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Mobility as a Service (MaaS) as a Sustainability Concept for Tourist Destinations

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Abstract: In order to meet the needs and requirements of visitors in tourist destinations related to modes of transport, the offer in tourist destinations must satisfy travel habits. The introduction of the MaaS (Mobility as a Service) concept is reflected in the reduction of dependence on private cars. The main objectives of this paper are (1) to explore the MaaS concept, awareness about the concept, its importance and benefits in general and related to tourism in the Republic of Croatia; and (2) to explore the connection between a multimodal mindset about mobility concepts on the very concept of MaaS under the influence of satisfaction using mobility-related applications in tourism. The results of the research confirm a statistically significant relationship between a multimodal mindset (way of thinking) and the MaaS service in the function of tourism, and that relationship is mediated by the satisfaction with the use of mobility-related applications, but also the lack of awareness about the concept itself.

1. Introduction

A new concept of mobility that is growing and gaining more and more importance in many European and global cities is Mobility as a Service, i.e., MaaS. The significance and advantages, and above all the values, of the mentioned concept can be reflected in the integration of mobility services, while enabling and offering a combination of different modes of transport. Therefore, the concept of MaaS can be defined as a model of mobility distribution in which the main needs of the customer are met through a single interface and offered by the service provider. The concept is designed for all citizens to meet their needs for seamless travel mobility from point A to point B, as well as for ease of booking and payment for all integrated services through a single platform. Traffic congestion and their high costs are just one burden on tourist destinations. It is therefore up to transport professionals to take necessary actions and implement modern and contemporary digital technology that will impact traffic congestion and reduce the associated costs. In accordance with the criteria of local economic, social and environmental policy, it is necessary to find ways that will provide a unique travel option to facilitate the stay of tourists. In this way, the aim is to achieve the concept of smart cities while providing various forms of mobility so that users and travelers in tourist destinations can find the most appropriate, when necessary, multimodal service. Therefore, the development of MaaS depends on creating conditions that will enable the innovation of mobility services, integrating competitors' banners, thus creating a sharing economy and its associated benefits and providing a framework for developing and financing appropriate transport infrastructure.

There are not many studies that explore the application and use the MaaS concept in the field of tourism, nor do many studies explore its importance and contribution to strengthening the field of tourism.

This paper aims to review the existing literature on the MaaS concept in tourism, and to research and define potential opportunities for further investigation. Despite the existence of literature reviews on the MaaS concept, there is lack of research that connects the MaaS concept and tourism. To our knowledge, this is one of the very first studies that specifically conducts research regarding recognition and usage of MaaS in the field of tourism, which confirms the importance of this research and the need to conduct it. The intention and aim of this paper is to explore and see what the current avenues of research are for such studies.

The contribution of this study is four-fold. First, this research provides a clear picture of the state of the MaaS concept. The engagement of academics and practitioners with the potential of the MaaS concept is not explored enough, and there is evident lack in observing benefits of MaaS usage in the field of tourism. Second, this study conducts a survey on how MaaS is impacted by a multimodal mindset and the satisfaction of using mobility-related applications in the field of tourism. The MaaS concept can improve mobility, timelines and reliable information; it integrates different services, such as planning, booking, payment, and ticketing, via a single interface all at one single platform, which facilitates travel in tourist destinations. Third, our study contributes to the MaaS literature, but also the tourism literature, with a discussion of the potential future research trends related to the usage of the MaaS concept in the field of tourism. This study will be a helpful resource for present and future scholars interested in addressing the most meaningful connections between the MaaS concept and tourism, in this case a connection between a multimodal mindset and MaaS mediated by satisfaction of using mobility-related applications. Fourth, the main research directions and gaps are suggested for future studies that employ the MaaS concept in the field of tourism.

To collect data, empirical research was conducted through an online survey, while mediation testing based on the set research model was conducted in order to further process the data and confirm the research hypotheses. This paper focuses on research that examines the cause-and-effect relationship in which the independent variable has a direct causal effect on the dependent variable but also has an outcome of various indirect effects of the so-called third variables, examining the relationship between the multimodal mindset (way of thinking) and the MaaS concept in the function of tourism, mediated by the third variable satisfaction with the use of mobility-related applications.

