. The comparison was made for the Poznan Agglomeration related to the period 2012-2030; its analysis shows a general decreasing level of emission of pollutants; however, it draws attention to the relatively significant emission of pollutants from heavy-goods vehicles (this is the result of including in the analysis the A2 motorway section within Poznan) "[1].



The emission level for the vehicles in the years 2012-2030 for two methods of determining the exhaust emissions from a single vehicle.
Source: [1]

Sources:

[1] J. Merkisz, J. Pielecha, P. Lijewski, A. Merkisz-Guranowska & M. Nowak; Exhaust emissions from vehicles in real traffic conditions on the example of Poznan Agglomeration. Air Pollution XXI. WIT Transactions on Ecology and The Environment, Vol 174, 2013

4. Annexes

Annexe 1.
The survey in Polish language.

Ankieta – proces dostaw

I. Ogólne informacje o działalności handlowej		
Informacja o firmie		
1	Nazwa	
2	Adres oraz strefa wg. mapy	
3	Liczba pracowników	

4. *Rodzaj działalności*							
Działalność handlowa – zaznacz typ							
1	Sprzęt AGD	2	Antykwariat, antyki	3	Artykuły spożywcze	4	Bielizna
5	Sklep z biżuterią	6	Mięso, wędliny	7	Obuwie	8	Odzież
9	Pościel	10	Naczynia	11	Apteka	12	Filatelistyka, znaczki pocztowe, monety
13	Kiosk	14	Księgarnia	15	Materiały papiernicze	16	Materiały budowlane
17	Kapelusze, rękawiczki, parasole, krawaty	18	Owoce i warzywa	19	Oświetlenie	20	Piekarnia
21	Perfumy	22	Optyk, fotograf	23	Akcesoria do rejestrowania, płyty CD, pamięć USB itp.	24	Sklep komputerowy
25	Sklep rybny	26	Sklep tytoniowy	27	Sklep z pamiątkami	28	Artykuły do szycia, pasmanteria
29	Odzież dla dzieci	30	Wyposażenie wnętrz	31	Ubrania skórzane	32	Sprzęt sportowy
33	Tapety i podłogi	34	Urządzenia elektryczne	35	Sklep kuśnierza, wyroby skórzane	36	Kwiaciarnia
37	Wyroby włókiennicze	38	Zabawki	39	Sklep zielarski		
40	Inne, jakie?						

Działalność usługowa, rzemiosło							
1	Zakład cukierniczy	2	Szewc	3	Restauracja mebli, stolarz, wyroby drewniane	4	Zakład z materiałami tekstylnymi
5	Piekarnia	6	Zakład krawiecki	7	Zakład złotniczy	8	Wyroby skórzane, kuśnierz, rymarz
9	Wyrób produktów mącznych, mlecznych	10	Oprawa obrazów	11	Tapicer	12	Zegarmistrz

Hotele, restauracje, kawiarnie							
1	Bar, kawiarnia	2	Bistro, restauracja	3	Cukiernia	4	Hotel
5	Pensjonaty, noclegi	6	Restauracja	7	Winiarnia		

	Inne, jakie:			
1	Fryzjer, salon piękności	2 Pralnia	3 Rzemieślnik	4 Detalista, sklep inny

	II. Wymiary sklepu (lokalnej jednostki handlowej)	
5	Całkowita powierzchnia sklepu/pomieszczenia (m2)	
6	Powierzchnia przeznaczona na magazyn (m2)	
7	Liczba magazynów zewnętrznych	

	III. Informacja o magazynach *– jeśli firma nie posiada magazynu, przejdź do pytania dot. pojazdów cz. IV*		
8	***Magazyn nr 1:*** Adres oraz strefa		Nr. Strefy
	Magazyn nr 2: Adres oraz strefa		Nr. Strefy
	Magazyn nr 3: Adres oraz strefa		Nr. Strefy
	Magazyn nr 4: Adres oraz strefa		Nr. Strefy
	Magazyn nr 5: Adres oraz strefa		Nr. Strefy

9	Całkowita powierzchnia wymienionych magazynów (m2)	Magazyn 1:	Magazyn 2:	Magazyn 3:	Magazyn 4:	Magazyn 5:
10	Odległość od sklepu (km)	Magazyn 1:	Magazyn 2:	Magazyn 3:	Magazyn 4:	Magazyn 5:
11	Czy magazyn znajduje się w tej samej strefie co firma?	Magazyn 1: ☐ Tak ☐ Nie	Magazyn 2: ☐ Tak ☐ Nie	Magazyn 3: ☐ Tak ☐ Nie	Magazyn 4: ☐ Tak ☐ Nie	Magazyn 5: ☐ Tak ☐ Nie

