



What do CIVITAS cities have in common?

An attempt to group CIVITAS cities

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Abbreviations

air.	Air transport hub
AD	Anno domini
BC	Before Christ
EC	European Commission
EU	European Union
GDP	Gross Domestic Product
inh.	Inhabitants
inj.	Inland navigation junction
prov.	Provincial capital
rail.	Main railway junction
sea	Shipping transport hub
sq.km	square kilometres
st.c.	State capital
stre.	Road transport hub
thsd.	thousand
uni.	University town

1 Introduction

1.1 What is the CIVITAS Initiative?

CIVITAS stands for City-VITALity-Sustainability. 'With the CIVITAS Initiative, the EC aims to generate a decisive breakthrough by supporting and evaluating the implementation of ambitious integrated sustainable urban transport strategies that should make a real difference for the welfare of the European citizen.'¹

CIVITAS I started in early 2002 (within the 5th Framework Research Programme); CIVITAS II continued the approach in early 2005 (within the 6th Framework Research Programme).

Within CIVITAS I (2002-2006) there are 19 cities clustered in 4 demonstration projects, whilst within CIVITAS II (2005-2009) 17 cities in 4 demonstration projects are taking part. These 36 cities all over Europe (see Map 1: CIVITAS cities) will be funded by the EU with 100 M € and the overall budget of the Initiative will be more than 300 M €.

The CIVITAS Initiative I promoted innovative urban transport approaches in 19 cities within four projects. The planned urban transport measures in the cities covered a broad range of transport policies within the fields of mass transport and commercial transport. However the cities distinguish concerning demographic, area-related and economic frame conditions as well as mobility data such as modal split shares, population figures, economic role or daily mobility data.

1.2 Why to deal with CIVITAS cities?

The wide spectrum of cities participating in the CIVITAS Initiative suggests to have a close look at the cities and to examine aspects such as: do cities vary in spatial and demographic structure, function and mobility indicators and how? Do cities show similarities and is it possible to group cities?

This report provides an overview about the participating CIVITAS I cities and their mobility relevant indicators and proposes categories for groups of cities with similar functions, structures and mobility indicators. The city patterns are the result of an analysis process using descriptive und quantitative indicators derived from data banks and CIVITAS project and city websites.

The first chapter outlines the analysis approach and gives definitions on relevant terms.

The second chapter gives an overview about the different CIVITAS cities painting portraits of each participating city of the CIVITAS Initiative one and two.

¹ Source: http://www.civitas-initiative.org/cms_pages.phtml?id=348&lan=en&PHPSESSID=6da360c157cfef88c46ca57fe09b27f5

The third chapter investigates relationships between selected indicators and proposes groups of cities.

The fourth chapter provides a list of 55 descriptive and quantitative indicators that describes the cities. A long list of indicators has been produced by reviewing literature and by using brain-storming techniques.

Map 1: CIVITAS cities



Source: http://www.civitas-initiative.org/city_map.phtml?lan=en

1.3 Which indicators have been used to describe the cities?

The following indicators are used to describe the cities. Many of them are based on data provided by the Statistical Office of the European Communities²

Age structure:

Three age groups are used to describe the age structure of the population in the cities. The age structure is the share of each age group related to the total population. The idea behind this indicator is that different age groups cause different mobility demands. It is assumed that people in the different age groups are related to different activities and that those groups are fixed or flexible in determining when to carry out their activities.

People in the age group '0 to 19 years' are strongly related to educational activities and time fixed; people in the age group '20 to 64 years' are strongly related to work, shopping and leisure activities and time fixed; people in the age group '>64 years' are strongly related to service, shopping and leisure activities but they are flexible in carrying out those activities over the day.

Total economically active population:

The total economically active population is described as the number of residents in the city who are older than 16 years and earning a regular income for livelihood.

Poverty rate:

The poverty rate is the share of households in the city earning less than half of the average household income. The indicator is based on data from the Statistical Office of the European Communities.

Special political/cultural function:

Three different functions have been chosen:

- *Federal capital*: seat of the National government;
- *Regional capital*: seat of the District, Province or Federal state government;
- *University city*: city with at least one university.

Population density:

Population density is expressed by the number of residents per square kilometre (km²) related to the core city area³.

² <http://epp.eurostat.ec.europa.eu>

³ The categories are based on the urban audit categories; see HELANDER (2006): The urban audit – an introduction and the first results

Average temperature coldest/ hottest month:

Average temperature is described by two figures: the average coldest and hottest month in the city, measured between 1995 and 2005.

Commuter share:

Commuter share is the percentage of people commuting into or out of the core city related to the population of the core city.

Main Railway junction:

City mentioned in the literature as main railway junction or city having at least three railway lines to important cities (capital or cities with more than 500,000 inhabitants).

Gross Domestic Product:

The Gross Domestic Product (GDP) of a country is defined as the market value of all final goods and services produced within a country in a given period of time. It is the sum of gross investment, consumption, governmental spending and exports minus imports.

The GDP is used as an indicator for prosperity

Geographical context:

A short description of the regional context of the city

Air passengers:

Number of air passengers of the respective air port in the year 2005

Population of the urban hinterland:

The population of the urban hinterland is the difference between the number of residents in the larger urban zone and the number of residents of the city⁴.

The figure indicates the commuter pressure caused by people living outside the city but using the economic, social and cultural supply of the city⁵

Population change:

Change of the population figures⁶ of the city during the period of 2000-2005 in per cent. Base year is the year 2000.

⁴ The larger urban zone comprises the city and the surrounding areas (urban hinterland); see as well 'area of the urban hinterland

⁵ Example: in the larger urban zone of Berlin lives 4,200,000 inhabitants, but in Berlin city lives 3,386,000 inhabitants only. The population of the Berlin urban hinterland (commuting zone) is 814,000 inhabitants (4,200,000 – 3,386,000 = 814,000).

⁶ Source of population figures: UN-Habitat data bank

Shipping transport hub:

The port of the city has been graded as important on national level by an independent publication (publication not published by the city or by the owner).

Area of the urban hinterland:

The area of the urban hinterland includes the area of the larger urban zone less the area of the core city. The hinterland has a strong relation to the city (people working in the city but living outside the city).

Road transport hub:

The city can be reached by two or more roads of national or international importance.

Summer smog:

Average number of days the 'ozone O₃ concentration' exceeds 120 microgramm/m³ during the period 1999-2003.

Air transport hub:

The city can be reached by an airport of international or at least European importance.

Sex-ratio:

Sex ratio is the number of male residents divided by the number of female residents in the city.

Economic sectors⁷:

For reasons of simplifying and because a more detailed categorisations seems not to be necessary the tertiary sector and quaternary sector as well as the secondary and quinary sector of industry has been merged.

Primary sector of industry

It generally involves the changing process of natural resources into primary products. Most products from this sector are considered raw materials for other industries:

- agriculture, agribusiness,
- fishing,
- forestry,
- mining and quarrying industries

Secondary sector of industry:

The secondary sector of industry includes those economic sectors that create a finished, usable product:

⁷ based on the economic sectors defined by Fourastié and Gottmann a three sector model is used; see: Skript zur VL „Makroökonomie“ SS06, Prof. Dr. Helmut Wagner, FernUniversität in Hagen

- Manufacturing
- Construction,
- Energy.

Tertiary sector of industry

The tertiary sector of industry involves the provision of services to businesses as well as final consumers:

- Transport and logistic;
- Tourism;
- Banking;
- Retailing;
- Entertainment;
- News media;
- Leisure industry / hotels;
- Consulting;
- High technology;
- Healthcare / hospitals;
- Public administration.

Number of headquarters of national corporations:

Number of companies with headquarters in the city quoted on the national stock exchange.

2 City profiles⁸

2.1 The cities within CIVITAS I Initiative

The following chapter provides a quick overview about the 19 CIVITAS I cities applying the following indicators: first historical mention/ founding year, population, geographical location, political and cultural role, economy, transport and public transport.

2.1.1 Aalborg (Ålborg)

First historical mention:

1040 AD;

Population:

162,000 inhabitants;

After the administrative reform that has been implemented on 1st of January 2007 the population figure increased to 190.000 inhabitants due to incorporation of some communities.

Geographical location:

Aalborg is located in the northern part of Denmark.

Political and cultural role

Aalborg is the capital of the County of North Jutland (Nordjylland Amt) and the fourth-biggest city in Denmark.

The University of Aalborg, founded in 1974, has about 12.000 students and is one of the largest universities in Denmark.

Economy:

The secondary sector of industry with companies belonging to chemicals, iron, tobacco and textile industry is the biggest employers in Aalborg. The University of Aalborg cooperates closely with high-tech companies, especially from the field of telecommunication.

⁸ Chapter two is based mainly on two internet sources: on information provided by CIVITAS homepage: <http://www.civitas-initiative.org/main.phtml?lan=en> and the related CIVITAS cities pages; furthermore on general information about the cities to be provided on city-specific pages in 'wikipedia - The Free Encyclopedia': <http://en.wikipedia.org/wiki/>

Transport:

The European Highway E45 connects Aalborg with the south of Denmark as well as with the seaports Frederikshavn and Hirtshals in the north. The port of Aalborg is one of the biggest in Denmark.

The airport of Aalborg offers international connections.

The railway plays a regional role; it connects the city with the rest of the country and Europe. The railway station of Aalborg will be improved as a railway junction for the Region within the next years.

Public transport:

At present public transport is provided by buses. A tram is under construction.

2.1.2 Barcelona

Founding year:

15 BC;

Population:

1,501,000 inhabitants;

Geographical location:

Barcelona is located at the east coast of the Iberian Peninsula. Its particular situation on a narrow plain between the Mediterranean Sea in the east, a mountain range in the west, the river Llobregat in the south and the river Besós in the north limits the evolution of the city.

Political and cultural role

Barcelona is the capital of Catalonia, hosting the Regional Government and parliament. It is the second largest city in Spain and the main city in Catalonia.

Beside four public universities a number of private colleges can be found in Barcelona.

Economy:

In the 18th und 19th century the city became a major centre for textile industry. Today the traditional industry plays a secondary role, passed by the service sector and the tourism.

Transport:

Barcelona is an important junction for the public railway RENFE⁹. The high-speed lines connect Barcelona and Madrid as well as West-Catalonia. A connection with the French high-speed railway network TGV¹⁰ is planned for 2010.

⁹ Red Nacional de Ferrocarriles

¹⁰ train à grande vitesse

The airport Barcelona is the second largest in Spain and offers good international connections. The port is an important Mediterranean port for general cargo of containers and cruisers. Ferry services to Genoa and Balearic Islands are provided.

Public transport:

The public transport company of Barcelona („Transports Metropolitans de Barcelona“) offers different types of road and rail transport such as bus lines, metro lines and tramlines. The regional rail transport is the backbone of the regional public transport and serviced by Ferrocarrils de la Generalitat de Catalunya.

2.1.3 Berlin

First historical mention:

1237 AD;

Population:

3,386,000 inhabitants;

Geographical location:

Berlin is located in the eastern part of Germany on the east-west axis from Paris to Warsaw/Moscow and on the north-south line from Stockholm to Prague/ Vienna/ Budapest.

Political and cultural role

Berlin is the capital of Germany and in addition a federal city-state. It is the second largest city in European Union and is one of the most influential political centres in Europe. With the extension of the European Union (EU), Berlin's geo-political location has become even more significant. Four public universities, one private university and a number of colleges indicate the important role of science for Berlin.

Economy:

About 80 percent of the companies in Berlin belong to the tertiary sector. The formerly important role of the industrial sector is lessened.

Transport:

Berlin is a very important railway junction of the Deutsche Bahn. The new central station, opened in 2006, strengthens this role.

Three airports connect Berlin with national and inner-European destinations. The planned airport Berlin-Brandenburg-International will serve as an international hub.

Berlin is an important junction of the inland water transport and located in the centre of the federal waterway network east. Three waterways connect Berlin with the important rivers Elbe, Weser, Rhine und Oder.

Public transport:

The public transport company Berliner Verkehrsbetriebe operates a good extended network for underground, tram and busses. An urban train system run by Deutsche Bundesbahn connects the suburbs with the city and a number of regional rail lines service the Metropolitan area.

2.1.4 Bremen

Founding year:

788 AD;

Population

541,000 inhabitants;

Geographical location:

Bremen is located in the north-western Germany along the river Weser about 70 km from its mouth into the North Sea. Bremen consists of the City of Bremen and the seaport City of Bremerhaven.