Therefore, the main goals of this paper are (1) to conduct a survey and to collect data about the MaaS concept application and usage in tourism regarding mobility in tourism; (2) to test a set operational model and to confirm the connection between constructs of the research model; and (3) to confirm that the multimodal mindset affects and is a predictor of usage of the MaaS concept under the influence of mediation (the satisfaction with the use of mobility-related applications) to increase mobility in tourism.

Based on the review and analysis of previous world research and based on the analysis of the MaaS concept usage in tourism, two research questions were asked: (1) Is there a statistically significant relationship between the multimodal mindset (way of thinking) (independent variable X) and the MaaS service in the function of tourism (dependent variable Y), and can this relationship be mediated by a third variable, a mediator variable of satisfaction with the use of mobility-related applications (mediator variable M)? (2) To what extent is MaaS (Y) related to a multimodal mindset (X), and is this relationship mediated by the satisfaction of using mobility-related applications (M)? These questions are posed as research questions to find out whether a multimodal mindset affects a MaaS concept application and usage in tourism and if it is a useful tool in increasing mobility in tourist destinations presented and tested through an operational conceptual model.

This paper is divided into four parts. The first part of the paper is dedicated to understanding basic terms related to Mobility as a Service and its implementation in tourism. Moreover, the first part of the paper presents the hypotheses to test the presented research model. The second part is focused on the methodology used presenting the instrument, data collection and analysis of collected data. The third part of the paper presents demographic

findings and the results of the analysis of the conducted research. Lastly, the fourth part is a discussion about the conducted research, recommendations, limitations and a conclusion.

2. Theoretical Framework

2.1. Mobility as a Service (MaaS)

Traffic experts have been trying to make public transport more attractive so as to allow a gradual transition from private cars to more alternative modes of transport, which can mainly be achieved through new modern mobility technologies that must provide a high level of flexibility and accessibility. With the introduction of the new trend—"Mobility as a Service" (MaaS)—the situation will be visibly different, so the first key change will be that transport users and service providers communicate about their needs through a digital platform service. Another key change is the emergence of a whole new package of shared services, which means that users will be freer in terms of their expectations, so multiple operators of transport services will specify more accurate features of the transport service: arrival time, origin and destination, the level of comfort required, the price it is willing to pay, etc.

MaaS is based on the idea of access through a single medium—smartphone, various mobility services, including public transport and shared mobility services. The concept underlying MaaS is that urban mobility must become fully multimodal, while access to a wide range of services will be coordinated through different service providers, given the fact that the digital revolution can offer new opportunities for all involved [1]. MaaS can be described as a mobility distribution model that delivers users' transport needs through a single interface of a service provider, and it combines different transport modes to offer a tailored mobility package, similar to a monthly mobile phone contract [2]. Among the efforts to turn the idea of MaaS into reality, Finland and MaaS Global stand out as a special case. The story of the company is the story of new digital technologies, crumbling infrastructure, close cooperation between the authorities and the private sector and learnings from the time Finland was the mobile industry capital of the world. In hindsight, it is fascinating how a whole country was turned into an incubator to make MaaS happen. One of the most prominent examples of operational MaaS platforms is "Whim", developed by the Finnish start-up MaaS Global and introduced in Helsinki in 2016. The Whim user can combine, plan and pay, both in pay-as-you-go or monthly subscription forms, for public transport, taxi, car rental, car sharing, and city bike trips [3]. To work effectively, MaaS would require the following conditions: widespread penetration of smartphones on 3G/4G/5G networks; high levels of connectivity; secure, dynamic, up-to-date information on travel options, schedules, and updates; and cashless payment systems [4].

2.2. Tourism in the Republic of Croatia

Trends in tourism in the Republic of Croatia are one of the most important factors in the overall economic trend in the Republic of Croatia. According to the World Tourism Agency, "tourism includes all activities resulting from the travel and stay of persons outside their usual environment for no more than one year for holidays, business trips and other reasons unrelated to activities for which they would receive any compensation in the place they visit" [5]. In order for a certain country to be able to compete from the point of view of tourism and tourist attractions, the level of development of a certain tourist destination is necessary, as well as the effectiveness of the applied tourism policy. The main goal and task of the tourism policy of a certain country and city is to establish favorable relations between attractive factors and tourist capacities. The services offered in tourism and tourist destinations need to be adjusted to the tourist demand in terms of quantity, quality and price and to contribute to the highest possible tourist consumption. Tourism as part of economic and non-economic activities should be in the function of meeting the needs of tourists and encouraging the recognition of tourist destinations.