	IV. Informacje o posiadanej flocie (pojazdach)				
12	Czy firma posiada własne pojazdy?	1	Tak – ile pojazdów:	2	Nie – *przejdź do części V Proces dostaw*

Dane o pojazdach z własnej floty *– chodzi głównie o auta, którymi odbywają się dostawy do firmy*				
	Rodzaj pojazdu	**Ciężarowy**	**Samochód (osobowy)**	**Furgonetka**
	Wpisz ilość pojazdów danego typu			
Rodzaj konfiguracji (liczba wg. konfiguracji i rodzaju)				
	Towary mrożone			
	Lodówka, chłodnia			
	Dźwig			
	Rampa hydrauliczna			
	Pick-up			
	Kabriolet, dostawczy, bez plandeki			
	Z plandeką			

	Pojazd opancerzony			
Waga (podaj liczbę pojazdów wg. wagi i rodzaju)				
	Do 1,5 t			
	Od 1,5 t do 3,5 t			
	Powyżej 3,5 t			
Paliwo				
	Benzyna			
	Elektryczne			
	Olej napędowy			
	Gaz-CNG, NLG			
	Gaz metan, LPG			
	Hybrydowy			
Kategoria środowiskowa:				
	Euro 0			
	Euro 1			
	Euro 2			
	Euro 3			
	Euro 4			
	Euro 5			
	Euro 6			
Forma własności				
		Ciężarowy	**Samochód (osobowy)**	**Furgonetka**
	Własne			
	Leasing			
	Wypożyczone			
	Inne			
Gdzie pojazd jest parkowany w trakcie dostaw:				
	W pobliżu sklepu, w tym: a. Wyznaczone miejsce parkingowe b. Parking nieformalny/niedozwolony: zatoka autobusowa, krawężnik c. Parking uliczny wyznaczony d. Prywatny parking firmy e. Publiczna zatoka rozładunkowa	*Wpisz oznaczenie*	*Wpisz oznaczenie*	*Wpisz oznaczenie*
	W magazynie, na terenie magazynu: Proszę wskazać numer magazynu wymienionego powyżej w cz. III			
	W innym miejscu, proszę wskazać gdzie			

V. Proces dostaw
Kategorie dostawców

24	Liczba dostawców głównych asortymentów – wpisz liczbę (max. 3 dostawców)	

	Dostawca 1	Dostawca 2	Dostawca 3
Rodzaj dostawcy *(zaznacz odpowiednią odpowiedź)*	a. hurtowy b. detalista c. producent	a. hurtowy b. detalista c. producent	a. hurtowy b. detalista c. producent
Rodzaj dostarczanych towarów *(opisz najważniejsze* np. ubrania dziecięce/ dla dorosłych, wypieki – bułki, chleb, buty – sportowe, gumowe itp.*)*			

	Dostawca 1	Dostawca 2	Dostawca 3
Forma dostawy i odpowiedzialności (podatków, ubezpieczenia itp): *Wpisz wyłącznie główną formę współpracy z dostawcą* 1. **Po stronie sprzedającego** (DDP) - dostawca opłaca przesyłkę, cła i ubezpieczenie towaru -> *jeśli wskazano, wypełnij część VI Warunki dostaw* 2. **Po stronie zamawiającego** (Ex-Works) – wszystkie opłaty pokrywa zamawiający -> *jeśli wskazano, wypełnij część VI Warunki dostaw* 3. **Zakup bezpośredni** np. z samochodu przedstawiciela handlowego -> jeśli wskazano, przejdź do części VII Dostawy do sklepu/firmy			

VI. Warunki dostaw			
Wpisz numer odpowiedz przy każdym z dostawców – z wyjątkiem zakupów bezpośrednich	Dostawca 1	Dostawca 2	Dostawca 3
30. Decyzja o formule dostawy i odpowiedzialności sprzedawcy są wynikiem: 1. Warunków narzuconych przez nadawcę 2. Warunków narzuconych przez odbiorcę 3. Warunki ustalone z wysyłającym/wspólnie			
31. Sposób dostawy/odbioru towaru 1. Własnym środkiem transportu 2. Kurier, firma przewozowa – zadaj pyt. dodatkowe 31.2 A i B 3. Różnie, nie jest to ściśle określone			
31.2 Pytania dot. firmy przewozowej: A. **Jeśli tak to jaka to firma:** 1. Nie wiem/nie znam 2. Różne firmy 3. Nazwa: *wpisz nazwę w rubryce*			

