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Stakeholders' Analysis of Environmental Sustainability in Urban Logistics: A Case Study of Tricity, Poland

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Abstract: Environmental sustainability, defined as the responsibility to protect the global ecosystem in a holistic way, has become an integral factor of city strategies. Designing and implementing environment-friendly solutions to make the standard of living in cities better is indispensable for present and future generations. This article's main objective is to identify the most environmentally friendly urban logistics measures from the perspective of urban transport system stakeholders. A multi-method approach was implemented to achieve the article's main findings. Firstly, the literature review provided the basics for designing the research framework. Then, a three-layer methodological approach was used: The first layer included designing and carrying out the case study approach; the second layer comprised a Delphi study involving interviews with urban logistics stakeholders; and the third layer included analyzing the voices of Delphi interviewees to assess which urban logistics measures are the most important for them. The study provides an initial insight into the opinions of stakeholders for a general audience, but at the same time, also presents specific, detailed views of Tricity urban space users and decision-makers. Significant differences in opinions were observed and confirmed in the interviewed group. This study can contribute to the scientific discussion about the stakeholders' analysis of urban logistics goals.

Keywords: urban logistics; stakeholders analysis; environmental sustainability; urban policy; urban planning

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1. Introduction

Many cities around the world have set an improvement in the environmental quality of their spaces as a goal in urban policies. Making urban areas more environmentally friendly goes much further than, e.g., reducing the emissions of harmful substances. The urban environment seems to be a complex and complicated system where environmental interventions on the public level, supported by agreements with all urban transport system stakeholders, must be conducted in pursuit of achieving the desired level of environmental quality [1,2]. Their voices allow a map of requirements, goals, and needs to be built and addressed by local and national authorities, local businesses, etc.

This study aims to identify the most environmentally friendly urban logistics measures from the perspective of various stakeholders. The agglomeration presented in this study is Tricity—one of the biggest agglomerations in Poland, and one of three where the trolleybus system exists (precisely in the city of Gdynia). as Additionally, many initiatives have been implemented in this agglomeration in relation to meeting the goals of environmental sustainability (e.g., cargo bikes and micromobility services).

This paper provides an initial insight for managing environmental sustainability in the Tricity area according to the city logistics stakeholders. The stakeholders' voice should be considered in defining many urban policies to improve the urban area and logistics system. The results presented in this paper show the main problems that stakeholders

face while being urban space users and their opinions on how to improve the situation. A special focus was placed on environmental sustainability since it has been a key feature of regional, national, EU, and global policies.

The remainder of the paper is as follows. Initially, the literature review provides the basics for designing the research framework. The authors present urban logistics (UL) characteristics and describe its stakeholders, and then provide various approaches to urban logistics initiatives and the value of sustainability in city logistics planning. In the methodology section, the three-layer approach is implemented. The first layer includes designing and carrying out a case study approach. The second layer comprises a Delphi study involving interviews with the urban logistics stakeholders. The third layer analyzes the voices of Delphi interviewees to assess which urban logistics measures are the most important for them. After describing all of the methods and techniques used, data gathering and analysis are presented. This part is followed by a section describing the research results. The article concludes with the research implications, limitations, and future research plans.

2. Urban Logistics Essentials and Stakeholders

Urban logistics (UL) has been investigated by numerous researchers for many years, but this area is still evolving because of the changes related to environmental and citizens' habits [3–5]. UL is interpreted by its objectives, mostly indicating the nuisance connected with urban transport issues, while supporting the sustainable development of urban transport areas. The first research papers on urban logistics issues were mainly focused on how to minimize adverse impacts on the environment and the cost of freight transport in cities. According to Taniguchi [6], urban logistics is "a process for totally optimizing the logistics and transport activities by private companies with the support of advanced information systems in urban areas considering the traffic environment, the traffic congestion, the traffic safety and the energy savings within the framework of a market economy". Later, more emphasis was placed on the stakeholders' cooperation, as one of the main factors for the effective implementation of new solutions in urban freight transportation [7,8]. According to this approach, urban logistics was associated with freight transportation issues and was thus a point of interest of private businesses. Then, among the urban logistics' actors, the role of public authorities started to be analyzed [9,10].

Nowadays, much review-based research has been conducted to analyze UL more precisely and widely [5]. According to these studies, the notion of UL is defined as a coordination process of all the flows within urban areas—freight and passengers [11–13]. More accurately, UL is defined as a set of practices related to the movements of things and people [14] and their management, which plans, organizes, implements, and controls the efficient flows and related information [15] in order to meet all urban transport system stakeholders' demands. Additionally, these practices aim to reduce or prevent commercial traffic and its adverse external effects [16].

It is worth emphasizing that the first-last mile (FLM) operations tend to be the most relevant approach to urban logistics issues. FLM is an informal notion related to the first and last steps of each transport operation that concerns public and private passenger mobility, as well as freight transport. FLM gained importance because of, firstly, being estimated as the most expensive part of each transportation process (from 28% to 75% of all costs) [17], and secondly, due to it being required to be safe, time-sensitive, cost-effective, and convenient [17–19].

Passengers' mobility that is related to urban public transport is mostly the responsibility of the public administration, so city logistics covering cargo and people flows should be a point of interest—at the same moment—of private and public stakeholders. However, according to the first approach to urban logistics issues, stakeholders of the urban transport system are most commonly associated with the transportation of freight. This is reflected by several literature sources treating them as devoted to freight flows [20–22]. In this context, according to the classical E. Taniguchi approach [23], stakeholders can be divided into the following groups:

- Freight carriers;
- Shippers;
- Residents;
- Administrators;
- Urban expressway operators.

In relation to the broader definition of the urban logistics notion, stakeholders are perceived as entities interested in decisions related to urban transport issues [21,22,24,25]. The stakeholders can be divided into several groups [26–28]:

1. Private:
    - Freight carriers;
    - Shippers;
    - Other entrepreneurs.
2. Public:
    - Authorities;
    - Public transport operators;
    - Residents;
    - Other traffic participants called city users.

Stakeholders may be most exhaustively described by their needs, aims, and scopes. They mainly differ concerning their private or public character and their kind of activity in the urban logistics system.

In the private stakeholders group, we can consider freight carriers, shippers, and other entrepreneurs. Freight carriers usually aim to obtain low-cost, but high-quality pick-up and delivery tours, satisfying the interests of the shipper and receiver [29,30]. Shippers' main aims are related to maximizing the profit [31]. Their intentions lead to providing services at the highest level of efficiency. Other entrepreneurs are represented by the private entities operating in the logistics sector; thus, their efficiency is their main scope.

As public actors in the urban transport system, authorities, public transport operators, residents, and other traffic participants can be classified.

Among authorities, we can consider the local government, as well as national authorities. Generally, they are interested in reducing numerous environmental nuisances and increasing road traffic safety [32]. In particular, local authorities focus on making the city attractive for residents and visitors by implementing, e.g., an effective and efficient transport system [33–35]. For the national government, the main issue is minimizing external effects from transport and maximizing economic benefits.

Public transport operators are most often the responsibility of the municipalities, but more particularly, it depends on the model of the public transport system applied in a particular case [36]. This is why, in universal models, there are options to provide the services themselves or contract the service out to private companies. In practice, this means that the public transport services may be provided by private or public companies [37].

City dwellers experience numerous urban freight transport nuisances, so they are interested in the most sustainable and environmental friendly urban transport system [29]. They share similar problems to other traffic participants because of sharing the same infrastructure, so their aims are homogenous [21]. Visitors and tourists are included in this group because of being affected by urban freight transport [22].