Political and cultural role:

The city of Bremen is a federal city-state hosting the Federal Government and Parliament. Bremen is the second largest city in northern Germany.

Three public universities one private university are the scientific basis of the city. In 2004 Bremen was „City of Science“, a honouring in Germany.

Economy:

The most important economic factor is the harbour. About 25% of the jobs are related to shipping, harbour, and logistic. Furthermore the industrial sector plays an important economic role. Car industry with assembling companies and supply services, as well as food industry are leading employers in Bremen. Moreover the aeronautics and astronautics industry is represented by EADS¹¹.

Transport:

Bremen is a railway junction for goods transport. However the importance for long distance transport is related to the harbour. The airport plays a secondary role and offers mainly regional connections.

¹¹ European Aeronautic Defence and Space Company

Public transport:

The transport company Bremer Straßenbahn AG provides bus and tram services. Private transport companies complement the bus supply. All transport companies have been merged in the regional transport organisation Verkehrsverbund Bremen/Niedersachsen.

2.1.5 Bristol**Founding year:**

11th century;

Population:

380,000 inhabitants;

Geographical location:

Bristol is located at the river Avon in the south-western part of England.

Political and cultural role:

The city of Bristol is regarded as cultural centre of the Region. Two universities are the scientific backbone of the city.

Economy:

Beside aeronautics and astronautics (BAE Systems¹², Rolls Royce Aero Engines) the most important industries are information technology, media and finances.

Transport:

The railway connects Bristol with London, the British Midlands Wales. Moreover Bristol is located at the crossing of two important highways the M4 (London - Wales) and the M5 (Birmingham - Exeter). Bristol owes the status as biggest importer of cars in Great Britain to the harbour.

Public transport:

The public transport is provided by a private transport company and exclusively by buses.

2.1.6 Bucharest (Bukaresti)**First historical mention:**

1459 AD;

¹² British Aerospace and Marconi Electronic Systems

Population:

1,996,000 inhabitants;

Geographical location:

Bucharest is located in the centre of Romania.

Political and cultural role:

Bucharest is the capital of Romania, and beside its role as political centre of the country it is the cultural capital. The city has one university and several colleges (e.g. art college and music college) can be found.

Economy:

The most important economic sectors are electrical industry and manufacturing. The service industry is growing and gains in importance. Bucharest is the most developed region in Romania and the per capita GDP of Bucharest is as double high as in the rest of the country.

Transport:

Bucharest is the biggest and most important railway junction of Romania. Two air ports provide international connections. In addition Bucharest is the most important hub for air and road freight transport.

Public transport:

The public transport is well developed and served by different systems such as underground, tram, bus and trolley bus.

2.1.7 Cork

Founding year:

606 AD

Population:

122,000 inhabitants

Geographical location:

Cork is situated in the south-east of Ireland. The central area is located on an island in the mouth of the river Lee.

Political and cultural role:

Cork City is the second largest city in Ireland and the capital of Munster. The University College Cork was founded in 1845.

Economy:

Cork City is the economic centre of the southern part of Ireland. There is a burgeoning electronics industry in the city and a well-established pharmaceutical industry in the surrounding area replacing the former important car industry. The biggest employer is Apple Computer. The main businesses within the city are banks, insurance companies, legal firms, retail outlets, consultancies and service industries.

Transport:

The international airport is the second biggest in the country. Cork City has always been an important seaport offering ferry services to Wales and France. The harbour is the second biggest natural harbour in the world. There are good rail links and destinations to all over Ireland can be reached. The N8, N20 and N22 provide long distance road transport.

Public transport:

Cork City's public transportation is provided by the national bus operator Bus Éireann. A suburb rail provides transport for commuters to the city every day from the city's suburbs.

2.1.8 Gdynia

First historical mention:

13th century;

Population:

255,000 inhabitants;

Geographical location:

Gdynia is located in the northern part of Poland near Gdansk at the Baltic Sea.

Political and cultural role:

Three cities, Gdansk, Sopot and Gdynia form a metropolitan area the so called Tricity economic region. There are seven public universities and a number of private colleges.

Economy:

Gdynia, a city of maritime traditions and origins, has its development strategies closely linked with the maritime economy. The tertiary sector of industry dominates with a share of 46 per cent the city's

economy followed by the secondary sector of industry. Important companies are the polish shipyard Stocznia Gdynia and the polish IT company Prokom SA.

Transport:

Gdynia has an important port for passenger and goods transport with international ferry lines to Scandinavia and overseas. A national road and a main train route connect the Tricity. An urban rail Szybka Kolej Miejska (SKM) provides the passenger transport.

Public transport:

The public transport is provided by buses and trolley buses.

2.1.9 Göteborg

Founding year:

1100 AD;

Population:

467,000 inhabitants;

Geographical location:

Göteborg is located on the west coast of Sweden. The city is situated where the river Göta Älv discharges into the Kattegat; the River divides the city in two halves.

Political and cultural role:

Göteborg is the capital of province Västergötland and the second biggest city in Sweden. The city is also a significant university city in Scandinavia with two universities and the largest in terms of numbers of students.

Economy:

Göteborg is a centre of trade, bank and industry. The blue collar industries dominated with shipyards and industries such as Volvo, Ericsson and SKF¹³, changing into a mix of hi tech industries. Furthermore the city is one of the biggest exhibition centres in Europe.

Transport:

Several international ferry lines connect Göteborg with Denmark, Norway, Great Britain and Germany. The city is an important logistic centre for rail, road and ship freight.

¹³ Svenska Kullagerfabriken AB

Göteborg is an important rail junction connecting the city to the Scandinavian capitals Copenhagen, Oslo and Stockholm. There are two airports with internal flights but the importance is rather on a regional level.

Public transport:

The public transport into the larger urban zone is provided by train. Trams and buses operate in the city. Göteborg has one of the largest tram networks in Europe containing 12 tram lines.

Motorised transport is partly restricted in the inner city. However, the modal share is still dominated by car use.

2.1.10 Graz**First historical mention:**

1128 AD;

Population:

226,000 inhabitants;

Geographical location:

Graz is situated on the Mur river in the mountainous area in Austria. It is surrounded by low hills.

Political and cultural role:

Graz is the second largest city in Austria and the capital, the economic and cultural centre of Styria province- It has a long tradition as a student city with six universities and over 40.000 students.

Economy:

Companies belonging to the information technology as well as manufacturers and car industry are contributing to the economy of the city.

Transport:

Graz is located at the junction of the two highways A9 and A2. The city is a regional railway hub with long distance links to Vienna, Salzburg, Innsbruck, Maribor in Slovenia, Zagreb in Croatia, Prague in the Czech Republic and Budapest in Hungary. The airport offers international connections, but is compared with other airports small in number of passengers.

Public transport:

The city has a comprehensive bus network, complementing a tram network consisting of eight lines operated by the Steirischen Verkehrsverbund.

2.1.11 Kaunas

Founding year:

1408 AD;

Population:

379,000 inhabitants;

Geographical location:

Kaunas is situated in the centre of Lithuania on the confluence of two rivers, the river Nemunas and the river Neris.

Political and cultural role:

Kaunas is the second biggest city in Lithuania and it is called the city of students because of its six universities and several academies and colleges

Economy:

Kaunas is the main industrial city in the country. In addition the tertiary industry sector with information technologies and financial sector.

Transport:

Kaunas is the central road hub of the country. The east-west route of the country and the so called 'via Baltica', a long distance link from Poland to Finland meets in Kaunas. The international airport is of lower importance because the airport of Vilnius, the capital of Lithuania and within 100 km distance of Kaunas, is the central air passenger and freight hub. The importance of the inland water transport is decreasing.

Public transport:

The public transport is road based comprising buses, trolley-buses and micro-buses and provided by three operators. The hinterland is connected by rail.

2.1.12 Lille

Founding year:

1054 AD;

Population:

1,091,000 inhabitants;

Geographical location:

Lille is situated in north of France near the border with Belgium.

Political and cultural role:

Lille is the capital of the Nord-Pas de Calais région and the Nord département and one of the first university city in France. Lille forms the heart of a larger conurbation, consisting of Lille, Roubaix, Tourcoing and Villeneuve d'Ascq, which is France's 4th-largest urban conglomeration.

Lille Métropole is divided into 87 communes and about half of the population lives on its Belgian side.

Economy:

Lille has a long tradition in textile manufacturing. Today about 57% of the enterprises belong to the service sector and 34% to commerce. Only 9% of the businesses belong to the industrial sectors consisting of smaller companies. The city has become a base for distribution in the centre of Northern Europe and a major route to traffic travelling north-south and east-west across Europe.

Transport:

Lille is an important crossroads in the European high-speed rail network. It lies on the Eurostar line to London, the French TGV¹⁴ network to Paris, Brussels and the Talys high speed network to Amsterdam and Cologne.

The inland water transport port is the third biggest in France. The airport is of regional importance. Lille has a dense confluence of highways - not less than five auto routes pass by the city.

Public transport:

Lille Métropole is responsible for the urban public transport system. Public transport consists of the driver-less metro system (known as the 'VAL'), a «no step to carriage » tramway system (19 km), 38 bus routes and 42 main rail routes (including 8 which cross the border with Belgium).

2.1.13 Nantes

First historical mention:

843 AD;

Population:

554,000 inhabitants;

Geographical location:

Nantes is situated in Western France near the Atlantic coast, on the banks of the Loire river.

¹⁴ train à grande vitesse

Political and cultural role:

Nantes is the capital of the Pays de la Loire région, as well the préfecture of the Loire-Atlantique département.

Economy:

Most important economic sectors are the iron, glass and food industry. The tertiary sector is of small importance

Transport:

The commercial relevance of the port is small. The airport offers inner European and some international connections.

Public transport:

Public transport is provided by bus and three tramway lines. The tramway network is the largest in France. The improvements in public transport supply led to a significant reduction of the car trips.

2.1.14 Pécs

First historical mention:

3rd century;

Population:

162,000 inhabitants;

Geographical location:

Pécs is located in the south-west of Hungary about 40kms from the Croatian border.

Political and cultural role:

Pécs is the fourth largest city in the country and the administrative and commercial, educational and health centre of Baranya county. It has a long university tradition. The University of Pécs is the oldest university in Hungary, and is among the first European universities.

Economy:

Pécs is located in the midst of an agricultural and industrial area. Electronic and electrical industries are important sectors. The importance of mining is decreasing

Transport:

A new airport was founded in 2003 and offers inner European flights only. The city is railway hub with connections to Budapest, Vienna and Sarajevo. A new highway is currently under construction (project will finish end of 2007) connecting Pécs and Budapest.

Public transport:

Public transport is provided by buses.

2.1.15 Prague (Praha)**First historical mention:**

9th century;

Population:

1,169,000 inhabitants;

Geographical location:

Prague is situated on the Vltava river in central Bohemia.

Political and cultural role:

Prague is the capital and largest city of the Czech Republic. The city contains nine universities and colleges including the oldest university in Central and Eastern Europe.

Economy:

There is a high concentration of political and economic administration, industry, trade, education, research as well as tourism. The most important sectors are engineering, metalworking industry and chemicals industry.

Transport:

The city forms the hub of the Czech railway and road transport system, with services to all parts of the Czech Republic and to neighbouring countries. The airport offers international connections and is considered as one of the most important airports in Europe. The inland water transport harbour plays an important role for goods transport of the industrial sector.

Public transport:

Public transport consists of an integrated transport system of three metro lines, trams, buses, a funicular to Petřín Hill and a chairlift at Prague Zoo. All services have a common ticketing system, and are run by a public transport company.

2.1.16 Rome (Roma)

Founding year:

753 BC;

Population:

2,547,000 inhabitants;

Geographical location:

Rome is located in the central western part of Italy, about 24 km inland from the Tyrrhenian Sea at the confluence of the Aniene and Tiber rivers.

Political and cultural role:

Rome is the capital city of Italy and of the Lazio region, as well as the country's largest and most populous commune. It is seat of a number of UN organisations such as FAO¹⁵, IFAD¹⁶ and WFP¹⁷. Furthermore it is unique in its containing another sovereign state, the Vatican City.

Rome is a nation-wide centre for higher education and has a long university tradition. It hosts three public universities, a number of pontifical and private universities. The Università degli Studi di Roma La Sapienza, with an enrolment of 147,000 students is the biggest in Europe.