Wpisz numer odpowiedz przy każdym z dostawców – z wyjątkiem zakupów bezpośrednich	Dostawca 1	Dostawca 2	Dostawca 3
31.2 Pytania dot. kuriera: B. **Czy dostępna jest usługa dostawy kurierskiej?** 1. Tak 2. Nie			
32. Gdzie najczęściej dostarczane są dostawy od danego dostawcy? 1. **Do sklepu, firmy –** jeśli dostawy trafiają do sklepu/firmy wypełnij część VII 2. **Do magazynu** – jeśli dostawy trafiają do magazynu, wpisz numer magazynu z części III i wypełnij część VIII Dostawy do magazynu **UWAGA:** Jeśli dostawy od poszczególnych dostawców trafiają i do sklepu/firmy i do magazynu, wypełnij część VII i VIII.			

VII. Dostawy do sklepu, firmy	
34. Typowa częstotliwość dostaw do sklepu/firmy – *zapytaj jak często realizowane są dostawy towaru dostarcza towar i w jakich dniach/miesiącach*	
1. Jeśli **Raz lub kilka razy dziennie:** Wpisz ile razy dziennie oraz zaznacz dni bez dostaw	Wpisz ile razy dziennie: **Dni bez dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
2. Jeśli **Raz lub kilka razy w tygodniu** Wpisz ile razy w tygodniu oraz zaznacz dni dostaw	Wpisz ile w tygodniu: **Dni dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
3. Jeśli **Raz lub kilka razy w miesiącu** Wpisz Ile razy w miesiącu oraz zaznacz miesiące **BEZ dostaw**.	Wpisz Ile razy w miesiącu: **Miesiące bez dostaw** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru
4. Jeśli **Raz lub kilka razy w roku** Wpisz Ile razy w roku oraz zaznacz **miesiące dostaw**:	Wpisz Ile razy w roku: **Miesiące dostaw:** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru
37. W jakiej formie dostarczany jest towar zazwyczaj – wskaż 1 rodzaj jednostki ładunkowej	
☐ Paleta ☐ Kontener rolkowy ☐ Skrzynia ☐ Pudełka/kartony	

38	**Rozmiar jednostki ładunkowej** *(jeśli inne niż podane w p.37 – wpisz rozmiar np. 20x30x40 itp.)*	
39	**Waga jednostki ładunkowej** *(wpisz wagę np. pudło 3 kg, paczka 8 kg itp.)*	

40	Maksymalna liczba jednostek ładunkowych na dostawę (np. ilość kartonów, palet itp.)				
41	Średnia/przeciętna liczba jednostek ładunkowych na dostawę				
42	Minimalna liczba jednostek ładunkowych na dostawę				
43	Czy występują okresy tzw. szczytu dostaw? Tzn. dni/tygodnie gdy dostaw jest najwięcej?	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**
45	Czy występują okresy pozaszczytowe tzn. takie, w których dostaw jest bardzo mało?	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**
48	Proszę wskazać typowe godziny dostaw	☐ 00-06 ☐ 06-07 ☐ 07-08 ☐ 08-09 ☐ 09-10 ☐ 10-11 ☐ 11-12 ☐ 12-13 ☐ 13-14 ☐ 14-15 ☐ 15-16 ☐ 16-17 ☐ 17-18 ☐ 18-19 ☐ 19-20 ☐ 20-21 ☐ 21-24			
49	Kto określa godziny dostawy	☐ Narzucone przez nadawcę ☐ Narzucone przez odbiorcę ☐ Narzucone przez kuriera/spedytora/dostawcę ☐ Są uzgodnione z nadawcą ☐ Są uzgodnione z kurierem/przewoźnikiem ☐ Są zgodne z zasadami dostawy /o określonych godzinach			
50	Jakie są Państwa preferowane godziny dostawy	☐ 00-06 ☐ 06-07 ☐ 07-08 ☐ 08-09 ☐ 09-10 ☐ 10-11 ☐ 11-12 ☐ 12-13 ☐ 13-14 ☐ 14-15 ☐ 15-16 ☐ 16-17 ☐ 17-18 ☐ 18-19 ☐ 19-20 ☐ 20-21 ☐ 21-24			
51	Ile trwają przeciętnie dostawy?	☐ Między 10 a 20 minut ☐ Mniej niż 10 minut ☐ Więcej niż 20 minut			
52	Jakie czynności wykonywane są w czasie dostaw? Np. kontrola jakości, liczenie produktów itp.	Wpisz odpowiedź			
53	Jak długo trwają działania związane z przyjmowaniem dostaw?	Wpisz odpowiedź			
54	Pojazdy używane do dostaw	☐ Osobowy ☐ Ciężarowy ☐ Dostawczy ☐ Inny			
55	Pozycja parkowania pojazdów	☐ Teren prywatny ☐ Punkt przeładunku ☐ Miejsce parkingowe na ulicy ☐ Parking nieformalny/niedozwolony: zatoka autobusowa, krawężnik ☐ Zajęcie dwóch miejsc parkingowych			