Additionally, stakeholders of the urban transport system can be characterized by heterogeneous scopes regarding the sustainability approach (see Table 1). Freight carriers, shippers, and other entrepreneurs represent private capital and thus are determined to maximize their profits. Therefore, this stakeholder group's main scope is closest to economic sustainability [38–40].

Table 1. Urban transport system stakeholders' objectives.

Sustainability of the Urban Transport System		
Economic	**Environmental**	**Social**
freight carriers	authorities	authorities
shippers	PT operators	PT operators
other entrepreneurs	residents	residents
	other users	other users

Authorities represent environmental and social objectives, but at a lower level—in efforts to provide high quality and available public transport services to city dwellers [38–42].

Public transport operators are most often controlled by the municipalities, because of being dependent on subsidies from the municipality budget. Consequently, their main scopes are closest to social sustainability [38–42].

The residents and other urban transport users are most interested in the highest quality of life in cities and in the best availability of public transport (PT), which can be placed within the scope of social sustainability. The environmental issues receive attention in a long-term perspective [38–42].

The fundamental aspect in city logistics processes is to take into account all city logistics stakeholders' views and decisions as components of the integrated urban transport system, so that decision-makers are considering and implementing urban logistics measures from the perspective of present and future generations' needs.

3. Urban Logistics Measures

In order to mitigate the external effects of urban transport (being a part of urban logistics), a range of goals have been set for working towards a more sustainable urban transport system [43,44]. The European policy within these issues is focused on promoting various urban logistics measures taking into consideration sustainable urban mobility issues in the planning procedures [45,46]. The European Union member countries were previously obliged to prepare Sustainable Urban Mobility Plans (SUMPs), the main aim of which was to, among others, address issues connected to the urban transport systems. According to the official definition, SUMP is "a strategic plan designed to satisfy people and businesses' mobility needs for a better quality of life. It builds on existing planning practices and takes due consideration of integration, participation, and evaluation principles" [45–47].

Numerous authors have conducted investigations of urban transport solutions. The most frequently proposed categorizations are based on the criteria related to the area of regulation, the entity that is responsible for regulations, and the party that is obliged to fulfill them. The classification of urban logistics solutions proposed by Russo and Comi [48] focuses on measures related to material infrastructure, immaterial infrastructure, equipment, and governance of the traffic network. According to van Rooijen and Quak [49], urban logistics measures can be divided with regard to the CIVITAS (Clean and Better Transport in Cities) initiatives implemented in European cities for eight clusters: Public passenger transport; mobility management; urban freight logistics; clean fuels and vehicles; demand management strategies; safety and security; car-independent lifestyles; and transport telematics.

Categorization was also conducted by Papoutsis and Nathanail [50], where six clusters of city logistics measures were established, being characterized by various scopes and urban logistics elements: New distribution and logistics models for operators (e.g., consolidation schemes and off-peak deliveries); infrastructure development and vehicle characteristics (e.g., ICT and distribution centers); access control; regulations for enabling activities (e.g., parking regulations); enforcement; routing optimization (e.g., eco-driving); and training capacity sharing (e.g., use of existing infrastructure or vehicles for multiple operators) [50].

In terms of the categorizations identified in the literature and on the basis of the practical solutions applied in European countries, the improvement in city logistics may relate to the following areas [51]:

- Material infrastructure-related measures;
- Immaterial infrastructure-related measures;
- Regulatory measures;
- Cooperation-related measures;
- Environmental measures.

Material infrastructure-related measures are assessed as the most effective solution set in urban mobility management, by firstly identifying areas of conflicts between freight activities, passengers' mobility, and other land uses, and by secondly creating unique and dedicated infrastructure. The initiatives connected to the material infrastructure are the following [52–54]:

- Inner logistics centers, e.g., distribution centers dedicated to collecting shipments before last-mile transport;
- Dedicated parking places—preparing special lanes for loading and unloading trucks;
- Bus lanes for certain freight vehicles—place for transshipment from long-distance to short-distance (urban) traffic where consignments can be sorted and bundled;
- Loading and unloading zones—solutions for many dense urban areas, providing dedicated zones for handling freight;
- E-commerce pick-up points—enabling transporters to deliver parcels to single locations without having to go from door to door.

In the immaterial infrastructure group, solutions are related to the latest technologies and connected to the organizational initiatives that aim to make the urban freight transport more sustainable. The role of new technologies can be applied in different solutions, such as [55,56]

- The intelligent transport system;
- The advanced traffic management system;
- The advanced vehicle control system;
- The advanced traveler information system.

In the organizational area, the most common initiatives are alternative transportation means using

- Off-peak deliveries,
- Capacity sharing solutions (use of existing infrastructure and vehicles for multiple operators).

Most of the regulatory measures related to urban logistics are applied in European countries as the best type of solution to reduce the externalities. They can refer to [50,57]

- Parking regulations;
- Road-pricing solutions;
- Subsidies;
- Tax reductions;
- Incentives to optimize the transport efficiency;
- Delivery time windows;
- Restricted access to certain areas, based on different criteria for vehicles;
- Time slots—solution refers to a situation when certain vehicles can enter certain streets;
- Exclusivity zones—consisting of limiting the number of transporters that can perform deliveries.

Cooperation-related measures are connected to the agreements and unions between the urban transport system stakeholders. Without cooperation and understanding amongst stakeholders, it is impossible to implement long-term solutions to urban logistics problems. Stakeholder engagement is becoming recognized as an essential part of any decision-making process [29,58]. Successful collaborative partnerships between particular stake-

holders can lead to the formulation of high impact freight strategies that consider the logistical needs of the city, businesses, transport operators, and local residents. Urban logistics solutions that are related to engaging various stakeholder groups [51]:

- Freight quality partnerships that bring together the public and private sector to discuss problems, and identify and implement solutions within freight transport activities;
- Freight advisory boards and forums are an opportunity for stakeholders to meet and discuss challenges and chances of the freight space within the city;
- City logistics manager functions.

Environmental measures' [59,60] intention is to promote eco-friendly and sustainability in urban logistics by applying, e.g.,

- Eco-driving;
- Greener trucks;
- Alternative, zero-emission means of transport.

National governments, as well as municipalities, in spite of being supported by dedicated European Union funds, usually address the urban logistics measures' effectiveness. The main reason of such problems can be found, firstly, in the lack of considering the urban transport system as a whole with the integration of freight transport and passenger mobility [48], and secondly, in the lack of assessment of the urban logistics solutions prior to their implementation.

4. Sustainability in Urban Logistics

All logistical activities that occur within city areas should be adapted to sustainable development requirements [61]. According to the 1980 World Conservation Strategy [62], the concept of sustainability can be defined as a development that allows ecosystem services and biodiversity to be sustainable [63]. Then, in the Brundtland Report in 1987 [64], sustainability was additionally described as "a kind of a development that meets the needs of the present without compromising the ability of future generation to meet their own needs" [64]. Later, in 1992, during the UN Conference on Environment and Development in Rio de Janeiro, Brazil, sustainability was finally defined as a multidimensional concept consisting of the three pillars [65–67]:

- Social equity;
- Economic growth;
- Environmental protection.