Economy:

Rome is the most important commercial and administrative centre of Italy. As the capital of the country, administrative, political and services are the main activities, including transport and all assets related to tourism. The tertiary industry sector with tourism and other service branches are dominating. The secondary industry sector with metalworking industries and pharmaceutical industries are of minor importance.

Transport:

Rome is served by two international airports of which the intercontinental airport Leonardo da Vinci is the second important aviation hub in Italy. The city is the central railway hub in Italy. The port has international ferries but does not play an important role for goods transport.

Public transport:

The public transport consists of subway (Rome Metro), extensive tramway network, light rail and buses (more than 300 lines, including electric minibuses, trolley-buses). The public transport operator in the city is ATAC (Agenzia per i Trasporti Autoferrotranviari del Comune di Roma). In addition water

¹⁵ Food and Agriculture Organization of the United Nations

¹⁶ International Fund of Agricultural Development

¹⁷ World Food Programme

transport supplements the road and rail public transport. The Metrebus integrated fare system allows holders of tickets and integrated passes to travel on all companies vehicles, within the validity time of the ticket purchased.

2.1.17 Rotterdam

Founding year:

1230 AD;

Population:

595,000 inhabitants;

Geographical location:

Rotterdam is situated in the south-west of Netherlands on the banks of the river Nieuwe Maas, one of the streams in the delta formed by the Rhine and Meuse rivers.

Political and cultural role:

Rotterdam is the economic, social and cultural centre of the Rijnmond region and the industrial heart of the Netherlands. The city has one major university, a music college and a number of vocational universities.

Economy:

Rotterdam is the largest port in Europe and has excellent access to upstream hinterland such as Switzerland, France and Germany. Transport and logistics are the most important economic sectors. Offices of numerous multi-national companies can be found in the city.

Transport:

The port of Rotterdam is the seventh largest of the world. The city is well connected to the international and national railway network and is a hub for freight transport. The airport of Rotterdam is the second largest in Netherlands and offers European connections.

Public transport:

The public transport consists of buses, trams, metro and regional light rail as well as fast ferry services including water taxis service.

2.1.18 Stockholm

Founding year:

13th century;

Population:

743,000 inhabitants;

Geographical location:

Stockholm is situated on the east coast of Sweden at the mouth of Lake Mälaren.

Political and cultural role:

Stockholm is the capital of Sweden and the largest city in Scandinavia. The city has been Sweden's political and economic centre since the 13th century. It is as well the residence of the Swedish head of state, the king.

Stockholm is the educational centre of Sweden and hosts 16 colleges and universities. Furthermore the European Centre for Disease Prevention and Control is located in Stockholm.

Economy:

Stockholm is a service industry and financial centre. Furthermore high technology companies such as IBM¹⁸, Ericsson and Electrolux provide a significant number of jobs. Tourism is playing an increasing role in the city's economy.

Transport:

Stockholm is the railway hub in Sweden. The city has Stockholm has regular ferry lines to Finland, Estonia; Latvia; and to the Åland islands. The airport of Stockholm is compared to other European airports rather small but offers international connections.

Public transport:

Stockholm has an extensive public transport system consisting of metro, commuter and light rails and a big bus fleet. The land-based public transport is organised by AB Storstockholms Lokaltrafik.

2.1.19 Winchester

Founding year:

871 AD;

¹⁸ International Business Machines Corporation

Population:

32,000 inhabitants;

Geographical location:

Winchester is located in the southern England.

Political and cultural role:

Winchester is at the heart of Hampshire; It is the seat of the City of Winchester local government district and the county town. It was the ancient capital of England.

Economy:

The city's economy is determined by service sector. The secondary sector of industry contains mainly small and medium enterprises.

Transport:

Winchester is a regional railway junction.

Public transport:

Public transport is provided by buses only.

2.2 The cities within CIVITAS II Initiative

The following chapter provides a quick overview about the 17 CIVITAS II cities applying the following indicators: first historical mention/ founding year, population, geographical location, political and cultural role, economy, transport and public transport.

2.2.1 Burgos

Founding year:

10th century;

Population:

170,000 inhabitants;

Geographical location:

Burgos is located in the North-central part of Spain in the region of Castilla-León on the half way between Madrid and the French border.

Political and cultural role

Burgos is the capital of the homonymous province. It is famous for its cultural, monumental, and artistic heritage. It has a university

Economy:

The industry in Burgos is varied and dynamic and characterised by important European companies. Burgos is a medium-sized city with a lot of space for sustainability, urban growing and industrial development.

Transport:

Burgos is a road and rail junction. National and European roads connects the cities with the south and north as well as with the north-west and north-east parts of Spain. The airport of Burgos provides only local flights.

Public transport:

Burgos has an extensive bus system with more then 30 lines.

2.2.2 Debrecen

Founding year:

1235 AD;

Population:

207,000 inhabitants;

Geographical location:

Debrecen is located 220 kilometres from Budapest in the eastern part of the Great Plain.

Political and cultural role

Debrecen is the second largest city in Hungary. It is the centre of the North Plain Region and the seat of Hajdú-Bihar county. Due to the University of Debrecen the city has an educational reputation.

Economy:

Debrecen belongs to the most popular tourist locations in Hungary. It offers services for health tourism, conferences, business tourism and incentive tourism. Due to that a lot of commercial lodgings are located in this area.

Transport:

Debrecen has an airport with the international status since 2001. The city is situated at the largest railway and road junction in the eastern part of the Great Plain.

Public transport:

Public transport is provided by buses and tram. The bus system consists of diesel, bio-fuel and trolley buses.

2.2.3 Genova

First historical mention:

400 BC;

Population:

630,000 inhabitants;

Geographical location:

Genova is located in northern Italy. The city is spread between the Mediterranean Sea and mountains.

Political and cultural role

Genova is the capital of Liguria Region and also the core of the Italian Riviera. It is characterised by one of the largest historical centres in Europe. The University of Genoa was founded in 1471 and is with about 40.000 students one of the largest universities in Italy.

Economy:

The port of Genoa plays an important role for the economic hinterland and cities like Milano and Turin.

Transport:

A dense road net connects the city with its hinterland. The port of Genoa is a freight hub.

Public transport:

Public transport is provided by a metro system as well as an extensive bus system consisting of diesel and trolley-buses. The steep slopes of the mountains call for special transport solutions and a number of rack and funicular railways as well as lifts are serving as public transport mean.

2.2.4 Kraków

Founding year:

4th century;

Population

800,000 inhabitants;

Geographical location:

Kraków is located in southern Poland on the Vistula River.

Political and cultural role:

Kraków is one of the biggest cities in Poland with a unique historic character. The city is a centre of culture, science and higher education. There are about 18 university-level institutions with altogether more than 150,000 students. The Jagiellonian University with about 40,000 students, is the oldest university in Central and Eastern Europe. Kraków was cultural capital of Europe in the year 2000.

Economy:

In Kraków the economic activity especially the industry, including the metallurgical, steel, chemical, food, clothing and printing industries is very strong and the tourism is growing. Many international companies like Motorola, Deutsche Bank, Phillip Morris, and Volvo moved to the city. As well a number of international retailers like Ikea, Metro, Tesco, Carrefour and ECE Projektmanagement have subsidiaries in the city.

Transport:

Krakow is a road transport junction connecting the city with the northern part of Poland, Western Europe, and with Slovakia, Czech Republic and Ukraine.

The railway plays the same role as the road and freight transport is connected to Gdansk. Bulk cargo is transported on inland waterways but with less importance.

The John Paul II international airport Krakow-Balice is the second largest airport in Poland and offers national, European and overseas flights

Public transport:

Krakow offers a dense tram and bus network for public passenger transport. A fleet of about 500 buses ranging from midi to articulated buses and a fleet of about 400 trams ranging from old-fashion to modern low floor trams provide the public transport.

2.2.5 La Rochelle

Founding year:

10th century;

Population:

160,000 inhabitants;

Geographical location:

La Rochelle is located in western France on the Atlantic Coast.

Political and cultural role:

La Rochelle is the capital of Departements Charente-Maritime and an important trade centre. The city with its well preserved past architecture is one of the most pictorial and historically rich cities on the Atlantic coast. The city has a young university opened in 1993 and a number of institutions of higher learning.

Economy:

La Rochelle also has the largest marina for pleasure boats in Europe at Les Minimes. Boat-building, fishing, food processing and chemical industry are the most important economic sectors. Due to the well maintained past architecture the city developed a strong tourism industry. The commercial harbour in deep water named La Pallice is the eighth biggest port in France. The economic foundation of the city is the great number of small enterprises with more than 7,000.

Transport:

The city is connected to Nantes, Bordeaux and Paris by road and train. The TGV connects the city with the capital of France. The airport provides national flights and offers low cost flights.

Public transport:

Public transport is provided by buses. There a special public transport services operating in the city: a bike-bus system that can carry bikes and night-taxi service as a night public transport service.

2.2.6 Ljubljana

First historical mention:

15 AD;

Population:

265,000 inhabitants;

Geographical location:

It is located in central Slovenia, between the Alps and the Adriatic Sea.

Political and cultural role:

Ljubljana is the capital and the largest city in the Republic of Slovenia. The headquarters of national agencies or institutions, diplomatic and consular missions, the University and cultural centres can be found in the city.

Economy:

Ljubljana is a strong economic centre with concentrated human resources and scientific potential. It creates about a third of all trade in Slovenia and influences the dynamics of the region and the whole Slovene economy.

Transport:

Ljubljana is an important transport junction south of the Alps. The city is located next to the main transport crossroads in Slovenia. The airport Brnik is located about 25 km from the city.

Public transport:

Public transport is provided by buses only.

2.2.7 Malmö

Founding year:

1275 AD;

Population:

276,000 inhabitants;

Geographical location:

Malmö is situated in the southernmost province of Sweden named Scania.

Political and cultural role:

Malmö is the third largest city of Sweden. It contains many historic buildings and parks, and is a popular place for shopping. The city is more and more focusing on education, arts and culture. A university college has been established in 1998. The Lund University has some academies in the city and the UN World Maritime University is located in Malmö.

Economy:

The economy of Malmö was traditionally based on shipbuilding and construction related industries. The nearby city of Lund is competing with Malmö for businesses and jobs. Malmö has gone from a very important economical recession and high unemployment in the 80s and 90s to a city full of initiative and development in the new millennium.

Transport:

Malmö is a transportation hub in southern Sweden. The Oresund Bridge, a combined two-track rail and four-lane road bridge connects the two metropolitan areas of the Oresund Region: the Danish capital of Copenhagen and the Swedish city of Malmö. The international European route E20 runs across the bridge. Currently under development is a rail system, the City tunnel, linking into the transport infrastructure of Malmö and Copenhagen and changing the railway station into a transit station. The Malmö airport is a minor airport offering low-cost flights. The importance of the sea port has been decreased due to the Oresund Bridge.

Public transport:

Public transport is provided by an extensive bus system.

2.2.8 Norwich

First historical mention:

7th century;

Population:

120,000 inhabitants;

Geographical location:

Norwich is located in East Anglia, in Eastern England.

Political and cultural role:

Norwich is the regional administrative centre of the County of Norfolk. The University of East Anglia, founded in 1963, is located in the city.

Economy:

The city's economy has completely changed from industrial and shoe making sector to a service-based economy in the eighties and nineties.

Transport:

Norwich is connected to the east and the west of the country by the road A47 and to Cambridge by the road A11, which leads to the road M11 to London. The Norwich International Airport in Hellesdon is a feeder for KLM. Regional and holiday charter flights are offered. Two rail links connect Norwich to the rest of the country. Local rail-lines run to hinterland destinations.

Public transport:

Public transport is provided by a good bus network.

2.2.9 Odense

Founding year :

988 AD;

Population:

185,000 inhabitants;

Geographical location:

Odense is located centrally in the middle of Denmark on the Island of Funen.

Political and cultural role:

Odense is the third largest city in Denmark. It is the capital city of the Island and County of Funen and accommodates the County Headquarters. It is a university city with about 30,000 students.

Economy:

Odense is a centre for small and middle-sized firms. The city has an assortment of supporting service enterprises. Denmark's largest shipbuilding yard is next to the city. Odense is also known for its gardening centre.

Transport:

Odense is an important traffic terminal for road, rail and bus traffic. More than 26,000 commuters travel to Odense each day.

Public transport:

Local transport is provided by a good bus network.