56	**Czy istnieje możliwość odbioru dostaw w innych godzinach?**	☐ Tak ☐ Nie

VIII. Dostawy do magazynu

34. Typowa częstotliwość dostaw do magazynu/magazynów– *zapytaj jak często realizowane są dostawy towaru dostarcza towar i w jakich dniach/miesiącach*	
1. Jeśli **Raz lub kilka razy dziennie:** Wpisz ile razy dziennie oraz zaznacz dni bez dostaw	Wpisz ile razy dziennie: **Dni bez dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
2. Jeśli **Raz lub kilka razy w tygodniu** Wpisz ile razy w tygodniu oraz zaznacz dni dostaw	Wpisz ile w tygodniu: **Dni dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
3. Jeśli **Raz lub kilka razy w miesiącu** Wpisz Ile razy w miesiącu oraz zaznacz miesiące **BEZ dostaw**.	Wpisz Ile razy w miesiącu: **Miesiące bez dostaw** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru
4. Jeśli **Raz lub kilka razy w roku** Wpisz Ile razy w roku oraz zaznacz **miesiące dostaw**:	Wpisz Ile razy w roku: **Miesiące dostaw:** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru
Opisz jaki typ materiałów dostarczany jest do magazynów:	
37. W jakiej formie dostarczany jest towar zazwyczaj – wskaż 1 rodzaj jednostki ładunkowej	
☐ Paleta ☐ Kontener rolkowy ☐ Skrzynia ☐ Pudełka/kartony	

38	**Rozmiar jednostki ładunkowej** *(jeśli inne niż podane w p.37 – wpisz rozmiar np. 20x30x40 itp.)*	
39	**Waga jednostki ładunkowej** *(wpisz wagę np. pudło 3 kg, paczka 8 kg itp.)*	
40	**Maksymalna liczba jednostek ładunkowych na dostawę** (np. ilość kartonów, palet itp.)	
41	**Średnia/przeciętna liczba jednostek ładunkowych na dostawę**	
42	**Minimalna liczba jednostek ładunkowych na dostawę**	

43	**Czy występują okresy tzw. szczytu dostaw? Tzn. dni/tygodnie gdy dostaw jest najwięcej?**	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**
45	**Czy występują okresy pozaszczytowe tzn. takie, w których dostaw jest bardzo mało?**	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**

IX. Dostawy do odbiorców końcowych, klientów		
Czy realizują Państwo dostawy towarów/produktów do odbiorców końcowych – klientów indywidualnych, sklepów itp.	☐ Tak ☐ Nie -> przejdź do części X Problemy i sugestie	
W jaki sposób odbywają się dostawy do klientów końcowych? *Zaznacz wszystkie formy*	☐ Własnym środkiem transportu -> *wskaż jakim pojazdem*	☐ Samochód osobowy ☐ Samochód ciężarowy ☐ Samochód dostawczy/van/furgonetka
	☐ Kurier, firma przewozowa	☐ Odznacz jeśli jest to firma kurierska ☐ Wpisz nazwę firmy przewozowej:
Skąd wysyłany jest towar do klientów końcowych?	☐ Sklep, firma	☐ Magazyn -> numer magazynu:
Jaka jest liczba przeciętna liczba odbiorców podczas standardowej trasy dostaw?	Wpisz liczbę:	
Jaka część z nich mieści się na terenie Poznania?	Wpisz liczbę:	