Considering sustainability development as a three-dimensional notion, the question of whether these three factors are provided with equal support may be raised. International organizations and institutions indicate that the environmental issues are prerequisite conditions for social justice and economic development [68]. Therefore, environmental sustainability has become an integral factor in strategy planning in private companies [69]. Environmental sustainability is defined as "a condition of balance, resilience and interconnectedness that allows human society to satisfy its needs while neither exceeding the capacity of its supporting ecosystems to continue to regenerate the services necessary to meet those needs nor by our actions diminishing biological diversity" [70].

Providing clean water, clean air, or productive and clean land should be the basis of a responsible socio-economic system. Furthermore, a sustainable production environment providing a raw material base is a prerequisite for building a sustainable society [70–73].

Environmental sustainability has become more and more important for different stakeholders and in the next part of the study, UL measures will be analyzed from this perspective. According to the existing research and on the basis on the environmental performance index (EPI), which was employed to evaluate the environmental sustainability of countries all over the world [74], a set of criteria was developed (see Table 2) and then used to examine the environmental sustainability of the urban logistics measures implemented in the Tricity area.

Table 2. Environmental sustainability criteria in the research framework.

No.	Category (UN)	Criterion (Category in EPI UN)	Sub-Criterion (Urban Logistics Environmental Sustainability)	Description
1	ENVIRONMENTAL HEALTH	HEALTH IMPACT	Increasing the quality of life	Focus on implementing rules, documents, and practices focused on improving the quality of life
2			Informing about health benefits	Marketing focused on the popularization of knowledge on the health impact of car transport and benefits of using active transport modes (e.g., micromobility)
3			Improving safety	Establishing procedures about safety in road and non-road transport (e.g., safety of pedestrians) within a metropolitan area
4			Reducing noise (for people)	Using quiet transport modes, controlling noise, and informing about noise level. Defining the instruments (including regulations) aimed at decreasing the noise level for city residents and other users
5		AIR QUALITY	Less traffic and congestion	Decreasing the level of traffic and congestion by the differentiation of transport modes
6			Reduction of harmful substance emissions	Implementing procedures aimed at achieving an increase in choosing zero- or low-emission transport modes (emission to air) or vehicles by city users
7	HYBRID	WATER QUALITY AND RESOURCES	Reduction of harmful substance emissions	Implementing procedures aimed at achieving an increase in choosing zero- or low-emission transport modes (emission to water), e.g., public transport, active modes (cycling and walking), and micromobility
8	ECOSYSTEM VITALITY	CLIMATE AND ENERGY	Using renewable fuels and other energy sources	Using energy sources (including fuels) producing no greenhouse gas emissions and reducing some types of air pollution
9			Fewer environmental losses	Fewer losses for the environment (e.g., in the area of changing the temperature) by reducing waste, reusing, and recycling rules' implementation
10			Effective use of resources	Activities aimed at reducing the use of non-renewable resources and restoring renewable ones (e.g., green city areas)
11		BIODIVERSITY AND HABITAT	Reducing noise (for animals)	Using quiet transport modes, recording and controlling noise, preparing restrictions for noise pollutants, and informing about the impact of noise on animals
12			Less waste	Less waste caused by decreasing the use of individual modes of transport, especially a car
13		NATURAL CULTURE PRESERVATION	Strategy of cooperation in environmental issues	Effective information campaigns and competitions, as well as cooperation on local and regional scales (e.g., between local authorities), leading to partnerships between the public and private sector

5. Methods

5.1. Research Framework

This research was focused on examining the voices of urban logistics stakeholders in the area of environmental sustainability. The research framework was designed in three layers to precisely describe the research focus and intended results (see Table 3). An initial sources review (including a literature review) allowed the research gap to be found. Then, the research goal was operationalized, the criteria were identified and sorted out for assessing the research field (to reach the goal), and finally, the research methods which have been used in similar research were analyzed. Following this, the case study was designed (Phase I), followed by Delphi interviews (Phase II), and consequently, statistical analysis (Phase III). Therefore, this study was designed to be exploratory [75] and deductively oriented [76]. Mixing qualitative and standardized quantitative measures may reduce potential bias in the final results [77].

Table 3. Research framework.

Step	Input(s)	Method(s)/Approach(es)	Tool(s)	Outcome(s)	Section of the Paper
INITIAL PHASE—Sources review					
1. Defining the research characteristics	Literature sources Other sources	Literature review (Snyder's approach) Other sources review	Sources review report	Research gap Research goal, research questions Criteria for further assessment (Table 2) Methods for empirical research	1–4
PHASE I—Case study					
2. Preparing the case study	Outcomes of step 1	Case study method (Yin's approach)	Case study protocol	Case study schedule and plan	5.1., 5.2.
3. Conducting the case study	Outcome of step 2			Filled case study protocol	5.2., 6, 7
PHASE II—Delphi interview					
4. Preparing the interview questionnaire	Outcome of step 3	Delphi interview method	Questionnaire template Delphi interview rules and standards	Target groups list List of contact data Interview questionnaire Recruitment procedure	5.1., 5.3.
5. Recruiting the group and conducting the interview	Outcome of step 4		Outcomes of step 4: Target group list and recruitment procedure	List of participants Report on interview results	5.3., 7
PHASE III—Data analysis					
6. Planning statistical analysis	Outcome of step 5	Acquired knowledge and procedures	Algorithm of choosing method according to data types	List of chosen statistical methods	5.1., 5.4.
7. Conducting and reporting statistical analysis	Outcome of step 6	ANOVA Kruskal–Wallis test U Mann–Whitney test	Statistical software	Report on research results	7
8. Concluding the results	Outcome of step 7	Deduction	Paper template	Manuscript proposal	All, but especially 8

Some of the elements of the research approach overlapped with each other because of their specifics. Taking into consideration the Snyder's approach to the literature review [78] and R.K. Yin's approach to designing the case study [79,80], identification of the research problem or research gap was one of the steps, but for the literature review, it was a final one (a result of the review) and for the case study, it was a first step. Therefore, they supplemented each other very well. A similar situation applied to the case study method, Delphi interview, and statistical analysis—the end part of the case study should be preparing results and modifying the theory (or building a new one). In the study, this role was assigned to statistical analysis and was a result of using Delphi interviews. Statistical analysis verified, to some extent, the characteristics provided for Tricity by the documents and actions characterized in detail in Section 6.

Looking at the full description of the research approach, in this paper, the research results are presented in two parts. Firstly, Section 6 describes the characteristics of the agglomeration chosen as an example presented in the case study method. Then, in Section 7, we present the Delphi interview results, together with the statistical analysis findings, and discuss the results (Section 8).

5.2. Phase I—Case Study Method

A case study is perceived to be one of the most popular methods in social sciences [79], as well as in business, logistics, and socio-economic geography [81]. Its use is especially justified for research presenting the specifics of urban and suburban areas. Every city sprawls differently and the urban logistics should be adjusted to this process. On the other hand, some of the characteristics of urban logistics are the same for cities with different features, e.g., urban logistics stakeholders. Therefore, even if applied for individual geographical locations, case studies provide valuable insights to compare urban logistics systems and stakeholders analysis results for cities with similar functions (including political), morphological features, populations, climates, etc. This issue was the basis for choosing Tricity in this study. Section 6 provides necessary information about this agglomeration needed to identify its specifics and urban logistics elements.

The literature and other sources review provided evidence for using a case study as an accurate method for investigating the urban logistics systems. This approach has been used, e.g., to present the city as an omnichannel environment [82], investigate resource-sharing and vehicle routing problems [83], analyze urban logistics projects' results [16], evaluate road pricing schemes for the sustainable city [84], and conduct many other investigations. Furthermore, it has been used to present environmental sustainability in urban logistics [85–87]. Finally, it has also been utilized to show environmental sustainability in Tricity (or its cities of Gdynia, Gdańsk, and Sopot) as a whole [88–90] or its elements [91,92], even for only small groups of city users [93].