2.2.10 Ploiesti

First historical mention:

1597 AD;

Population:

248,688 inhabitants;

Geographical location:

Ploiesti is located in southern Romania.

Political and cultural role:

Ploiesti is the county seat of Prahova County. The city has a university, the Oil & Gas University.

Economy:

The city is one of the most important economic centres in Romania with textile and oil processing industry and major oil companies.

Transport:

Ploiesti is an important road and railway junction for freight and passenger transport. The airport in Strejnic provides local flights.

Public transport:

Public transport is provided by an extensive network of buses, trolleybuses and trams.

2.2.11 Potenza

Founding year:

4th century BC;

Population:

69,295 inhabitants;

Geographical location:

Potenza is located in southern Italy on a mountain range next to the Basento River.

Political and cultural role:

Potenza is the capital of the Basilicata region and the Potenza province.

Economy:

Potenza is undergoing a considerable process of economic renewal. The food, metal, plastic, electronics and clothing production sectors are modernised.

Transport:

Potenza is a rail junction on the main line from Salerno to Taranto

Public transport:

Public transport is provided by an urban bus fleet with 15 bus lines.

2.2.12 Preston

Founding year:

1179 AD;

Population:

129,000 inhabitants;

Geographical location:

Preston is situated in the North West of England.

Political and cultural role:

Preston is the capital and largest commercial centre of Lancashire and England's newest city. The University of Central Lancashire in Preston is the sixth-largest university in the UK.

Economy:

The city has a strong economic and retail base, but the major employer in Preston is the University of Central Lancashire.

Transport:

Preston is an important transport hub between London and Scotland. The West Coast Main Line railway and M6 motorway are key rail and road links to the city. The former port is no longer used for commercial shipping. Blackpool International Airports is located about 20 miles west of the city. Low-cost airlines offer international flights.

Public transport:

Public transport is provided by Preston Bus with a fleet of 123 buses ranging from midi buses to double-decker bus.

2.2.13 Stuttgart

First historical mention:

10th century;

Population:

592,000 inhabitants;

Geographical location:

Stuttgart is located in the south-west of Germany.

Political and cultural role:

Stuttgart is the capital of Baden-Wuerttemberg state. It has two universities, 19 technical colleges and 9 Fraunhofer Associations and Max-Planck Institutes.

Economy:

Stuttgart is the export-strongest region of Europe. In the automotive and mechanical engineering the city creates its strength.

Transport:

Stuttgart has an international airport, is a railway hub especially for the InterCity networks and has road links to several motorways.

Public transport:

Stuttgart has a local transport system consisting of a light rail system, a bus network, a rapid transit system, a rack railway and a funicular railway.

2.2.14 Suceava

First historical mention:

1388 AD;

Population:

118,500 inhabitants;

Geographical location:

Suceava is located in the north-eastern part of Romania on the Suceava riverside.

Political and cultural role:

Suceava is the capital city of the Suceava County. The city has a university founded in 1990.

Economy:

The economic backbone of the city are the machinery sector, wood processing and paper industries.

Transport:

The European corridor 9 of TINA network, five national roads and four county roads are situated near Suceava. Suceava Airport is situated 12 east from the city offering international flights.

Public transport:

The municipality owned public transport company provides buses services.

2.2.15 Tallinn

First historical mention:

13th century;

Population:

400,000 inhabitants;

Geographical location:

Tallinn is situated in the north of Estonia.

Political and cultural role:

Tallinn is the capital and the largest city of Estonia. It is the country's centre of cultural, economic and higher education activities. The city is the location of the two universities as well as a number of academies, colleges and institutes. The older part of Tallinn has been declared a UNESCO world heritage site.

Economy:

Tallinn is developing the information technology sector in addition to its long time functions as seaport and capital city.

Transport:

Tallinn has rail and road links, an airport and even several ferry operators.

Public transport:

Tallinn public transport network consists of buses, trolleys, tramways and suburban trains.

2.2.16 Toulouse**Founding year:**

125 BC ;

Population:

700,000 inhabitants;

Geographical location:

Toulouse is located in southwest France on the banks of the Garonne River, half-way between the Atlantic Ocean and the Mediterranean Sea.

Political and cultural role:

Toulouse is the capital of Midi-Pyrénées, the largest French region. It is the 4th largest French city and among the biggest cities in southern Europe. The city has a long university tradition. The University of Toulouse was founded in 1230. The city is the second largest student campus in France with more than 110,000 students attending three universities and a number of engineering schools.

Economy:

Toulouse's major industries are aeronautics, space, electronics, information technology and biotechnology. Toulouse hosts the Airbus headquarters and several assembly-lines.

Transport:

Toulouse has two airports and one major railway station.

Public transport:

Toulouse has an extensive bus system. In addition public transport is provided by Toulouse Metro with a VAL¹⁹ (automatic vehicles) metro system and an urban rail network.

2.2.17 Venice (Venezia)**Founding year:**

421 AD;

¹⁹ Véhicule Automatique Léger

Population:

271,073 inhabitants;

Geographical location:

Venice is located in north-east Italy and the city stretches across numerous small islands in the marshy Venetian Lagoon along the Adriatic Sea.

Political and cultural role:

Venice is the capital of the region Veneto. It has three universities.

Economy:

Venice is a centre of trade and tourism is the main economy sector on the island. The port of the city is one of the largest ports in Italy. A number of highly specialised research centres are located in the city

Transport:

Venice has an airport (Marco Polo International Airport) on the mainland. The canals have the function of roads, and every form of transport is on water or on foot. Venice's railway station is connected by a causeway to the mainland. Venice also has an automobile causeway and parking lot. The city is served by three airports on the mainland providing national and international connections.

Public transport:

The city is divided into two parts, mainland and island Venice and each of them with different transport needs. Venice has a typical traffic system on the medium sized urban area on the mainland, and the waterborne traffic in the lagoon and canals of island Venice.

3 Can we form city categories?

This chapter lines out the attempt to categorise the 19 CIVITAS I cities into sound groups. The categorisation of cities is restricted to CIVITAS I cities because data for CIVITAS II cities are insufficient for a number of reasons. However, because urban mobility is the main concern it seems useful to categorise the cities by such characteristics related or linked to urban transport instead relating all cities to all characteristics elaborated in chapter three. The categorisation process was carried out by using the following three dimensions and related characteristics:

Demographic characteristics:

- population of the city
- population density in the city

Transport data:

- motorisation
- vehicle density
- modal Split
- long-distance-traffic junction

Economical data:

- per head GDP
- economic sectors
- special political or cultural function

3.1 Population of the city

A population-related categorisation of cities has already been published by the International Statistics Conference²⁰. There are four categories by population size (see table...):

Table 1: Population related city categories

City category	Population figures between
Small town	5,000 and 20,000
Middle size town	20,000 and 100,000
Large city	100,000 and 1,000,000
City with over one million inhabitants	> 1,000,000

²⁰ Häussermann, Hartmut: „Großstadt: soziologische Stichworte“

With this categorisation the following distribution of the cities is possible:

Table 2: Distribution of CIVITAS cities according city category

Small town	Middle size town	Large city	Over a million inhabitants
	Winchester	Aalborg	Barcelona
		Bremen	Berlin
		Bristol	Bucharest
		Cork	Lille
		Goteborg	Prague
		Graz	Rome
		Gdynia	
		Kaunas	
		Nantes	
		Pécs	
		Rotterdam	
		Stockholm	

The result shows that within CIVITAS I the focus is on large cities. Only one middle-size city belongs to the selected cities, but one third of the cities belongs to the group of cities with more than one million inhabitants and/or capital cities.

3.1.1 Population and public transport share

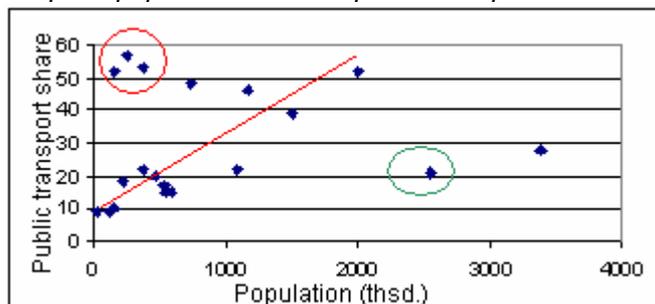
Hypothesis:

The larger the population of a city the larger the share of public transport in the modal split.

It is necessary to have a sufficient number of passengers to run a public transport system efficiently. The more passengers - using a public transport system - the larger the transport system. Furthermore it seems be possible to run smaller side lines efficiently. By running smaller side lines, more customers can be reached which increases the number of passengers. A larger number of passengers is most likely found in a city with a large population.

Analysis:

Graph 1: population size and public transport share



Result:

According to the graph it would be principally possible to say that a larger population leads to a larger public transport share in the modal split. There are two exemptions from that rule. The red circle marks three cities with a relative small population but a high public transport share. These three cities are

Gdynia, Kaunas and Pécs. All three have two facts in common: they are former eastern bloc cities with a public transport tradition and they have a very low per head GDP. A correlation between GDP and public transport share appears obvious. The relative small public transport share of Rome (green circle) could be led back to the unpopular public transport system in this city, as mentioned in many publications.

Remarks:

Generally many factors influence the size of the public transport share. The population size might represent some of these factors only. These factors could be e.g. fares, income of the inhabitants, number of tourists, and popularity of the public transport system to mention a few.

3.1.2 Population and existence of a metro system

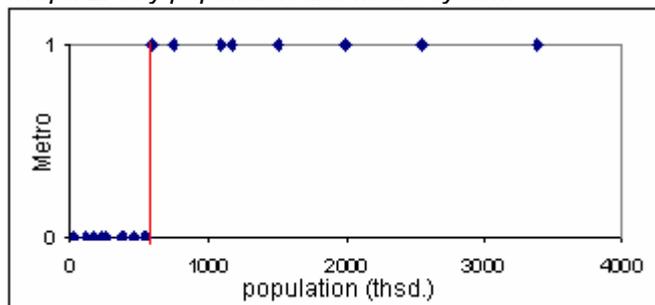
Hypothesis:

Only cities with a population of a certain size do have a metro system“

The investment costs of a metro system are relatively high. The operational costs can only be covered if a certain number of passengers use the system. This necessary number of passengers can only be found in cities of a certain size.

Analysis:

Graph 2: City population and metro system



Legend: 1= metro system exists; 0= no metro system exists

Result:

The smallest city (by population) that operates a metro system is Rotterdam with a population size of 595,000 inhabitants. The largest city that does not operate a metro system is Nantes with a population size of 554,000 inhabitants. The critical population size for CIVITAS cities providing a Metro as mass transport system lies between 500,000 to 600,000 inhabitants.

Remarks:

The outlay for the operation of a metro system does not only depend to the number of passengers but also to the fund necessary to build the system.

Construction costs depend on the local situation. In Rome it was necessary to consider important historical buildings and sites during planning and construction. In Stockholm the construction costs were affected by the loamy underground.

3.1.3 Dimension of the part of the city on the total population in the country and size of the local airport

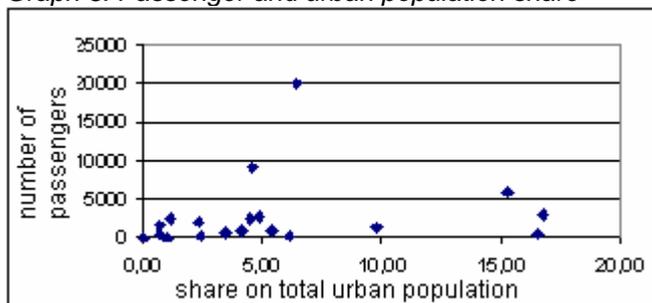
Hypothesis:

The larger the population of a city in comparison to the total urban population of a country the more passengers are dispatched at the local airport.

The number of passengers of an airport depends among other factors on the size of its catchment area. The more potential passengers live close to an airport the more customers might use the choice of flying. It also can be presumed, that larger cities attract more international corporations, which generate an additional demand and request for international air connections. As an example, the economical importance of Frankfurt/Main helped to establish an air traffic hub of international importance. It is assumed, that the importance of a city correlates to its size in comparison to the total urban population of a country, and that this induces a high number of passengers at the local airport.

Analysis:

Graph 3: Passenger and urban population share



Result:

A correlation between the population of a city in comparison to the total urban population of the country and the size of the local airport can not be found. A look at the data chart also reveals that there is no correlation between the number of passengers and the population of a city in comparison to the total population of the country.