In the Republic of Croatia, tourism is one of the main and most important carriers of economic development, and today it is the fastest growing industry in the world. The

Republic of Croatia has numerous natural beauties that enhance the attractiveness of certain tourist destinations and can satisfy the different needs and desires of many tourists. As a small country, the Republic of Croatia has less accommodation capacity, fewer arrivals and overnight stays than large and developed countries, but as a member of the European Union (EU) since the beginning of its membership, it has recorded a continuous growth of arrivals and overnight stays of foreign tourists. Growth in the period from 2014 to 2019 is +49% of arrivals of foreign and domestic tourists (with an increase of +37% of overnight stays of domestic and foreign tourists), while due to the COVID-19 pandemic in 2020, there was a significant decline in tourist traffic. However, in 2021, the Republic of Croatia continued to grow significantly in tourist traffic, and growth was achieved, i.e., 71.2 million overnight stays were realized [6]. In 2021, there were 12.8 million arrivals (82.5% more) and 70.2 million overnight stays, which is 72.1% more than in 2020. Tourist revenues in 2018 and 2019 amounted to as much as 18.3% and 21% of the GDP, to be reduced to 8.9% and 15.8% of the GDP in 2020 and 2021 due to the negative effects of the pandemic on tourist demand [6]. We can say that the Republic of Croatia is one of the most recognizable countries in the Mediterranean, and every year it has an increasing number of arrivals and overnight stays (except in the years of the COVID-19 pandemic) due to its natural position and attractiveness of the environment. Economic branches can influence the creation and increase the added value of Croatian tourism. Tourism creates an inflow of foreign capital to the Republic of Croatia, which affects the balance of payments, but also during the tourist season creates greater employability of the local population. Tourism in the Republic of Croatia has a high seasonal character and is related to summer and the coastal area of the Republic of Croatia, showing a lack of tourism development in other continental parts of the Republic of Croatia, which should be pursued through strategic directions of tourism development.

The field of tourism has great potential, especially today with the development of new technologies and digitalization, where meeting the needs of consumers in accordance with the growing awareness of consumers poses a number of challenges to the tourism sector. Digitization of the population and digital technologies available to consumers both facilitate and create problems in tourism and tourist destinations. In accordance with new technologies, the direction of development in tourism should be towards increasing digitalization, striving to create and maintain sustainable growth and development of tourist destinations. Just as the very concept of sustainability is viewed through three factors—economic, environmental and socio-cultural—sustainable tourism should also strive to meet the same elements in achieving sustainable development. Sustainable development in the field of tourism should reflect the high level of tourist satisfaction within tourist destinations.

Authors [7] examine the application of the Michelin application and the impact of Michelin quality standards on increasing the profitability of the hospitality industry and the contribution to the competitiveness of the Croatian gastronomic offer on a global scale. The research includes only one application and connects it with gastronomy (but also tourist offerings), and the MaaS concept is still unrecognizable in this segment, while the MaaS concept combines more elements than the Michelin application. There are no studies in the Republic of Croatia that investigate the MaaS concept and its application and use within tourism, so this research can be considered a pioneer of its kind. Insufficient awareness, but also lack of information and insufficient knowledge of the MaaS concept by the citizens of the Republic of Croatia is one of the reasons why the MaaS concept does not have stronger visibility and use in tourism.

2.3. MaaS and Its Implementation in Tourism

The problems facing large urban areas today, and especially tourist areas, are primarily the occurrence of bottlenecks, congestion, increased fuel consumption and environmental pollution. Roads in tourist destinations become congested when visitors use the roads with the local population, visitors who are looking for a mode of transport during or after

their stay. Tourism generates about 5% of GDP globally and creates about 8% of jobs and as such is the third most important economic activity. Tourism also generates a number of other positive development effects, including the opportunity to develop areas on the economic periphery (especially in rural, coastal, island and mountain areas); contributing to regional cohesion; contributing to awareness and the need to protect and value natural and cultural heritage; and social growth through learning about other regions and cultures; and contributing to the positive heritage of one's own identity and the identity of regions [8]. Tourists as the so-called temporary citizens of a certain destination, but also tourism as such, in a certain period of time, represents an additional city burden. Accordingly, in the case of unplanned and inadequate management of tourist destinations, the balance and organization of the city can be affected, which leads to the fact that the relationship between tourism and urban activities is often conflicting and as such affects the mobility system. Cities as tourist destinations should strive for the best possible quality of service, reduction in environmental impact and control of energy consumption. In this way, and also due to the human factor, cities (tourist destinations) become smart cities, which creates the city's recognizability and increases its level of competitiveness.