The case study method, even if perceived as an easy and not-demanding method, is rigorous and represents strong practical evidence [91]. Its result should be a theoretical construct(s) or theory based on the case, presenting empirical evidence [94]. The research questions in this study were as follows:

RQ1: What environmental sustainability criteria might be the most important for urban logistics stakeholders in Tricity? (see Section 7)

RQ2: Do the preferences of different stakeholders of the urban transport system differ? (see Section 7)

RQ3: What urban logistics initiatives can meet the needs of the urban transport stakeholders in Tricity the most? (see Section 8)

To answer these questions, a Delphi study was used (Phase II) and its results were analyzed (Phase III).

5.3. Phase II—Delphi Interview

A Delphi interview was proposed to gain and evaluate the voices of the stakeholders after the review of the sources. Firstly, the review provided a complex picture of stakeholders. They represent many sectors and kinds of city users (residents, business visitors, tourists, and others, unemployed, studying, or working in different sectors). It was impossible to address all of the possible stakeholders' groups; that is why it was beneficial to use non-random sampling in the research and choose the most suitable method for such research. Secondly, multiple researchers have successfully used the Delphi method in their research in the fields of urban logistics [37,95], mobility [96], multi-stakeholder analysis in urban logistics [37,96], and urban public transport [97]. What is more, it has already been used to analyze environmental awareness generally [98], and specifically, in transport [99,100] and urban transport planning [39,101], among various stakeholders [98]. The Delphi interview became the proper method to address the aim of the study. It often appears in the literature, as well as in the field of the health impact of urban planning [1].

It has to be highlighted that, in this study, only one round of the Delphi interview was conducted. It is more popular in medical sciences (especially nursery); in the social sciences, it is usually required to be applied at least four times [102]. However, sometimes, it can be stopped when the results are stable [77,103], even if this occurs after one round [104]. Therefore, in this approach, knowing that the stakeholders from different groups represent various needs, we decided to first check if they were homogeneous and then decided if there was a need to conduct a second round. What is more, we only wanted to check the homogeneity and map the differences between the stakeholders' groups. The Delphi interview was conducted just before the first case of COVID-19 disease in Poland (March 2020) and the next rounds could have disturbed the view of the needs and opinions of interviewees because of many legal restrictions, including urban mobility. Therefore, we decided to stop the Delphi interview at this step. The outcomes of the previous steps in the research approach supported creating the interview questionnaire. Instructions for the interview were also developed, but the interviewers were the authors of the research, knowing its specifics and their requirements for the research findings the best. The instructions and questionnaire were discussed, and after a short pilot interview with three stakeholders (January 2020, one individual-urban resident, one entrepreneur, and one local authority member), they were corrected and validated. Separately, the list of urban

logistics stakeholders was used as a result of previous studies [105]. A database of email addresses of representatives of those groups was partially built with the use of the ORBIS database (database of the private companies and other entities provided by Bureau van Dijk), partially with publicly available data (public transport operator and local authorities), and partially as a result of previously conducted research (individuals allowing for further contact after previous surveys on a similar topic). Then, the invitations were sent to potential stakeholders (within the targeted selection from the mentioned database). After receiving and analyzing the positive responses, the respondents' group was defined. Interview questionnaires were completed by two interviewers. The characteristics of the interviewed groups are presented in Table 4.

Table 4. Short summary of the interviewed group.

City	Respondent	Stakeholder Group	Public/Private
Gdańsk	Entrepreneur (trade), business owner, male, aged 31–40	Business (non-related to logistics sector)	Private
	Teacher (higher education, specialized in transport and logistics, male, aged 41–50)	Individual	Private
	Student (higher education), unemployed, female, aged 21–30	Individual	Private
	Specialist responsible for urban logistics (city authorities), female, aged 31–40	Local authority	Public
Sopot	Constructor (maritime industry), male, aged 31–40	Individual	Private
	Member of city council (local authorities), male, aged 41–50	Local authority	Public
Gdynia	Chairman (freight forwarding to Northern Europe), male, aged 51–60	Logistics sector	Private
	Chairman (freight forwarding, containers), male, aged 51–60	Logistics sector	Private
	Co-chairman (freight forwarding, sea and road freight), male, aged 51–60	Logistics sector	Private
	CEO (carrier, road transport), male, aged 51–60	Logistics sector	Private
	Chairman (carrier, road transport), male, aged 41–50	Logistics sector	Private
	Co-chairman (carrier, road transport, male aged 51–60)	Logistics sector	Private
	Entrepreneur (construction), business owner, male, aged 41–50	Business (non-related to logistics sector)	Private
	Entrepreneur (beauty sector), business owner, female, aged 41–50	Business (non-related to logistics sector)	Private
	Financial specialist (finance sector), male, aged 41–50	Individual	Private
	Accountant (construction), female, aged 21–30	Individual	Private
	Unemployed, female, aged 21–30	Individual	Private
	Director (public transport operator), male, aged 41–50	Transport operator	Public
	Specialist responsible for urban logistics (city authorities), female, aged 21–30	Local authority	Public

As is presented in Table 4, the limitations of the surveyed group were noticeable and included the following:

- Overrepresentation of male respondents—because of masculinization of the logistics sector in Poland and Tricity;
- Overrepresentation of respondents from Gdynia—the small research sample from Sopot resulted from the character of the city (small spa city mainly focused on small businesses and tourists), and unequal samples from Gdańsk and Gdynia only resulted from the better availability and higher willingness to participate in research declared by respondents from Gdynia;
- Overrepresentation of road transport representatives—in Poland, including Tricity, the road transport companies are plentiful. Polish road transport companies have been providing one of the biggest service supplies in the European market for many years because of their price competitiveness.

However, representatives of local authorities from all Tricity cities participated in the interview. The interview questionnaire was short and only included the introduction, control questions about the knowledge of sustainable development, its dimensions (economic, social, and environmental), knowledge on the Tricity logistics system components, and a discussion about those issues if the interviewee wanted to talk about her or his opinions. If the respondent did not understand the questions or was not familiar with the terms mentioned, they were clarified by the interviewer. This action aimed to ensure that there was a proper understanding of the presented terms. After this initial part, every respondent had to assess to what extent the subcriterion (see Table 2) is essential for this person as a stakeholder (on a Likert scale from 1 to 5, where 1 meant entirely unimportant and 5 meant extremely important). The question was as follows:

How could you assess the importance of the presented environmental sustainability subcriteria for you as an urban logistics stakeholder?

At this step, the subcriteria presented by the interviewer were clarified, if needed. The assessment of subcriteria was purposeful because assessing them was more unbiased then assessing the whole criterion. At the stage of data analysis (Phase III), the assessments were summed up for each criterion and separately for every stakeholder group. The optics of each respondent could potentially represent the priorities of the specific stakeholders' group. This was verified in Phase III.

The interviewed stakeholders' group included public and private stakeholders, companies from the logistics sector, entrepreneurs, individuals, a public transport operator, and representatives of local authorities. The interview lasted from 15 to 28 min (the answers for the one question presented above lasted from 5 to 11 min).