Remarks:

The number of passengers of an airport depends on many factors. For example "Dulles Airport" and many other large airports, especially in the United States show that a large air traffic hub can exist without a large city nearby.

Furthermore the assumption, that a large city has a big economical importance does not necessarily need to be correct.

3.2 Population density

To categorise the cities according to their population density five categories have been defined in a first step:

- Very low population density;
- Low population density;
- Average population density;
- High population density;
- Very high population density.

In a second step these categories have been defined. The city with the lowest population density among the Civitas I cities (Graz: 184 inh./sq.km) and the city with the highest population density have been grouped into the lowest and highest category. To match the remaining cities to appropriate categories equal intervals have been introduced²¹.

The following category-sizes can be defined:

Table 3: Population-related city categories

	Category	Size²² Up to (inh./sq.km)
1	Very low population density	942
2	Low population density	1,700
3	Average population density	2,457
4	High population density	3,215
5	Very high population density	More than 3,215

With these categories the following distribution of cities to categories of population density is possible:

Table 4: Distribution of CIVITAS cities according to population density categories

very low	low	average	high	very high
Graz	Barcelona	Aalborg	Nantes	Berlin
Prague	Göteborg	Bremen		Bristol
	Pécs	Gdynia		Bucharest
	Winchester	Kaunas		Cork
		Lille		Stockholm
		Rome		
		Rotterdam		

²¹ In this case there is one value (Bucharest) that is so high, that it would distort the result. For this reason Stockholm shall be assumed as the city with the highest population density.

²² Distance between two categories: Distance = $(3973 - 184)/5 = 757$

The result is a mix of mainly three groups. More than half of the CIVITAS cities are grouped in the low and average density categories (between 943 and 2,457 inh./sq.km). One quarter of the cities belong to the category with very high density.

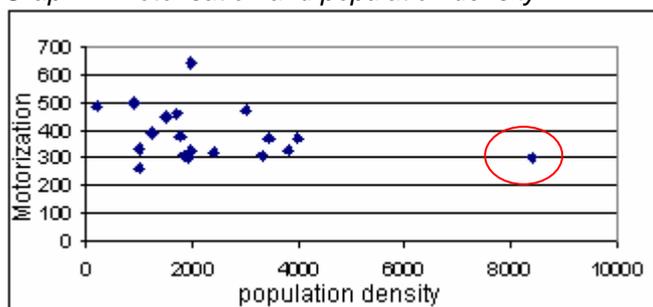
3.2.1 Population density and motorisation

Hypothesis:

The higher the population density the lower the motorisation rate.

Analysis:

Graph 4: Motorisation and population density



Result:

There is no obvious linear correlation. Especially Bucharest (red circle) has a very high population density, but an average motorisation rate.

Remarks:

The motorisation depends on many factors, such as wealth of the population, status symbol of the car, popularity of the public transport system etc. Furthermore high population density must not necessarily mean that the accessibility of locations such as work places, shopping, services, leisure are good for the population.

3.2.2 City category and city area

To categorise the cities according to their city space five categories-have been defined in a first step:

- Very small city area;
- Small city area;
- Average city area;
- Large city area;
- Very large city area.

The classification of the cities follows the same approach as described in paragraph 4.2²³.

The following category-sizes can be defined:

Table 5: City area categories

	Category	Size ²⁴ Up to (sq.km)
1	Very small city area	278
2	small city area	530
3	Average city area	781
4	large city area	1,033
5	Very large city area	More than 1,033

With these categories the following distribution of cities to categories of population density is possible:

Table 6: Distribution of CIVITAS cities according city area

very small	small	Average	large	Very large
Bucharest	Göteborg	Lille	Barcelona	Rome
Stockholm	Bremen		Berlin	Prague
Nantes	Rotterdam			Graz
Pécs				
Kaunas				
Gdynia				
Bristol				
Aalborg				
Cork				
Winchester				

The result shows that within CIVITAS I the focus is on cities with small city areas although population wise the emphasis is on large cities. The combination of these two factors leads to high population density figures (see 3.2). There are a number of cities with extraordinary high population density figures.

3.3 Motorisation

To categorise the cities according to their motorisation figures five categories-have been defined in a first step:

- Very low motorisation;
- Low motorisation;
- Average motorisation;
- High motorisation;
- Very high motorisation.

The classification of the cities follows the same approach as described in paragraph 4.2:

The following category-sizes can be defined:

²³ In this case there is one value (Bucharest) that is so high, that it would distort the result. For this reason Stockholm shall be assumed as the city with the highest population density.

²⁴ Distance between two categories: Distance = $(3973 - 184)/5 = 757$

Table 7: Motorisation categories

	Category	Size ²⁵ Up to (vehicle/1,000inh.)
1	Very low motorisation	343
2	Low motorisation	418
3	Average motorisation	494
4	High motorisation	569
5	Very high motorisation	More than 569

With these categories the following assignment of cities to categories of motorisation is possible:

Table 8: Distribution of CIVITAS cities according motorisation categories

very low	low	average	high	Very high
Aalborg	Bristol	Barcelona	Prague	Rome
Berlin	Lille	Bremen		
Bucharest	Stockholm	Graz		
Cork	Winchester	Nantes		
Goteborg				
Gdynia				
Kaunas				
Pécs				
Rotterdam				

The result is an impressive picture of low motorisation in CIVITAS cities. Only two cities have a motorisation figure of 500 and higher.

3.3.1 Age structure and motorisation

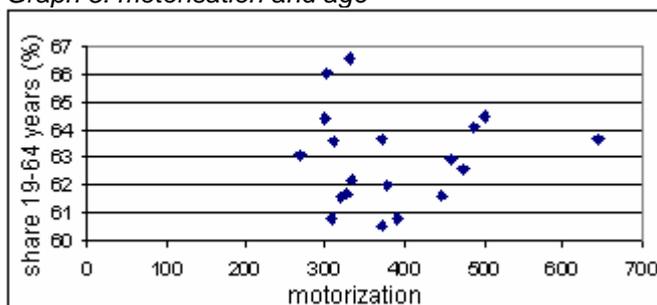
Hypothesis:

Cities with a high percentage of inhabitants aged between 20 and 64 years have a higher motorisation rate.

It can be assumed that car ownership is low for persons aged between 0 and 19 years. Furthermore, many persons older than 65 years are retired and currently the motorisation for this group is still on a low level.

Analysis:

Graph 5: motorisation and age



²⁵ Distance (ca.) = (645 - 268)/5 = 75

Result:

There is no linear relationship between age structure and motorisation.

Remarks:

It can be assumed that the motorisation depends stronger on other factors than the age structure. It also would be possible, that the influence of the age structure is not obvious, because the differences between the age structures of the different cities are too small. The share of the age group 'between 20 and 64' ranges between 60% and 67%.

3.3.2 Size of economically active population and motorisation

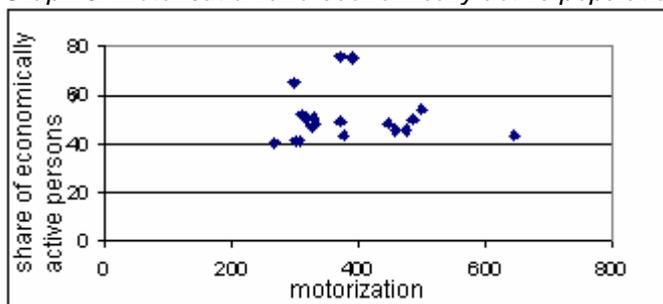
Hypothesis:

Cities with a higher share of economically active persons do have a higher motorisation.

It can be assumed, that economically active persons gain a higher income than unemployed persons. So they can afford to buy and operate a motorised vehicle. It also can be assumed that economically active persons have a higher need for transportation.

Analysis:

Graph 6: Motorisation and economically active population

**Result:**

There is no linear relationship between share of economically active inhabitants and motorisation.

Remarks:

It can be assumed that the motorisation depends stronger on other factors than the share of economically active persons.

3.4 Vehicle density

To standardize the cities according to their vehicle density, category-names will be defined in a first step:

- Very low vehicle density;
- Low vehicle density;
- Average vehicle density;
- High vehicle density;
- Very high vehicle density.

The classification of the cities follows the same approach as described in paragraph 4.2²⁶.

The following category-sizes can be defined:

Table 9: vehicle density categories

	Category	Size Up to (vehicles/sq.km)
1	Very low vehicle density	368
2	Low vehicle density	645
3	Average vehicle density	923
4	High vehicle density	1200
5	Very high vehicle density	More than 1200

With these categories the following distribution of cities to categories of vehicle densities is possible:

Table 10: Distribution of CIVITAS cities according vehicle density

very low	Low	average	high	very high
Göteborg	Aalborg	Barcelona	Cork	Berlin
Graz	Gdynia	Bremen		Bristol
Pécs	Nantes	Kaunas		Bucharest
	Prague	Lille		Rome
	Rotterdam			Stockholm
	Winchester			

The CIVITAS cities are grouped into three main groups – in about half of the cities the vehicle density is low and very low; in about 20 % of the cities the density is average; whereas in 25% of the cities the density is very high.

3.4.1 Vehicle density and road accidents

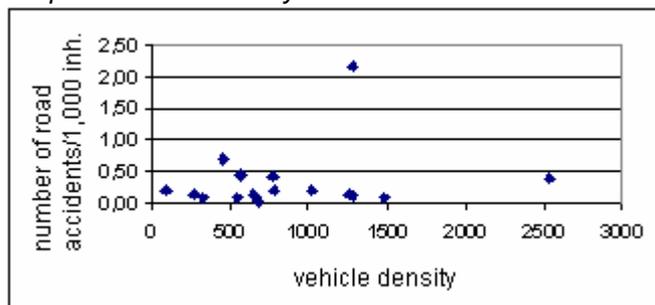
Hypothesis:

The higher the vehicle density, the higher the number of road accidents.

²⁶ there is one value (Bucharest) that is so high, that it would distort the result. For this reason Stockholm shall be assumed as the city with the highest vehicle density; Distance (ca.) = $(1478 - 90)/5 = 278$

Analysis:

Graph 7: Vehicle density and accidents



(The number of road accidents in the analysis refers to the number of road accidents with death or serious injury)

Result:

There is no linear regression between accidents and vehicle density. Furthermore Rome seems to be an exemption with an extraordinary high number of accidents.

Remarks:

It can be assumed, that the number of road accidents depends stronger on other factors than the vehicle density. Such factors could be the local driving style, the enforcement of traffic rules by the local police, the arrangement of this traffic rules, and the age of the vehicles to mention a few.

Furthermore the limitation on accidents with death and serious injury does not consider the possible fact that cities with a low number of accidents resulting in death or serious injury still have disproportionate higher number of road accidents that result in only non serious or no injury at all.

3.4.2 Vehicle density and vehicle speed on city-roads

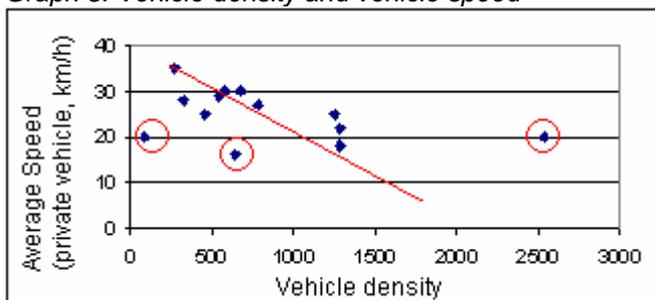
Hypothesis:

The higher the vehicle density the lower the average vehicle speed.

A large number of vehicles might lead more likely to congestions than a smaller number of vehicles.

Analysis:

Graph 8: Vehicle density and vehicle speed



Result:

There seems to be a linear relationship between vehicle density and average speed. However, there are three exceptions (Bucharest, Graz and Rotterdam; red circles) that need a closer examination.

Remarks:

There are no information about the real road-capacities in the CIVITAS I cities. It would be possible that cities with a high vehicle density have more appropriate capacities than cities with lower traffic density. In such a case the roads in the city with lower vehicle density would still more likely become congested.

3.5 Modal Split

The Modal Split shall be categorized in the same way as the population density, the motorisation or the vehicle density. Three different values (non-motorised, public transport, private transport and freight transport on streets) will be considered for categorisation.