The key moment of a tourist destination today is sustainable mobility, which adds value to cities, both for tourists (as a tourist product) and for residents, and thus affects the creation of sustainable development of the city and the environment. Due to the above, it is necessary to achieve the integration of tourism and mobility. In order to fulfill the purpose of mobility within tourist destinations, it is necessary to have an effective mobility network (infrastructure and services) so as to promote car-free tourism within the destination. In this way, intelligent mobility platforms can contribute to the dissemination and rationalization of information and inform tourists about the possibilities of moving within the destination by public transport or other forms of transport. Tourism and travel are two inter-related components that influence the social and economic trend of increasing mobility globally, with accessibility and mode of transport being a crucial factor in choosing the desired destination [9]. Europe has a leading position in terms of tourist travel and the creation of new concepts of mobility, becoming the center and future of travel and tourism by creating new and sustainable ways of traveling [10]. Introducing the concept of MaaS in the segment of tourism could open the possibility for visitors to access a wide selection of public and private operators through a digital platform. Digital platforms are increasingly used in all segments of tourism, especially when it comes to the travel process itself [11]. The trip for each user is planned separately according to the previously collected data on the demand and supply of transport services, combining them with information on the preferences of the participants themselves [11]. Simply put, the traveler can plan, book and pay for any trip, anywhere and at any time. Simultaneous planning of tourism and transport is not an easy task because in most cases, these plans diverge, but the cooperation of stakeholders of both branches is necessary for more attractive and environmentally friendly measures of sustainable mobility that ultimately affect the development of tourism [11]. The obtained results can be used to expand the current scientific knowledge about the MaaS concept and its impact in the field of tourism.

2.4. Hypotheses Development

So far, no research has been conducted in the Republic of Croatia that examines the general awareness of the general population about the concept of MaaS and its impact on tourism. Moreover, research that explores the connection and influence of the multimodal way of thinking (mindset) about mobility concepts on the very concept of MaaS through the impact of satisfaction with the use of mobility-related applications has not been yet conducted in the Republic of Croatia and beyond. Based on all the above in the previous sections, the importance of applying the concept of the MaaS service in the field of tourism is clear. The purposefulness and application of the MaaS service is evidenced by some of the research [12–15]. Systematic application of the MaaS service concept should result in increased mobility, faster and more efficient travel planning and the integration of

all functionalities offered by mobility applications. The MaaS concept service provides a conceptual framework according to which all users of this service can identify, evaluate, and combine possible mobility options and access all information that facilitates and accelerates travel organization and allows the user to find the best way to travel to the desired destination. In order to confirm the importance of applying the MaaS service concept in the field of tourism, the research model has its starting point in the mediation impact model [16] in which the model involves a system of three variables, with two influences on the criterion: direct predictor and indirect, through the mediator variable (Figure 1). The mediator variable implies a generative mechanism through which the independent variable, i.e., the predictor, exerts its influence on the criterion. Mediation variables explain the way in which internal psychological mechanisms manifest in external expressions and specify how and why certain effects are achieved, while moderators determine when these effects occur [16]. Paths "a", "b", "c" and "c'" represent the regression coefficients and the correlation between X and M, M and Y, and X and Y, respectively (Figure 1). The coefficient "c" conveys the total effect of X on Y, while the coefficients "a" and "b" transmit the indirect effect of X on Y, while path "c'" represents the direct effect of the independent variable (X) on the dependent variable (Y).
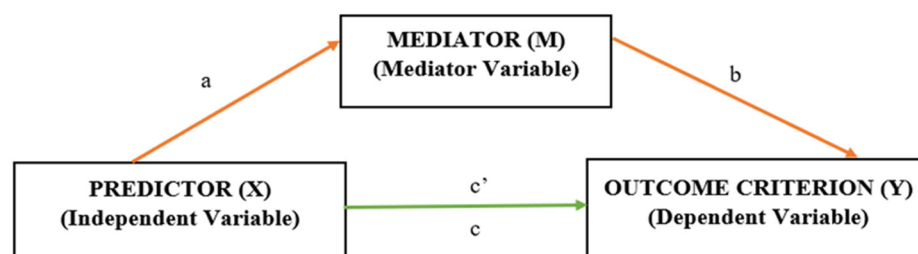

Figure 1. Mediation impact model. Source: Baron and Kenny, 1986 [16].