5.4. Phase III—Data Analysis

Data analysis based on Delphi interviews usually conducted with small groups of interviewees requires implementing statistical methods dedicated to small samples and types of data. The most popular are non-parametric tests [106], e.g., the U Mann–Whitney test, Kolmogorov–Smirnov test, and Spearman rho test. They are usually defined and chosen according to the dependent variable or variables and the purpose of the analysis (comparing independent or dependent groups or examining relations between variables).

In this research, the data investigation contained two parts. The first one was a basic analysis of obtained raw data, and scores were given by the interviewees to the subcriteria presented while interviewing. Because the stakeholders assessed subcriteria, their assessments were combined for each criterion (see Table 2). The coefficient of dispersion was estimated according to Kiba-Janiak's approach [37], allowing us to assess the homogeneity of opinions of the stakeholders divided into specific groups (see Section 7).

The second layer was pursued to evaluate the statistically significant differences between groups of interviewed stakeholders. For that purpose, the interviewed group was divided into stakeholders according to the literature review results, but also with regards to the city, age, gender, being a public or private entity or person, and being a business organization or non-business organization. That approach allowed data to be analyzed from different perspectives. The data were continuous (dependent variable), ordinal (age group), and nominal (stakeholders group, private vs. public, and business vs. non-business). Then, for those with more than two groups, we performed the ANOVA Kruskal–Wallis test (for the different cities, age groups, and stakeholder groups presented in Table 3). It was beneficial to use this approach because of the characteristics of the sample and its small size, when having to compare more than three groups [107–109]. For similar reasons, for comparing two independent groups, the U Mann–Whitney test is recommended [110]. Therefore, it was implemented to compare the assessments of interviewees of different genders, public vs. private stakeholders, and business vs. non-business stakeholders. As the IT solutions supporting the calculations, MS Excel and Statistica software were used.

6. Specifics of the Area of the Tricity Agglomeration (TA)

Tricity is an area in the North of Poland in the Pomeranian voivodeship, consisting of Gdańsk, Gdynia, and Sopot, which, due to their proximity to each other, form the Tricity, with a population of 755,700. Its diversity and specificity comes from the geographical location, landscape, access to the sea, access to a few container terminals, and being an agglomeration.

Gdansk, Gdynia, and Sopot are the biggest cities in the Pomeranian voivodeship included in the Tricity area, and are additionally connected within the Gdansk-Gdynia-Sopot Metropolitan Area. The Metropolitan Area of Gdansk, Gdynia, and Sopot (MAG-G-S) was formally established on 15 September 2011, with the main scope being focused on strengthening the cooperation and development of included urban areas (see Figure 1). The MAG-G-S constitutes the area far beyond the three main cities. Therefore, the main core of the presented research is focused on the Gdańsk, Gdynia, and Sopot activities.

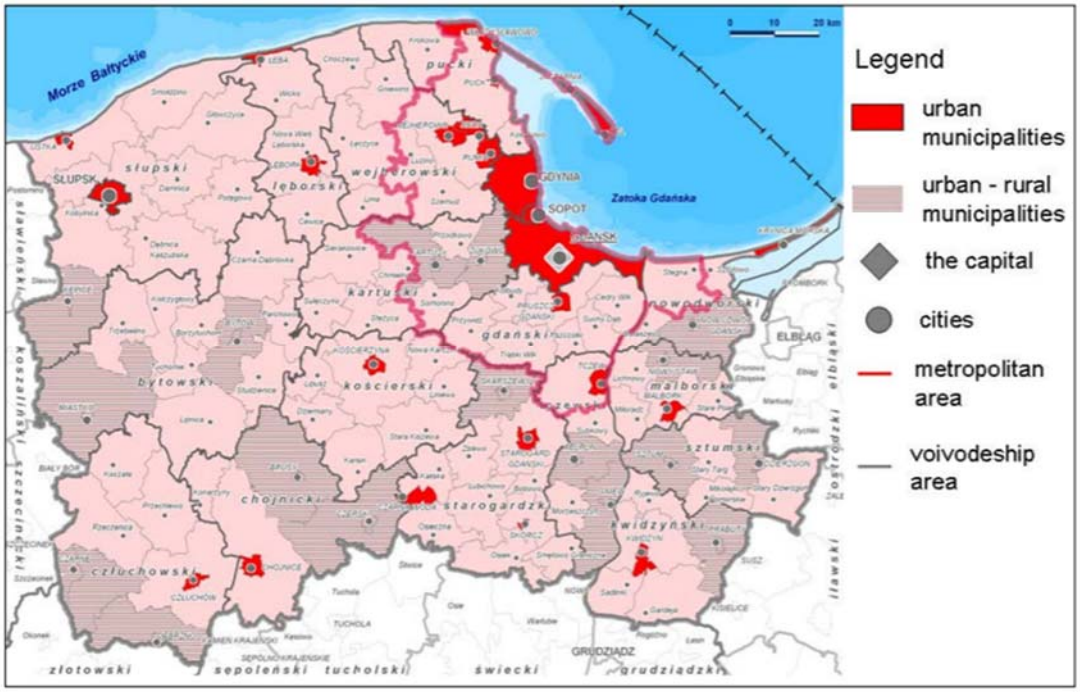

Figure 1. Pomeranian (Pomorskie) voivodeship. Source: Pomeranian Voivodeship Marshall's Office.

Gdansk is the Polish maritime capital, the capital of the Pomeranian voivodeship, and the oldest and biggest town, with almost half a million inhabitants and a big seaport. It lies on the southern coast of the Baltic Sea, with its Hanseatic tradition, and has been significant in creating commercial relationships between Northern and Western Europe.

Gdynia lies along the Gulf of Gdansk, northwest of Gdańsk city. First mentioned in 1232 as a fishing village, nowadays, it is a manufacturing center and port city. The city contains a naval museum and several maritime schools. Sopot, with about 40,000 inhabitants, is known as the most popular tourist destination on the Baltic. It lies between the larger cities of Gdańsk to the southeast and Gdynia to the northwest. In summary, Gdańsk and Gdynia are the biggest cities within the metropolitan area, with almost 700,000 inhabitants, offering a huge labor market and many educational and cultural opportunities. Sopot is mostly known for its touristic character and being a spa city, and has thus become a holiday destination for many Polish and foreign residents.

Problems of the urban transport system in the Tricity area are similar to those in other agglomerations [111,112]. Nuisances mainly come from the growing urbanization, traffic problems, limited special availability, and increasing environmental pollution [113,114]. The specifics of the Tricity transport system result from the direction of flows and characteristics of the particular cities. Inhabitants' journeys are determined by their workplace, which does not have to correspond to their accommodation. Therefore, Gdańsk and Gdynia are similarly treated as workplaces not only for the Tricity dwellers, but also for surroundings, and Sopot as a rest destination.

Tricity urban logistics difficulties can be distinguished in relation to the material infrastructure and organizational issues. Therefore, those are the main directions in the Tricity transport strategies—connected with the transport accessibility and infrastructure improvement. Moreover, the organizational problems to be solved are due to the low efficiency of the transport network, transport integration level, and external impact of urban transport [88,115].

Authorities of Gdańsk, Gdynia, and Sopot strongly cooperate within the agglomeration agreements, on all mobility issues, as it is crucial for the development of the whole agglomeration area. As entities responsible for providing public transport services, authorities focus on the mobility of passengers. Only a few initiatives are related to the holistic

treatment of the urban transport system, and even less are dedicated to freight transport that is assigned to private stakeholders [116–118]. The activity of the mobility improvement initiatives is strongly connected to the European Commission (EC) requirements and support. The EC keeps on reinforcing the abilities of members' cities in implementing urban logistics measures, delivering innovative solutions, and sharing experiences within international cooperation [67,119].