- Very small share of non-motorised / public transport / private and freight transport;
- Small share of non-motorised / public transport / private and freight transport;
- Average share of non-motorised / public transport / private and freight transport;
- High share of non-motorised / public transport / private and freight transport;
- Very high share of non-motorised / public transport / private and freight transport.

The classification of the cities follows the same approach as described in paragraph 4.2²⁷

The following category-sizes can be defined:

Table 11: Modal split categories

	Category	Non-motorised Up to	Public transport Up to	Private- and freight transport Up to
1	Very small	14,4%	18,6%	32%
2	Small	21,8%	28,2%	44%
3	Average	29,2%	37,8%	56%
4	High	36,6%	47,4%	68%
5	Very High	More than 36,6%	More than 47,4%	More than 68%

With these categories the following distribution of cities to categories of transport modes is possible:

Table 12: Distribution of CIVITAS cities according Share of non-motorised transport

Very small	Small	Average	High	Very High
Bristol	Cork	Aalborg	Barcelona	Bremen
Gdynia	Kaunas	Bucharest	Berlin	Rotterdam
Pécs	Rome	Lille	Göteborg	
Winchester	Stockholm	Nantes	Graz	
		Prague		

²⁷ Distance - non-motorised (ca.) = $(44 - 7)/5 = 7,4$; Distance - public transport (ca.) = $(57 - 9)/5 = 9,6$; Distance - private- and freight transport (ca.) = $(80 - 20)/5 = 12$.

The CIVITAS cities are equally grouped in the non-motorised transport categories. An exception is the category 'very high share of non-motorised transport' in which only two cities are grouped (Bremen and Rotterdam).

Table 13: Distribution of CIVITAS cities according share of public transport

Very small	Small	Average	High	Very High
Aalborg	Berlin		Barcelona	Bucharest
Bremen	Bristol		Prague	Gdynia
Cork	Göteborg			Kaunas
Graz	Lille			Pécs
Nantes	Rome			Stockholm
Rotterdam				
Winchester				

Concerning the public transport the CIVITAS cities can be grouped into two main groups: about two third of the cities belong to the categories 'very small and small' share of public transport; about one third of the cities belongs to the categories 'high and very high' share of public transport.

Table 14: Distribution of CIVITAS cities according share of private vehicles and freight transport:

Very small	Small	Average	High	Very High
Barcelona	Berlin	Göteborg	Aalborg	Cork
Bucharest	Bremen	Graz	Bristol	Winchester
Kaunas	Gdynia	Lille	Nantes	
Prague	Pécs		Rome	
	Rotterdam			
	Stockholm			

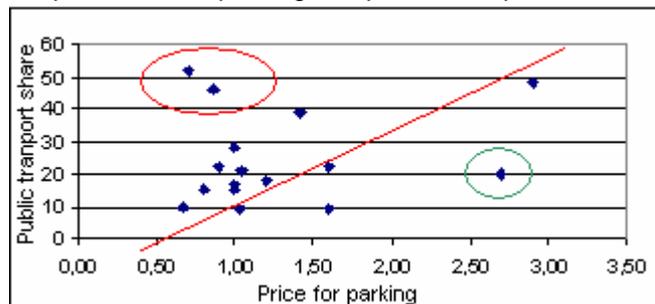
Concerning the 'share of private and freight transport' the cities are unequally distributed among the categories. About half of the cities show a small and very small share and about one fifth of the cities show a high share of private vehicles and freight transport.

3.5.1 Public Transport share and price for parking

Hypothesis:

The higher the price for parking the higher the modal split share of public transport.

It could be presumed, that the price for parking has an influence on the choice of certain transport modes.

Analysis:*Graph 9: Price of parking and public transport share***Result:**

There seems to be a relationship between 'price of parking' and 'share of public transport'. However, there are two exceptions (red and green circle). The cities Pécs and Prague show an extraordinary public transport share on a low parking price level. The city of Göteborg shows a low public transport share although the parking price is high.

Remarks:

Pécs and Prague are the only two former eastern bloc cities in this analysis - there were no data for the price for parking available from the other former eastern bloc cities. The former eastern bloc cities have traditionally a high public transport share and a very low per head GDP in common. This could explain the values of these cities.

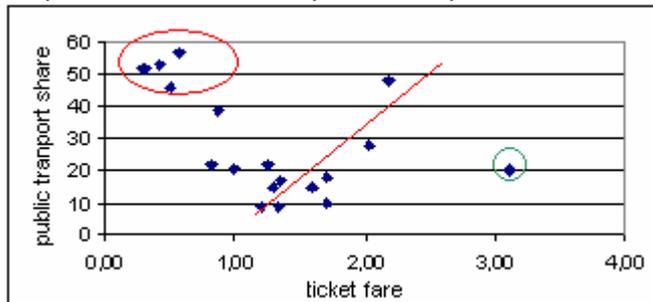
Nevertheless, the use of public transport systems most probably depends on more than this one factor.

3.5.2 Public Transport share and price for public transport

Hypothesis:

The higher the public transport fare the smaller the modal split share of the public transport system

It could be assumed that the inhabitants of a city tend to use private vehicles if the public transport prices are high.

Analysis:*Graph 10: Ticket fare and public transport share***Result:**

There is basically a relationship between public transport fare and public transport share within the CIVITAS cities. However, there are two exceptions (red and green circle). The red-circled values represent former eastern bloc cities (Bucharest, Gdynia, Kaunas, Pécs and Prague), which all have a traditionally high public transport share and a low per head GDP in common. The green-circled value represents Göteborg.

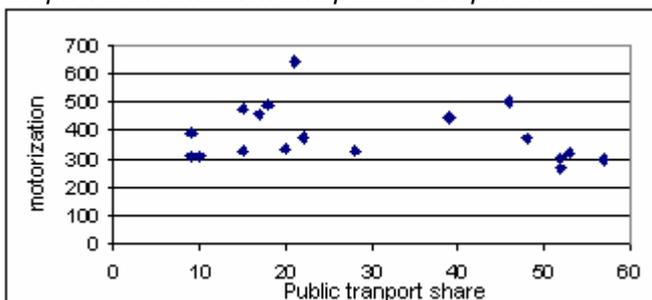
Remarks:

The use of public transport systems most probably depends on more than the price factor. Besides that, only prices for a one-way ticket in the city centre were used in this analysis.

3.5.3 Public Transport share and motorisation**Hypothesis:**

The higher the motorisation, the smaller the modal split share of the public transport system.

It could be assumed that a high number of vehicle owners indicate a high number of vehicle uses.

Analysis:*Graph 11: motorisation and public transport share***Result:**

There is no obvious linear relationship.

3.6 Long distance traffic-junction

The following types of long distance traffic-junctions were listed in the data chart:

- Main railway junction;
- Shipping transport hub;
- Inland navigation junction;
- Air transport hub;
- Road transport hub

The cities can be categorized by the existence of long distance traffic junctions in or near the cities as follows:

Table 15: Long distance traffic junctions and CIVITAS cities

City	With main railway junction	With air transport hub	With inland navigation junction	With shipping transport hub	With road transport hub
Aalborg					
Barcelona					
Berlin					
Bremen					
Bristol					
Bucharest					
Cork					
Göteborg					
Graz					
Gdynia					
Kaunas					
Lille					
Nantes					
Pécs					
Prague					
Rome					
Rotterdam					
Stockholm					
Winchester					

Cities with less than three types of long distance traffic junctions are marked light yellow;

Cities with at least three types of long distance traffic junctions are marked yellow.

Cities with more than three types of long distance traffic junctions are marked red.

There are four categories of cities: cities with low long distance traffic importance (Aalborg, Bristol, Graz, Kaunas, Nantes); cities with medium long distance traffic importance (Barcelona, Bremen, Göteborg, Gdynia, Pécs, Winchester); cities with high long distance traffic importance (Berlin, Bucharest, Cork, Lille, Rome, Rotterdam, Stockholm); and finally cities with very high long distance traffic importance (Prague).

3.7 Per-head GDP

To standardize the cities according to their per-head GDP, category-names will be defined in a first step:

- Very low GDP;
- Low GDP;
- Average GDP;
- High GDP;
- Very high GDP.

The classification of the cities follows the same approach as described in paragraph 4.228

The following category-sizes can be defined:

Table 16: GDP categories

	Category	Size Up to in€
1	Very low GDP	13,414
2	Low GDP	22,649
3	Average GDP	31,885
4	High GDP	41,120
5	Very high GDP	More than 41,120

With these categories the following distribution of cities to categories of per-head GDP is possible:

Table 17: Distribution of CIVITAS cities according to GDP categories

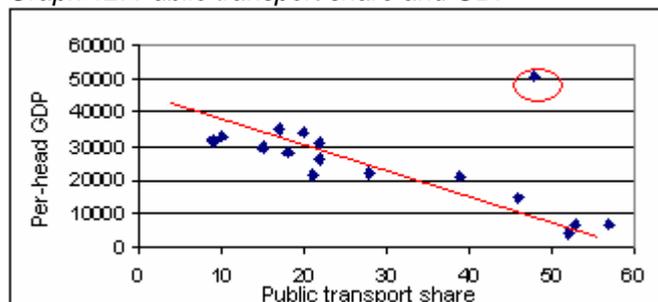
Very low	Low	Average	High	Very High
Bucharest	Barcelona	Bristol	Aalborg	Stockholm
Gdynia	Berlin	Cork	Bremen	
Kaunas	Prague	Graz	Göteborg	
Pécs	Rome	Lille		
		Nantes		
		Rotterdam		
		Winchester		

3.1.1 Per-head GDP und modal split share of public transport systems

Hypothesis:

The higher the per-head GDP the lower modal split share of public transport systems.

²⁸ Distance (ca.) = (50355 - 4179)/5 = 9235

Analysis:*Graph 12: Public transport share and GDP***Result:**

There seems to be a relationship between GDP and public transport share. However there is one exception. The city of Stockholm combines high GDP and high public transport share.

It can be presumed that the inhabitants of the CIVITAS cities generally prefer the use of a private vehicle in case the living standard (expressed in per head GDP) is high.

Remarks:

There is most probably more than one factor influencing the modal split. Especially the value for Stockholm shows that other factors most probably exist. Furthermore it has to be considered that the relationship between per head GDP and per-head income is an assumption.

3.8 Economic sectors

The following types of economic sectors have been listed in the data chart:

- Primary sector;
- Secondary sector;
- Tertiary sector.

In most of the CIVITAS cities a process of economic change took place therefore none of the cities is a common industrial city. Only Pécs has notable industries (coal mining) of recent dates in this sector.

The cities can be categorized by their main economic sector as follows:

Table 18: Economic sectors and CIVITAS cities

City	Secondary sector	Tertiary sector
Aalborg		
Barcelona		
Berlin		
Bremen		
Bristol		
Bucharest		
Cork		
Göteborg		
Graz		
Gdynia		
Kaunas		
Lille		
Nantes		
Pécs		
Prague		
Rome		
Rotterdam		
Stockholm		
Winchester		

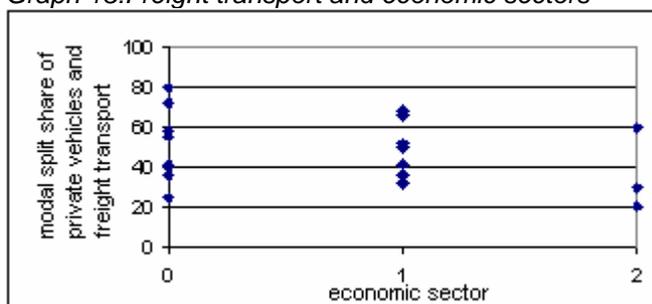
3.8.1 Economic sector and freight transport

Hypothesis:

Cities with a mainly secondary sector have a larger share of freight transports in the modal split.

Analysis:

Graph 13: Freight transport and economic sectors



0 = City with mainly tertiary economic sector.
 1 = City with mixed secondary and tertiary economic sector.
 2 = City with mainly secondary economic sector.

Result:

The modal split share of private vehicles and freight transport differs in the CIVITAS remarkable. Because there were no data for the share of freight transport available - only data for the sum of

freight transport and private vehicles have been provided by the statistics – the data can not be interpreted.

3.9 Special political or cultural function of city

The following possible political and cultural functions have been listed in the data chart:

- State capital;
- Provincial capital;
- University town.