In order to test the set research hypotheses, two research questions were asked: (1) Is there a statistically significant relationship between the multimodal mindset (way of thinking) (independent variable X) and the MaaS service in the function of tourism (dependent variable Y) and can this relationship be mediated by a third variable, mediator variable of satisfaction with the use of mobility-related applications (mediator variable M)? (2) To what extent is MaaS (Y) related to the multimodal mindset (X) and is this relationship mediated by the satisfaction of using mobility-related applications (M)?

Based on the research conducted for the first time in the Republic of Croatia and regarding the concept of MaaS in the function of tourism, the following hypotheses have been defined:

H0. *Increasing the multimodal mindset (way of thinking) (MULTIMOD) has a positive effect on the MaaS service concept in tourism.*

H1. *The multimodal mindset (way of thinking) (MULTIMOD) affects the satisfaction of using mobility-related applications (APP).*

H2. *Increasing the satisfaction with the use of mobility-related applications (APP) has a positive impact on the application of the MaaS service concept in the field of tourism.*

H3. *There is a mediated connection between the multimodal mindset (way of thinking) (MULTIMOD) and the MaaS service concept through satisfaction of using mobility-related applications (APP).*

The set hypotheses were tested through the set operational conceptual model.

The relationship between the two variables, among others, can be conceptualized as a cause-and-effect relationship in which the independent variable has a direct causal effect on the dependent variable but also has an outcome of various indirect effects of the so-called third variables [13]. The operational model of the research shows the paths "a", "b", "c" and "c'", which represent the regression coefficients, the correlation between X and M, M and Y, and X and Y, respectively (Figure 2). The coefficient "c" conveys the total effect of X

on Y, while the coefficients "a" and "b" transmit the indirect effect of X on Y, while path c′ represents the direct effect of the independent variable (X) on the dependent variable (Y). Based on the set research model, it can be seen that the construct X (Multimodal way of thinking) transmits a direct effect on the construct Y (MaaS in the function of tourism) based on the coefficient "c". Moreover, based on the proposed research model, it can be seen that the total effect of construct X (MULTIMOD) on construct Y (MaaS) is equal to "c + a * b" [16] (Figure 1). If either "a" or "b" is zero, then the relationship between X and Y is direct, and the total effect is equal to "c" (Total effect = c + a * b = c + 0 = c). The ratio of indirect performance (a * b) to total performance (a * b + c) represents the share of performance contributed to the intermediary [17]. The set research model was tested and presented through the following chapters.
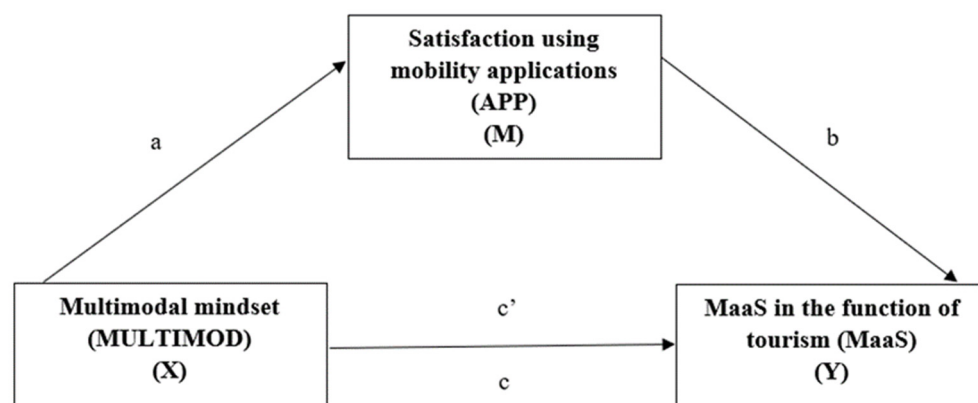

Figure 2. Operational Conceptual Model. Source: Author's work, 2022.