Following EC requirements, every city from the TA focuses on the preparation and implementation of sustainable urban mobility plans (SUMPs). Documents already prepared by Gdańsk and Gdynia and being prepared by Sopot aim to integrate and manage urban mobility and ensure the proper quality of city dwellers [112]. The Gdańsk SUMP's (prepared within the CityMobiNet project in 2016–2018) advantage is related to its holistic character, covering the mobility of passengers and goods, and including all modes of transport. Gdynia has additionally joined numerous European Union mobility initiatives: Civitas (2002–2006); Civitas I (Tellus); and Civitas Dynamo. Additionally, the Sustainable Urban Mobility Plan (SUMP) was adopted in 2016 on the basis of a previously prepared Sustainable Urban Transport Plan (2008–2015) [88].

In spite of separate mobility initiatives, one complex document related to the transport and mobility issues of the whole Tricity area was created in the context of a "Strategy for Transport and Mobility in Metropolitan Area (MA) until 2030", thus covering not only the three main cities, but also adjacent communes and counties. The strategy treats mobility and transport challenges very widely and holistically, but the main areas focus on the following points:

- Improving transport accessibility of the Tricity MA;
- Competitive infrastructure of TEN-T seaports and airports;
- A sustainable system of metropolitan transport;
- An effective management system of transport in MA;
- Promoting active mobility in MA;
- Safe transport and mobility in MA.

Within the transport accessibility, the development of internal and external accessibility of the MA is planned. Internal accessibility is mostly related to public transport development. Within this area, the integration of public transport and individual transport, priorities for public transport means, and introducing zones with different accessibility for passenger cars, including parking, is going to be introduced. Additionally, the changes cover the infrastructure development for cyclists and bicycle traffic organization systems, including metropolitan bicycles.

The external availability of MA will increase through the development of direct air, high-speed rail and road connections (motorways and expressways) with other metropolises. This increase will be achieved through the expansion and adjustment of the national transport infrastructure to the higher standards.

Taking into account the environment of the Tricity area, in the metropolitan strategy related to the transport and mobility, activities connected to the development of seaport infrastructure, ensuring access to ports from the sea, are provided. Therefore, the development of infrastructure for access to ports from the land side, adaptation of the port infrastructure to the changing scale and cargo structure, and extension and modernization of port terminals important for passenger and cargo handling are planned. Organizational and investment activities are to be undertaken to improve the direct connections of ports with road and rail infrastructure of the highest rank and support multimodality in linking ports with other economic actors.

The development of the metropolitan transport system is going to promote sustainable mobility, encouraging changes in the behavior of residents and visitors coming to the metropolis, by supporting the development of collective and bicycle transport services, the construction of pedestrian traffic zones and services of freight carriers through the construction of infrastructure, and traffic organization, assuming the use of intermodal transport technologies.

The traffic management system should enable a quick reaction to incidental situations, especially the occurrence of road accidents and directing drivers to alternative routes. In this regard, there is a plan to implement several systems of advanced traffic management at the same time and the possibility of cooperation with railway, water, and air traffic management systems poses a serious challenge to developing a plan for integration and cooperation between the existing and planned transport management systems. Additionally, it is also necessary to improve parking information, as well as the system of informing drivers and passengers of public transport and users about actual travel conditions.

Active mobility can be considered as organizing transport needs with transport means using one's own muscles' activity. Therefore, this aspect can be assessed as fulfilling ecological, social, economic, and spatial advantages in sustainable urban transport system development. A significant increase of non-motorized travels (of about 15%) by 2030 is assumed in the recommended scenario of the transport and mobility strategy. Shaping an active mobility culture is intended to be achieved by stimulating rational transport choices, environmental education focused on active mobility, the promotion of active mobility, mobility behavior monitoring, the development of an attractive public spaces network, and pedestrian and cyclist zones. Additionally, the main scopes in this area should be supported by favorable conditions for the use of bicycles in the intermodal travel chain and the development of an organizational and coherent tariff system of metropolitan bicycles.

Safe transport and mobility in MA are related to the safe behaviors of urban transport system participants' promotion, the protection of pedestrians and cyclists, building and maintaining safe transport infrastructure, the speed limit in a local street network, and development of the transport safety management system.

To present and characterize the specifics of the Tricity area on the basis of the metropolitan strategy, the transport and mobility strategy main assumptions are presented with the urban logistics measures and additionally matched to the requirements of the environmental sustainability criteria (see Table 5).

Table 5. Compatibility of the Tricity strategy areas with the environmental criteria.

No.	Areas of Improvement in Tricity	Urban Logistics Measures	Criterion (Category in EPI UN)
1	Improving transport accessibility of the Tricity area	• Material infrastructure-related measures • Regulatory measures	Health impact Air quality Water quality and resources Climate and energy
2	Competitive infrastructure of TEN-T seaports and airports	• Material infrastructure-related measures • Regulatory measures	Air quality Water quality and resources Climate and energy
3	Sustainable system of metropolitan transport	• Environmental measures • Material infrastructure-related measures • Immaterial infrastructure-related measures	Air quality Climate and energy
4	Effective management system of transport in the Tricity area	• Regulatory measures • Immaterial infrastructure-related measures • Cooperation-related measures	Health impact Air quality Climate and energy Biodiversity and habitat
5	Promoting active mobility in the Tricity area	• Environmental measures • Cooperation-related measures	Health impact Air quality Water quality and resources Climate and energy Biodiversity and habitat Natural culture preservations
6	Safe transport and mobility in the Tricity area	• Material-related measures • Cooperation-related measures	Health impact Biodiversity and habitat Natural culture preservations

7. Results

The results of the assessments of the interviewed group and its subgroups (according to the type of stakeholder, gender, age, etc.) are presented in Table 6. Generally, the interviewees assessed air quality as the most critical criterion. They indicated that the monitoring of General Inspectorate for Environmental Protection in Poland conducted in

many cities in Poland provides necessary information highlighting the need to be afraid of the impact of air pollution on health. The many initiatives provided to improve the air quality are not enough. On the other hand, in Poland, the central administration is not paying enough attention to providing efficient tools for managing this problem. The next important criteria were the health impact (mainly because of air pollution) and water quality and resources. As was mentioned by the interviewees, Poland has one of the worst levels of access to water and therefore, especially in cities, water management is crucial. There should be more activities focused on water retention. Some investments in Tricity and nearby communes have been made in this area, but the problem is still visible, especially in summer and during heavy rainfall.

Table 6. The results for the set criteria.