The cities can be categorized by their function as follows:

Table 19: Cultural function and CIVITAS cities

City	State capital	Provincial capital	University city
Aalborg			
Barcelona			
Berlin			
Bremen			
Bristol			
Bucharest			
Cork			
Göteborg			
Graz			
Gdynia			
Kaunas			
Lille			
Nantes			
Pécs			
Prague			
Rome			
Rotterdam			
Stockholm			
Winchester			

3.10 Two additional city-categories

On the basis of the data analysis two further city categories can be formed.

3.10.1 Operation of a metro system:

The analysis of the population number and existence of a metro system in the CIVITAS cities (section 4.1.2) shows that in addition to the four population-related city categories a further category could be established.

The fact that all CIVITAS cities with a population of more than 595,000 inhabitants operate a metro system indicates two aspects: i) the demand for a public transport system becomes so big as from a certain number of inhabitants, that the operation of a transport system with the capacity of a metro becomes necessary; ii) a metro system can be operated economically only as from a certain population figure.

3.10.2 Former eastern bloc cities:

The analysis of the public transport share in the CIVITAS cities (see previous sections) shows that the public transport shares of the cities Gdynia, Kaunas, Pécs, Prague and Bucharest are relatively high. These five cities have the following characteristics in common: all cities are former eastern bloc cities; all cities have a low per-head GDP; all five cities (except Prague) have a very low motorisation rate.

3.11 Summary and conclusions

The past sections show clearly that a general categorisation of the CIVITAS cities is hardly possible. The cities are very different and heterogeneous. Table 20 shows the results of different categorisation approaches (population, area, population density, motorisation, motorisation density, non-motorised transport, public transport, private transport and GDP). It is possible to pool cities within the different categories into sub-categories (very low, low, medium, high, very high). However the composition of cities and the number of cities within the sub-categories differ from category to category. No homogeneous picture can be painted. The results of the categorisation process can be summarised as follows:

Population size of the cities: the result shows that within CIVITAS I the focus is on large cities.

Area size of the cities: unlike the population size the focus is on small cities. The combination of both factors leads to high *population density* figures. Although the cities are distributed among all sub-categories, there is about one quarter of cities with extraordinary high population density figures.

Motorisation: the result is impressive: CIVITAS cities have low motorisation figures. Only two cities display a motorisation figure of 500 and higher.

Motorisation density: the picture is different from motorisation. The CIVITAS cities can be grouped into three main groups – in about half of the cities the vehicle density is low and very low; in about 20 % of the cities the density is average; whereas in 25% of the cities the density is very high.

Modal split: the CIVITAS cities are equally grouped in the *non-motorised transport* categories. An exception is the sub-category ‘very high share of non-motorised transport’ in which only two cities are grouped.

Public transport: the CIVITAS cities can be grouped into two main groups: about two third of the cities belong to the categories 'very small and small' share of public transport; about one third of the cities belongs to the categories 'high and very high' share of public transport.

Share of private and freight transport: the cities are unequally distributed among the categories. About half of the cities show a small and very small share and about one fifth of the cities show a high share of private vehicles and freight transport.

Economy: GDP the cities are distributed among all categories whereas the cities with very low, low and average GDP dominate (80%).

Table 20 : summary of categorisation

City	City population	City area	Population density	Motorisation	Motorisation density	Non Motorised transport	Public transport	Private and freight transport	GDP
Aalborg	low	average	average	average	low	average	average	low	average
Barcelona	very high	average	low	average	average	average	average	average	low
Berlin	very high	average	very high	average	very high	average	low	average	low
Bremen	average	average	average	average	average	very high	average	low	average
Bristol	average	average	very high	low	very high	average	low	average	average
Bucharest	very high	average	very high	average	very high	average	very high	average	average
Cork	average	average	very high	average	average	low	average	very high	average
Göteborg	average	average	low	average	average	average	low	average	average
Graz	average	very high	average	average	average	average	average	average	average
Gdynia	average	average	average	average	low	average	very high	low	average
Kaunas	average	average	average	average	average	low	very high	average	average
Lille	very high	low	average	low	average	average	low	average	average
Nantes	average	average	average	average	low	average	average	average	average
Pécs	average	average	low	average	average	average	very high	low	average
Prague	very high	very high	average	average	low	average	average	average	low
Rome	very high	very high	average	very high	very high	low	average	average	low
Rotterdam	average	average	average	average	low	very high	average	low	average
Stockholm	average	average	very high	low	very high	low	very high	low	very high
Winchester	average	average	low	average	low	average	average	very high	average

Legend

Very low	low	average	high	very high
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Finally, some relationships could be identified such as between public transport share and GDP and population size, price of parking and public transport, price of tickets, vehicle density and speed. However the results should be treated carefully especially because always exemptions exist as the cities Gdynia, Kaunas, Pécs, Prague and Bucharest show for public transport.

4 Which data have been used?

The following data charts show 1,094 researched data for 55 features from the areas of demography, transport, economy, politics, culture, geography and climate. If not stated differently the data refer to the core city.

The following abbreviations are used in the tables, explanations see chapter 1.3:

xxx: no data available
 prov.: provincial capital
 st.c.: state capital
 uni.: University town
 rail.: main railway junction
 sea: shipping transport hub
 inj.: inland navigation junction
 air.: air transport hub
 stre.: road transport hub
 inh.: inhabitants

4.1 Demographic characteristics

Table 21: Population related to country and urban hinterland of the city

city	country			urban hinterland of city		
	country	population of country (thsd., 2005)	total population of cities in country (thsd., 2005)	population (thsd., 2005)	population density in urban hinterland	population in urban hinterland in relation to population in core city
Aalborg	Denmark	5,431	4,646	333	1,247.19	2.06
Barcelona	Spain	43,064	33,015	2,999	386.72	2.00
Berlin	Germany	82,689	73,158	814	46.77	0.24
Bremen	Germany	82,689	73,158	580	110.81	1.07
Bristol	Great Britain	59,668	53,245	604	455.16	1.59
Bucharest	Romania	21,711	11,871	1,404	923.08	0.7
Cork	Ireland	4,148	2,505	189	304.84	1.55
Goteborg	Sweden	9,041	7,543	133	45.55	0.28
Graz	Austria	8,189	5,389	131	106.09	0.58
Gdynia	Poland	58,530	23,899	545	1557.14	2.14
Kaunas	Lithuania	3,431	2,286	82	49.61	0.22
Lille	France	60,496	46,389	52	47.27	0.05
Nantes	France	60,496	46,389	157	300.77	0.28
Pécs	Hungary	10,098	6,657	25	43.86	0.15
Prague	Czechia	10,220	7,616	772	110.65	0.66
Rome	Italy	58,093	39,224	1,453	274.15	0.57
Rotterdam	Netherlands	16,299	10,891	605	507.12	1.02
Stockholm	Sweden	9,041	7,543	900	138.27	1.21
Winchester	Great Britain	59,668	53,245	73	112.38	2.28

Table 22: Population related to the city

city	City				
	population (thsd., 2001)	population density (inh./sq.km)	Population change	City share related to the total population in country (%)	City share related to the urban population in country (%)
Aalborg	162	1,841	0.21	2.98	3.49
Barcelona	1,501	1,515	0.2	3.49	4.55
Berlin	3,386	3,800	0	4.09	4.63
Bremen	541	1,701	-0.29	0.65	0.74
Bristol	380	3,455	-0.16	0.64	0.71
Bucharest	1,996	8,387	-2.6	9.19	16.81
Cork	122	3,297	0.3	2.94	4.87
Goteborg	467	994	0.78	5.17	6.19
Graz	226	184	-2.2	2.76	4.19
Gdynia	255	1,932	-0.3	0.44	1.07
Kaunas	379	2,414	-1.46	11.05	16.58
Lille	1091	1,789	0.5	1.8	2.35
Nantes	554	2,995	0.4	0.92	1.19
Pécs	162	1,000	-0.32	1.6	2.43
Prague	1,169	910	-0.3	11.44	15.35
Rome	2,547	1,982	-0.9	4.38	6.49
Rotterdam	595	1,957	0.3	3.65	5.46
Stockholm	743	3,973	1	8.22	9.85
Winchester	32	1,231	-0.2	0.05	0.06

Table 23: city specific sex and age structure

city	city					
	Sex ratio			Age structure		
	male (thsd., 2001)	female (thsd., 2001)	ratio male/female	age group 0-19	Age group 20-64	Age group 65 and older
Aalborg	80	82	0.98	21.68	63.62	14.70
Barcelona	695	806	0.86	16.36	61.61	22.03
Berlin	1,644	1,742	0.94	18.44	66.54	15.02
Bremen	260	281	0.93	18.39	62.96	18.65
Bristol	185	195	0.95	24.52	60.59	14.89
Bucharest	934	1,062	0.88	19.97	66.07	13.96
Cork	59	63	0.94	29.00	60.82	10.18
Goteborg	229	238	0.96	21.23	62.20	16.57
Graz	106	120	0.88	18.90	64.07	17.03
Gdynia	119	136	0.88	21.82	64.44	13.74
Kaunas	171	208	0.82	25.36	61.58	13.06
Lille	523	568	0.92	25.32	62.02	12.66
Nantes	264	290	0.91	23.86	62.60	13.54
Pécs	75	87	0.86	21.77	63.06	15.17
Prague	554	615	0.90	19.30	64.46	16.24
Rome	1,199	1,348	0.89	17.31	63.65	19.04
Rotterdam	291	304	0.96	23.28	61.72	15.00
Stockholm	356	387	0.92	20.19	63.67	16.14
Winchester	15	17	0.88	23.35	60.81	15.84

Table 24: City specific economic data

City	City			
	Economically active population (thsd.)	Total economically active population (%)	Number of persons per household	Poverty rate
Aalborg	84	51.9	2.06	76.2
Barcelona	724	48.2	2.53	12.0
Berlin	1,708	50.4	1.82	20.3
Bremen	247	45.7	1.86	18.9
Bristol	288	75.8	2.31	11.5
Bucharest	826	41.4	2.67	9.8
Cork	50	41.0	2.35	xxx
Goteborg	226	48.4	1.87	xxx
Graz	113	50.0	2.06	5.7
Gdynia	165	64.7	2.51	xxx
Kaunas	191	50.4	2.42	0.0
Lille	468	42.9	2.38	16.0
Nantes	253	45.7	2.32	12.3
Pécs	66	40.7	2.53	22.5
Prague	632	54.1	2.15	19.4
Rome	1,104	43.3	2.45	11.3
Rotterdam	281	47.2	2.05	24.0
Stockholm	365	49.1	1.62	13.0
Winchester	24	75.0	2.14	12.5

4.2 Transport data

Table 25 : City specific motorisation and modal split

city	motorisation (vehicles / 1,000 inhabitants)	vehicle density (vehicles / sq.km city area)	modal split			
			non-motorised	public transport	private vehicles and freight transport on street	modal split check
Aalborg	310	571	24	10	66	100
Barcelona	447	677	36	39	25	100
Berlin	330	1,254	32	28	40	100
Bremen	459	781	42	17	41	100
Bristol	371	1,282	10	22	68	100
Bucharest	302	2,533	28	52	20	100
Cork	309	1,019	19	9	72	100
Goteborg	333	331	30	20	50	100
Graz	488	90	30	18	52	100
Gdynia	300	580	7	57	36	100
Kaunas	320	772	15	53	32	100
Lille	378	676	23	22	55	100
Nantes	475	540	25	15	60	100
Pécs	268	268	12	52	36	100
Prague	501	456	24	46	30	100
Rome	645	1,278	21	21	58	100
Rotterdam	327	645	44	15	41	100
Stockholm	372	1,478	16	48	36	100
Winchester	392	482	11	9	80	100

Table 26: City specific public transport data

city	modes of public transport	public transport performance	
		km/ year (thsd.)	persons / year (thsd.)
Aalborg	bus	328,000	15,300
Barcelona	metro, tram, suburban rail, bus	99,264	90,000
Berlin	metro, city railway, tram, suburban rail, bus	250,000	1,200,000
Bremen	bus, tram	22,000	142,350
Bristol	bus	xxx	xxx
Bucharest	metro, bus, trolley-bus, tram	97,000	969,000
Cork	bus	xxx	xxx
Goteborg	bus, tram, ferry, regional railway	xxx	117,895
Graz	bus, tram	xxx	100,000
Gdynia	trolley-bus, bus	xxx	xxx
Kaunas	trolley-bus, bus, suburban rail	xxx	85,950
Lille	metro, bus, tram	xxx	42,000
Nantes	bus, tram,	xxx	18,000
Pécs	bus	xxx	xxx
Prague	bus, metro, tram	156,889	1,160
Rome	bus, metro, tram, boat	xxx	1,199
Rotterdam	metro, bus, tram, ferry	xxx	2,530
Stockholm	bus, city railway, metro	xxx	1,200
Winchester	bus	7,240	xxx