34. Typowa częstotliwość dostaw do klientów końcowych – *zapytaj jak często realizowane są dostawy towaru dostarcza towar i w jakich dniach/miesiącach*	
1. Jeśli **Raz lub kilka razy dziennie:** Wpisz ile razy dziennie oraz zaznacz dni bez dostaw	Wpisz ile razy dziennie: **Dni bez dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
2. Jeśli **Raz lub kilka razy w tygodniu** Wpisz ile razy w tygodniu oraz zaznacz dni dostaw	Wpisz ile w tygodniu: **Dni dostaw:** ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd
3. Jeśli **Raz lub kilka razy w miesiącu** Wpisz Ile razy w miesiącu oraz zaznacz miesiące **BEZ dostaw**.	Wpisz Ile razy w miesiącu: **Miesiące bez dostaw** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru

4. Jeśli **Raz lub kilka razy w roku** Wpisz Ile razy w roku oraz zaznacz **miesiące dostaw**:	Wpisz Ile razy w roku: **Miesiące dostaw:** ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru

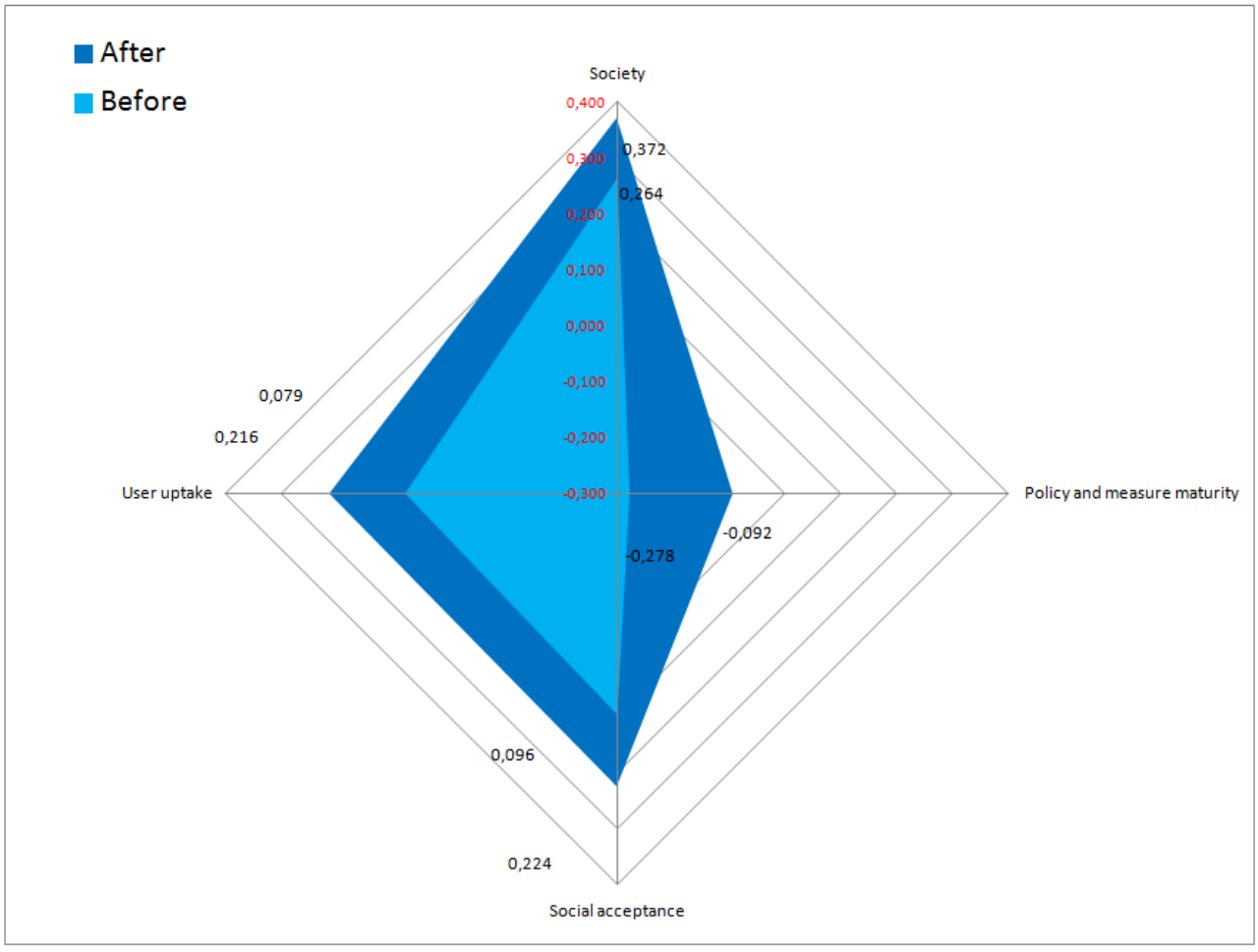
37. W jakiej formie dostarczany jest towar zazwyczaj – wskaż 1 rodzaj jednostki ładunkowej
☐ Paleta ☐ Kontener rolkowy ☐ Skrzynia ☐ Pudełka/kartony