Stakeholder Group	Criterion					
	Health Impact	Air Quality	Water Quality and Resources	Climate and Energy	Biodiversity and Habitat	Natural Culture Preservation
	Subcriteria					
	1–4	5–6	7	8–10	11–12	13
General	3.96	4.29	3.89	3.67	3.66	3.84
Logistics companies	3.13	3.33	2.33	3.83	2.83	3.83
PT operator	4.75	5.00	5.00	4.00	3.50	4.00
Individuals	4.42	4.75	4.67	3.22	4.08	3.83
Business owners	3.67	4.33	4.00	4.00	3.67	4.00
Local authorities	4.75	5.00	5.00	3.78	4.50	3.67
Gdańsk	4.06	4.63	4.50	3.33	4.00	3.50
Sopot	4.38	4.75	4.50	3.50	4.25	3.50
Gdynia	3.87	4.12	3.62	3.79	3.46	4.00
Male	3.69	4.08	3.46	3.77	3.42	3.92
Female	4.54	4.75	4.83	3.44	4.17	3.67
Aged 21–30	3.50	3.80	3.80	2.60	3.20	2.80
Aged 31–40	3.83	4.50	4.00	3.22	3.83	3.67
Aged 41–50	4.36	4.50	4.43	4.00	4.00	4.29
Aged 51–60	3.15	3.50	2.40	3.80	2.80	3.60
Public	4.75	5.00	5.00	3.83	4.25	3.75
Private	3.75	4.10	3.60	3.62	3.50	3.87
Business	3.45	3.80	3.10	3.90	3.15	3.90
Non-business	4.53	4.83	4.78	3.41	4.22	3.78

Generally, during interviews, the highest environmental awareness was observed among local authorities. The interviewed persons were working on ecofriendly solutions or had to decide to start new initiatives in this area. Additionally, the individuals were aware of the initiatives developed by public and private actors to improve the environmental awareness of city users, including residents, and generally assessed them positively. Two of six individuals indicated that they like sharing economy solutions, e.g., car-sharing, bike-sharing, and micromobility, and one of them said that the cargo bike idea is the best for him and he is waiting for the start of a new spring season. The lowest awareness about the ideas and initiatives, as well as terms related to environmental sustainability, was observed among business stakeholders.

The above findings show that they care about using the city, and in the case of many of them, living in the city. Logistics company representatives generally assessed all the environmental criteria relatively low (possibly because of the business incentives of the companies they work for, maybe related to economic sustainability, and not environmental sustainability). They indicated that it is necessary, but not the main priority for them. Climate and energy are crucial, as they have to plan the use of fuels and investments in new means of transport. This is dictated by many legal regulations. The PT operator is the public entity focused more on the health impact, as well as the air and water quality, because of his goals as a transport service provider offering one of the sustainable transport modes. Individuals present similar opinions, assessing the air and water quality as the highest priority, and then the health impact. They are aware of the statistics about deceases because of a bad air quality, also in Tricity, but on the other hand, four of six of them do not want to resign from using a car for daily travel. Business owners also indicate air

quality as being the most important factor. In turn, local authorities care the most about environmental sustainability and similar fields in comparison to the other groups.

Those groups can be presented from two different perspectives. Firstly, public stakeholders (authorities and the PT operator) assessed the air and water quality as having the most important, together with the health impact, possibly also because of marketing actions they design and implement to raise the social awareness about active and sustainable transport modes. Secondly, looking at the results on the division into business (logistics companies representatives, business owners, and the PT operator) and non-business stakeholders (authorities and individuals), differences in the values given to criteria are visible. Business-related stakeholders gave lower scores for environmental criteria. However, they assessed the air quality and climate change as being more important, being very strictly related to each other. Energy sources (e.g., fuels) generally used by businesses of different kinds emit substances with a negative impact, mostly on the air quality, especially in cities. The individuals and local authorities mentioned that business actors will not care about the environmental issues and therefore, only a state or local government and other public stakeholders can force them to implement eco-friendly practices. In fact, the opinions of the local authority representants were less negative than the opinions of individuals. Local authorities were positive about the cooperation with all of the stakeholders, e.g., while defining the content of the Sustainable Urban Mobility Plan.

Looking more at the socio-economic characteristics of interviewees and the city they represent, some interesting results can be noticed. Firstly, the results for cities are biased by including more business (especially logistics) representatives for Gdynia. Between interviewees from Gdańsk and Sopot, those differences are not noticeable at first sight. They similarly gave a significantly lower importance to climate and energy, together with natural culture preservation. Female interviewees gave higher scores for all of the criteria than men, with two exceptions—as did Gdańsk and Sopot users. The youngest and oldest interviewees assigned the lowest scores to criteria. Together, they gave climate and energy low scores. The youngest people do not care so much about the natural cultures and the oldest care less about biodiversity. The middle groups gave the climate and energy lower scores and the air and water quality higher scores. However, those findings may be biased because of an unequal number of people with the same gender and age group. Therefore, gender and age might be correlated in the research sample. Considering this, it cannot be decided whether the gender or age influences the final result.

It was vital from a theoretical point of view to evaluate whether the respondents assessed the criteria similarly or not. The dispersion coefficient usually reflects this. The results for this study (see Table 7) show that the particular groups of stakeholders (according to different divisions made) assess the criteria similarly, but cannot be treated as one big group—they are not homogeneous in their assessments.

According to Kiba-Janiak [37], a coefficient lower than or equal to 0.5 reflects strong agreement among interviewed persons. A value of the coefficient of between 0.5 and 0.8 means not satisfactory but moderate agreement, and a value higher than 0.8 indicates very weak agreement (see Table 7). Without any divisions, the interviewed group was homogeneous in their assessments of the priority of air quality, but this was still not satisfactory. In turn, the most homogeneous groups of stakeholders were local authorities (because they have very similar goals), private stakeholders, and the youngest interviewees. Additionally, the level of agreement that was possible to be perceived as sufficient was presented by individuals (surprisingly, as they were the most variable group), women, and non-business stakeholders. The most heterogeneous were the opinions of public stakeholders (because of differences between authorities and the PT operator), men, and employees of logistics companies.

Table 7. Coefficients of dispersion for the Delphi study.

Stakeholder Group	Criteria						
	Health Impact	Air Quality	Water Quality and Resources	Climate and Energy	Biodiversity and Habitat	Natural Cultures Preservations	Mean
	Subcriteria						
	1–4	5–6	7	8–10	11–12	13	1–13
General	0.86	0.77	0.92	0.86	0.90	0.86	0.86
Logistics companies	0.81	0.83	0.69	0.97	0.69	0.97	0.84
Individuals	0.59	0.45	0.56	0.72	0.45	0.76	0.59
Business owners	0.76	0.42	0.83	0.74	0.69	0.83	0.71
Local authority	0.14	0.28	0.00	0.65	0.28	0.56	0.32
Men	0.78	0.71	0.95	0.83	0.87	0.83	0.81
Women	0.57	0.45	0.35	0.65	0.69	0.56	0.57
Private	0.35	0.00	0.00	0.68	0.63	0.47	0.40
Public	0.85	0.77	0.94	0.80	0.82	0.82	0.83
Business	0.66	0.80	0.93	0.78	0.83	0.83	0.77
Non-business	0.58	0.34	0.43	0.67	0.68	0.71	0.58
21–30	0.55	0.47	0.47	0.47	0.47	0.63	0.50
31–40	0.76	0.42	0.83	0.65	0.83	0.56	0.68
41–50	0.63	0.56	0.56	0.80	0.84	0.77	0.69
51–60	0.55	0.65	0.70	0.70	0.60	0.70	0.63

The differences between the assessments of criteria by different groups are reflected by two tests: For two and many independent groups. Looking at the results of the U Mann–Whitney test (Z and *p* values, see Table 8, supplemented by Table 9), men and women assessed the criteria differently, which confirms the previous initial findings, but only partially—the differences between genders were observed in assessments of the biodiversity and habitat and water quality and resources. Then, the difference in assessing the importance of the health impact was almost significant. Generally, women gave higher priorities to criteria, but they were not business-oriented. This finding should be supplemented by age and city variables. The city variable was obviously biased, so the results are not reliable. However, there are no significant differences shown by the Kruskal–Wallis test. The opposite result can be observed for age groups. They assessed every criterion differently (or close to significantly different). This confirms the previous supposition.