Table 27: City specific commuter share

city	Commuter share				
	commuters into city, percentage of city population	commuters into city, total	commuters out of city, percentage of city population	commuters out of city, total	travel time to work (min.)
Aalborg	9	14,000	4	6,000	18
Barcelona	8	xxx	6		27
Berlin	6	191,000	6	113,000	31
Bremen	18	99,000	5	29,000	24
Bristol	22	83,000	18	45,000	29
Bucharest	15	xxx	0	xxx	48
Cork	xxx	xxx	xxx	xxx	20
Goteborg	20	94,000	4	21,000	23
Graz	xxx	xxx	xxx	xxx	21
Gdynia	xxx	xxx	xxx	xxx	xxx
Kaunas	xxx	xxx	xxx	xxx	xxx
Lille	8	86,000	3	37,000	xxx
Nantes	10	57,000	4	22,000	xxx
Pécs	9	15,000	2	4,000	49
Prague	14	163,000	2	29,000	37
Rome	xxx	xxx	xxx	xxx	32
Rotterdam	30	178,000	14	84,000	33
Stockholm	38	281,000	10	77,000	30
Winchester	xxx	xxx	xxx	xxx	xxx

Table 28: City specific speed and price data

city	average speed - bus (km/h)	average speed - private vehicle (km/h)	price for public transport (lowest one way fare in city centre)	Park&Ride lots per 1,000 inhabitants	price for parking (€/h in city centre, working day)
Aalborg	13	30	1.71	xxx	0.67
Barcelona	12	30	0.87	2.0	1.42
Berlin	19	25	2.04	1.6	1.00
Bremen	22	27	1.35	2.5	1.00
Bristol	18	22	0.82	xxx	1.60
Bucharest	14	20	0.31	xxx	xxx
Cork	xxx	xxx	1.2	7.7	1.60
Goteborg	22	28	3.11	xxx	2.70
Graz	15	20	1.7	3.8	1.20
Gdynia	xxx	xxx	0.57	xxx	xxx
Kaunas	xxx	xxx	0.43	xxx	xxx
Lille	xxx	xxx	1.25	xxx	0.90
Nantes	23	29	1.3	xxx	1.00
Pécs	19	35	0.28	xxx	0.70
Prague	17	25	0.5	xxx	0.86
Rome	15	18	1.00	3.9	1.04
Rotterdam	xxx	16	1.60	xxx	0.80
Stockholm	xxx	xxx	2.19	xxx	2.90
Winchester	xxx	xxx	1.34	24.5	1.03

4.3 Economy, politics and culture

Table 30: City specific economic and cultural data

city	per-head GDP per year of city (€)	Economic sectors	special political or cultural function of city	number of theatres	number of museums	number of tourists staying over night per year (thsd.) (average from 1999-2003)
Aalborg	32762	sec., tert.	prov., uni	3	5	xxx
Barcelona	20871	tertiary	prov., uni	46	40	8,204
Berlin	22159	tertiary	st.c., prov., uni.	60	165	10,757
Bremen	34711	sec., tert.	prov., uni.	17	22	1,076
Bristol	30790	sec., tert.	uni.	8	9	xxx
Bucharest	4237	secondary	st.c., uni.	19	31	927
Cork	31496	tertiary	uni.	xxx	xxx	xxx
Goteborg	34130	sec., tert.	prov., uni.	6	5	1,971
Graz	28086	sec., tert.	prov., uni	8	9	620
Gdynia	6703	sec., tert.	uni.	1	6	xxx
Kaunas	7029	sec., tert.	uni.	3	11	122
Lille	26018	tertiary	prov., uni	xxx	xxx	2,004
Nantes	29030	secondary	prov.,	xxx	xxx	1,438
Pécs	4179	secondary	prov., uni	3	24	297
Prague	14860	secondary	st.c., prov., uni.	55	88	8,149
Rome	21225	tertiary	st.c., uni.	xxx	53	22,013
Rotterdam	29587	tertiary	uni.	14	29	840
Stockholm	50355	tertiary	st.c. uni.	44	64	4,204
Winchester	31840	tertiary	prov.	xxx	xxx	xxx

Table 31: City specific transport related data

city	Number of headquarters of national corporations	long-distance-traffic junction	harbour	airport	
			yes / none open sea or inland port	yes / none	Air passengers / year (thsd.)
Aalborg	9	none	sea	yes	682
Barcelona	xxx	rail, air	sea	yes	2,450
Berlin	xxx	rail, inj, stre.	inland	yes	9,000
Bremen	8	rail, sea	sea	yes	1,700
Bristol	12	rtj.	sea	yes	560
Bucharest	xxx	rail, air, stre.	none	yes	3,000
Cork	xxx	air, sea, stre	sea	yes	2,700
Goteborg	27	rail, sea	sea	yes	270
Graz	1	rail, stre.	none	yes	893
Gdynia	0	none	sea	none	-
Kaunas	xxx	stre.,	inland	yes	500
Lille	17	rail., inj., stre.	inland	yes	2,000
Nantes	8	none	sea	yes	2,500
Pécs	1	rail	none	yes	150
Prague	xxx	rail, air, inj, stre	none	yes	6,000
Rome	557	rail, air, stre.	near sea port	yes	20,000
Rotterdam	11	rail, sea, stre.	sea	yes	1,000
Stockholm	130	rail, air, sea	sea	yes	1,300
Winchester	xxx	rail	none	none	-

4.4 Geography

Table 32: City specific geographical data

City	city area(sq. km)	area - urban zone of city (sq. km)	geographical context	natural traffic route (river, coast etc.)
Aalborg	88	267	plain	fjord
Barcelona	991	7,755	plain, forest	coast
Berlin	891	17,405	plain, forest	river
Bremen	318	5,234	plain	river => coast
Bristol	110	1,327	plain	coast, bay
Bucharest	238	1,521	plain, forest	-
Cork	37	620	plain	river => coast
Goteborg	470	2,920	plain, forest	coast, bay
Graz	1,228	1,228	mountains, forest	river
Gdynia	132	350	plain	coast, bay
Kaunas	157	1,653	plain	river
Lille	610	1,100	plain	river => coast
Nantes	185	522	plain	river => coast
Pécs	162	570	hills	-
Prague	1,285	6,977	hills	river
Rome	1,285	5,300	hills	river
Rotterdam	304	1,193	plain	river => coast
Stockholm	187	6,488	plain, forest	fjord
Winchester	26	647	plain	-

4.5 Environment and climate

Table 33: City specific environmental data

city	pollutants		climate		
	Summer smog	total CO-emissions (average 1999-2003)	average number of days of rain per annum	average temperature on coldest month of year (Celsius)	average temperature on warmest month of year (Celsius)
Aalborg	8	3,795	198	1.0	16.0
Barcelona	xxx	1,000	83	9.2	25.6
Berlin	14	xxx	130	-0.1	19.5
Bremen	5	xxx	204	1.4	18.7
Bristol	1	94,186	188	5.1	18.1
Bucharest	xxx	xxx	xxx	1.4	24.6
Cork	0	xxx	257	3.0	19.0
Goteborg	xxx	80,000	xxx	0.8	16.5
Graz	49	xxx	121	-6.0	20.5
Gdynia	xxx	xxx	xxx	-0.6	19.3
Kaunas	xxx	690	xxx	-5.5	20.9
Lille	2	xxx	xxx	4.5	18.7
Nantes	0	xxx	xxx	5.2	19.9
Pécs	1	7,457	91	-1.1	21.7
Prague	3	32,420	187	-1.0	20.3
Rome	10	xxx	69	11.2	32.5
Rotterdam	xxx	30,289	208	3.2	18.5
Stockholm	xxx	27,000	xxx	0	16.2
Winchester	xxx	xxx	xxx	4.8	18.5

5 References

Books

Wagner, Helmut (2006): Skript zur Vorlesung „Makroökonomie“ SS06, FernUniversität in Hagen

Häussermann, Hartmut (2005): „Großstadt: soziologische Stichworte“, VS Verlag,

Bortz, Jürgen (1993): „Statistik für Human- und Sozialwissenschaftler“, Springer Verlag

Pacione, Michael (2001): „Urban Geography, a global perspective“, Verlag Routledge

Internet sources:

www.civitas-initiative.org; Access: 04.05.2006

<http://www.trendsetter-europe.org>; Access: 05.05.2006

<http://www.miraclesproject.org>, Access: 05.05.2006

<http://www.vivaldiproject.org>; Access: 10.05.2006

<http://www.tellus-cities.net>; Access: 04.05.2006

<http://www.verkehrsplanung.tu-berlin.de/download/TELLUS.pdf> Access: 14.07.2006

<http://www.trendsetter-europe.org/> Access: 14.07.2006

http://www.civitas-initiative.org/city_map.phtml?lan=en; Access: 14.07.2006

Internet presences of cities and public transport institutions:

www.aalborg.dk; Access: 04.06.2006

www.visitaalborg.com; Access: 04.06.2006

www.bcn.es; Access: 04.06.2006

<http://www.tmb.net/> ; Access: 04.06.2006,

www.berlin.de; Access: 04.06.2006

www.bvg.de; Access: 04.06.2006

www.bremen.de; Access: 12.06.2006

www.bsag.de;

www.bristol-city.gov.uk; Access: 12.06.2006

<http://www.firstgroup.com>; Access: 12.06.2006

www.corkcity.ie; Access: 12.06.2006, 12:30

www.goteborg.se; Access: 12.06.2006

www.graz.at; Access: 12.06.2006

www.gvb.at; Access: 12.06.2006:

eks.kaunas.lt/English; Access: 12.06.2006

www.mairie-lille.fr; Access: 12.06.2006

www.nantes.fr; Access: 12.06.2006

http://www.ungarn-tourismus.de/staedte_pecs.htm; Access: 12.06.2006

www.prague.cz; Access: 15.06.2006

<http://www.comune.roma.it>; Access: 15.06.2006

www.rotterdam.nl; access: 15.06.2006

<http://www.stockholm.se/>; Access: 15.06.2006

www.stockholmtown.com; Access: 15.06.2006

www.winchester.gov.uk; Access: 18.07.2006

<http://en.wikipedia.org/wiki/Burgos>; Access: 25.3.2007

<http://www.aytoburgos.es/default.asp?contentid=0&nodeid=0>; Access: 25.3.2007

<http://portal.debrecen.hu/#>; Access: 25.3.2007

<http://www.comune.genova.it/index.jsp> ; Access: 25.3.2007

<http://www.krakow.pl/en/>; Access: 25.3.2007

<http://www.ville-larochelle.fr/>; Access: 25.3.2007

<http://www.ljubljana.si/en/>; Access: 25.3.2007

<http://www.malmo.se/servicemeny/cityofmalmo/thecitycouncil.4.33aee30d103b8f15916800024781.html>; Access: 25.3.2007

<http://www.norwich.gov.uk/>; Access: 25.3.2007

<http://www.odense.dk/>; Access: 25.3.2007

http://www.ploiesti.ro/en_index.php; Access: 25.3.2007

<http://www.comune.potenza.it/>; Access: 25.3.2007

<http://www.prestononline.com/>; Access: 25.3.2007

http://www.stuttgart.de/sde/menu/frame/ns_top_11021.htm; Access: 25.3.2007

<http://www.primariasv.ro/>; Access: 25.3.2007

<http://www.tallinn.ee/eng>; Access: 25.3.2007

http://www.uk.toulouse-tourisme.com/accueil/index_en.php; Access: 25.3.2007

<http://www.comune.venezia.it/flex/cm/pages/ServeBLOB.php/L/EN/IDPagina/1>; Access: 25.3.2007

Databases:

Schreiber, Marcel (2005), „Metropolis Indikatoren“, FG Integrierte Verkehrsplanung, Technische Universität Berlin, unpublished

www.Leda.ils.nrw.de; Access: 22.07.2006

www.citizensnetwork.org/UK/download/commonindicators_de.pdf; Access: 28.04.2006

<http://epp.eurostat.ec.europa.eu>; Access: 20.04.2006

www.unhabitat.org; Access: 05.05.2006

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