38	**Rozmiar jednostki ładunkowej** *(jeśli inne niż podane w p.37 – wpisz rozmiar np. 20x30x40 itp.)*				
39	**Waga jednostki ładunkowej** *(wpisz wagę np. pudło 3 kg, paczka 8 kg itp.)*				
40	**Maksymalna liczba jednostek ładunkowych na dostawę** (np. ilość kartonów, palet itp.)				
41	**Średnia/przeciętna liczba jednostek ładunkowych na dostawę**				
42	**Minimalna liczba jednostek ładunkowych na dostawę**				
43	**Czy występują okresy tzw. szczytu dostaw? Tzn. dni/tygodnie gdy dostaw jest najwięcej?**	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**
45	**Czy występują okresy pozaszczytowe tzn. takie, w których dostaw jest bardzo mało?**	1	**Tak** – wpisz w jakie dni i/lub miesiące ☐ Pn ☐ Wt ☐ Śr ☐ Czw ☐ Pt ☐ Sb ☐ Nd ☐ Sty ☐ Lut ☐ Mar ☐ Kwi ☐ Maj ☐ Cze ☐ Lip ☐ Sier ☐ Wrz ☐ Paź ☐ Lis ☐ Gru	2	**Nie**
48	**Proszę wskazać typowe godziny początku dostaw**	☐ 00-06 ☐ 06-07 ☐ 07-08 ☐ 08-09 ☐ 09-10 ☐ 10-11 ☐ 11-12 ☐ 12-13 ☐ 13-14 ☐ 14-15 ☐ 15-16 ☐ 16-17 ☐ 17-18 ☐ 18-19 ☐ 19-20 ☐ 20-21 ☐ 21-24			
49	**Proszę wskazać typowe godziny zakończenia dostaw**	☐ 00-06 ☐ 06-07 ☐ 07-08 ☐ 08-09 ☐ 09-10 ☐ 10-11 ☐ 11-12 ☐ 12-13 ☐ 13-14 ☐ 14-15 ☐ 15-16 ☐ 16-17 ☐ 17-18 ☐ 18-19 ☐ 19-20 ☐ 20-21 ☐ 21-24			

X. Problemy i sugestie		
128	**Z jakimi problemami/trudnościami spotykają się Państwo w zakresie załadunku i rozładunku towarów?**	☐ Brak punktów przeładunku ☐ Utrudniony dostęp do miejsca załadunku/rozładunku ☐ Czas dostaw ☐ Czas trwania załadunku/rozładunki ☐ Bezpieczeństwo ładunku ☐ Trudny transport towaru z parkingu do lokalu klienta ☐ Konieczność użycia windy bądź podnośnika ☐ Brak koordynacji dostaw ☐ Inne
129	**Dodatkowe sugestie i uwagi**	

Annexe 2.

The final results of the LSI calculations.



Before	
Impact area	**Impact area performance**
Society	0,264
Policy and measure maturity	-0,278
Social acceptance	0,096
User uptake	0,079
LSI	**0,160**

After	
Impact area	**Impact area performance**
Society	0,372
Policy and measure maturity	-0,092
Social acceptance	0,224
User uptake	0,216
LSI	**0,720**

Annexe 3.

The complete tables of the O/D Matrices.

The tables are in the text of the report in point 3. Current freight mobility impact. Other tables are in an attachment to the report in excel file.

OD Matrix in form of Chord diagram:

Grunwald, Jeżyce, Stare Miasto, Nowe Miasto and Wilda by Origin