Table 8. Results of ANOVA Kruskal–Wallis (KW) and U Mann–Whitney tests (Z).

	Gender		Age		City		Subgroup		Public/Private		Business/Non	
Criterion	**Z**	***p***	**KW**	***p***	**KW**	***p***	**KW**	***p***	**Z**	***p***	**Z**	***p***
Health impact	−1.86	0.06	6.93	0.07	1.11	0.57	11.67	0.02	−2.17	0.03	−2.76	0.01
Air quality	−1.59	0.11	8.08	0.04	1.67	0.43	15.09	0.00	−2.44	0.01	−3.01	0.00
Water quality and resources	−2.20	0.03	9.6	0.02	1.85	0.39	13.91	0.01	−2.08	0.04	−2.83	0.00
Climate and energy	1.34	0.18	8.22	0.04	2.74	0.25	6.79	0.15	−0.71	0.47	2.04	0.04
Biodiversity and habitat	−1.93	0.05	6.92	0.07	1.86	0.39	10.76	0.03	−1.28	0.20	−2.88	0.00
Natural culture preservation	0.52	0.60	3.72	0.29	1.61	0.45	0.31	0.99	0.11	0.91	0.22	0.83

Table 9. Results of the median test.

	Age		City		Subgroup	
Criterion	**Test**	***p***	**Test**	***p***	**Test**	***p***
Health impact	7.59	0.05	0.24	0.99	10.98	0.03
Air quality	8.22	0.04	0.65	0.72	12.55	0.01
Water quality and resources	7.59	0.05	1.64	0.44	10.98	0.03
Climate and energy	8.22	0.04	3.69	0.16	8.06	0.09
Biodiversity and habitat	7.59	0.05	1.64	0.44	10.31	0.04
Natural culture preservation	3.87	0.28	2.34	0.31	19.5	0.74

Moving onto the divisions focused on more economic dimensions, public and private stakeholders assessed the health impact and air and water quality differently—public stakeholders care more about them. This confirms the initial finding described earlier. Business stakeholders gave the criteria significantly lower values than non-business ones,

but the differences did not occur in the case of natural culture preservation, defining the strategy of cooperation to achieve this goal.

Finally, looking at the results for different subgroups, they differ in terms of assessments of all the criteria except for those of the strategy of cooperation (the last one) and climate and energy. This partially confirms the initial description of results made in the previous part of the paper.

8. Discussion

The results of the Delphi study and case study need to be discussed to highlight the insights of this research. In fact, there is a need to compile the information from Tables 2–9 and Sections 1–4, Sections 6 and 7.

Urban areas suffer from congestion, road accidents, and environmental degradation. Therefore, it is crucial to implement and assess environmental friendly initiatives that avoid lowering the quality of life in cities and let the inhabitants live in healthy conditions.

The findings of the study present urban transport system stakeholders' opinions concerning the environmental character of urban logistics measures. Comparing the obtained results with existing research is not easy because of a few reasons. Firstly, the article is unique in that an environmental approach was implemented. The environmental criteria examined in the paper were prepared based on the environmental performance index (EPI 2020), which provides a summary of the state of sustainability around the world every year, ranking almost two hundred countries (in 2020) based on their environmental health and ecosystem vitality [74]. Secondly, the approach only took into consideration one pillar of sustainability—environmental, and the sustainability was treated holistically, consisting of social, economic, and environmental parts [66,67]. Thirdly, existing research most often analyzes the private stakeholders' roles in the urban transport system, more rarely focusing on the public ones, and seldom treating all stakeholders in a holistic approach [21,22,120].

However, fragmentary comparisons could be performed, presenting similar findings to our research results. Conclusions comparable to those of Nieuwenhuijsen [2] were obtained regarding the air quality significance [121,122]. Other researchers have confirmed the air quality as a factor affecting urban inhabitants' health and being responsible for numerous diseases [123]. According to the presented analysis, the air quality, health impact, and water quality and resources are considered the most important for all stakeholders of the urban transport system, confirming their health self-care.

Taking into account the rising importance of sustainability issues, studies related to the business perception of environmental issues are available. Unfortunately, they mainly focus on institutional, governmental, or community pressure on the adoption of environmental management practices by private entities, rather than the voluntary implementation of environmentally friendly solutions [120,124]. Additionally, private stakeholders mostly care for freight transport issues [21], omitting the possibility to assess and treat the urban transport system as a whole [125,126].

The obtained results confirm the other researchers' conclusions that public authorities represent the stakeholder group caring for the environment the most [22,127].

The novelty of the presented study is the fact that it examined the Tricity (Metropolitan) area based on the environmental performance of the urban logistics measures implemented and to be implemented from the stakeholders' point of view. It is worth mentioning that the Tricity cities' municipalities are quite modern and seriously consider environmental issues. This is visible in the transport and mobility strategy prepared for the period until 2030. Table 5 presents the main assumptions of Tricity's transport and mobility strategy. The main strategy areas are presented, as well as complementary urban logistics and the environmental criteria that are going to be fulfilled through the particular UL measure implementation.

In summary, the presented article's significant advantage is the multiple methods applied in the research process, including a holistic approach to the urban logistics measures,

analyzing all of the city logistics stakeholders, and taking into account an original set of environmental criteria.

9. Conclusions

Urban transport is essential not only for economic growth, but also for developing a better environment. All logistics activities within the cities should be organized to allow passengers' and goods' flows to be efficient, as well as environmentally friendly.

This study's results are partially obvious to some extent, but to some extent, they do not entirely correspond to the existing literature, e.g., in the area of the environmental awareness of stakeholders. The results only show some possible differences between stakeholders divided into different groups, according to various division keys and should be considered by local authorities planning their activities in the area of local environmental sustainability. The findings of this study might be interesting for urban decision-makers defining different policies. The voices of stakeholders should be essential factors in addressing the assumptions of legal regulations, planning and making new investments, and creating public space. Their needs are different, but some trade-offs and compromises are possible. This study highlights the possible differences in stakeholders' needs and opinions to show their diversity that needs to be addressed by public policies. This initial insight can help provide different views on shaping environmental sustainability in cities, giving, e.g., a higher priority to water and air pollution management and lower priority to other areas, such as biodiversity, which should obviously be addressed in those policies. This study also gives insight into other research, presenting a case study of a very specific agglomeration tackling the same problems as the others and being one for which the general rules of stakeholder analysis can be applied to examine the criteria for environmental sustainability. Improving urban logistics in the environmental sustainability area is very demanding and gives results in the long run. Combining many solutions to meet stakeholders' needs should correspond to the rules of companies' legal requirements and incentives. Many trade-offs will be required to agree with all of those needs, and this is a task of urban logistics.

This study has two limitations. The first is recruiting a small group of interviewees, which resulted from a low willingness to participate in the research. The second is the overrepresentation of men, participants from Gdynia, and road transport companies. Although the last of the three mentioned shortcomings is justified, the two others cause some adverse effects for the results' reliability. However, the research was planned according to the rules of chosen methods and carefully controlled. Therefore, this study can be perceived as delivering initial insights on Tricity stakeholders and their opinions. Still, it is a valuable contribution giving a different perspective than the current scarce literature on stakeholders analysis of the Tricity area urban logistics system. The authors hope this paper will encourage research on stakeholders analysis in Tricity.

The future research works will be focused on extending the interview questionnaire, including the assumptions of sustainable urban mobility plans, development of micromobility, and integrating different solutions helping to improve the growth of environmental sustainability in Tricity.

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