3. Methodology

3.1. Instrument

The purpose of this study is to examine the relationship between a multimodal mindset and its impact on the MaaS concept service in tourism of a possible mediator effect of satisfaction with the use of mobility-related applications. This paper also seeks to explore and focuses on the importance and benefits of the MaaS concept in the field of tourism and the positive impact of citizens' perceptions to observe the MaaS concept as support for tourism development. The existent literature on this topic is mainly conceptual with very few related research instruments in existence, which represents a challenge for this research. The research instruments used consist of the following elements (constructs): (1) multimodal mindset; (2) satisfaction with the use of mobility-related applications; and (3) MaaS in the function of tourism. By researching the concepts and definitions of these constructs, measurement constructs were also formed (Likert scale;1—strongly disagree, 5—strongly agree) (Tables 1–3).

Table 1. Construct of measuring multimodal mindset (way of thinking).

Code	Particle	Modality
MULTIMOD1	I would use carpooling when traveling	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD2	I would use car sharing when traveling	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD3	I would use bike sharing when traveling	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD4	How I travel depends on the activities at the tourist destination of my trip	Likert scale (1—strongly disagree, 5—strongly agree)

Table 1. *Cont.*

Code	Particle	Modality
MULTIMOD5	Traveling to a particular tourist destination depends on who is participating in my trip	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD6	Traveling to a particular tourist destination depends on whether there is a parking space if I travel by car	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD7	Traveling to a particular tourist destination depends on the cost of the trip	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD8	I often compare different travel options before deciding to travel to a particular tourist destination	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD9	I don't mind combining different modes of transportation in one trip, like a bike and a train	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD10	Using online travel data, a route planner, or a navigation system, I determine which mode of transportation I will use	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD11	I would use the travel app to give me an overview of all possible travel options to tourist destinations	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD12	I am open to new ways of traveling to tourist destinations	Likert scale (1—strongly disagree, 5—strongly agree)
MULTIMOD13	I practice new ways of traveling to tourist destinations	Likert scale (1—strongly disagree, 5—strongly agree)

Source: Author's work, 2022, according to [3,12,13].

Table 2. Construct of measuring satisfaction with the use of mobility applications.

Code	Particle	Modality
APP1	Mobility applications make it easier and faster for me to organize my trip and allow me to find the best way to travel to my desired destination	Likert scale (1—strongly disagree, 5—strongly agree)
APP2	Different applications offer different information related to travel planning	Likert scale (1—strongly disagree, 5—strongly agree)
APP3	I wish there was one app that could integrate the functionality of all my mobility apps	Likert scale (1—strongly disagree, 5—strongly agree)

Source: Author's work, 2022, according to [3,12,13].

Table 3. Construct of measuring MaaS in the function of tourism.

Code	Particle	Modality
MaaS1	MaaS service (Travel planning): Proposing routes that combine modes of public and private transport	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS2	MaaS service (Travel planning): Suggesting transport mode combinations to save travel costs	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS3	MaaS service (Travel planning): Indication of the environmental impact of each proposed mode of transport	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS4	MaaS service (Travel planning): Sending real-time updates when there are delays on the route	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS5	MaaS service (Travel planning): Suggesting routes that include my private car	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS6	MaaS service (Travel planning) Suggesting routes that combine my private car with other modes of transport	Likert scale (1—strongly disagree, 5—strongly agree)

Table 3. *Cont.*

Code	Particle	Modality
MaaS7	MaaS service (Travel planning): Display of waiting time for arrival of mode of transport	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS8	MaaS service (Travel planning): Showing the location of the vehicle I will use	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS9	MaaS service (Paying and buying tickets): Possibility to buy all transport tickets in	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS10	MaaS service (Paying and buying tickets): Possibility to connect a bank card so that all cards can be paid	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS11	MaaS service (Paying and buying tickets): All my transport tickets are on my mobile phone	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS12	MaaS service (Other functionalities): Ability to view travel statistics for each week/month/year	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS13	MaaS service (Other functionalities): Possibility to take the bill for each trip	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS14	MaaS service (Other functionalities): Possibility to create and have a family account	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS15	MaaS service (Other functionalities): Possibility to share the trip with friends and family during the trip	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS16	MaaS service (Other functionalities): Possibility to order food delivery during the trip	Likert scale (1—strongly disagree, 5—strongly agree)
MaaS17	MaaS service (Other functionalities): Possibilities of setting travel goals to reduce travel costs	Likert scale (1—strongly disagree, 5—strongly agree)

Source: Authors'work, 2022, according to [18].

Today's notion of multimodal transport and the multimodal mindset about it changes the traditional ways of transport and the functioning of people in it. It is therefore not surprising that people are slowly embracing and applying new concepts and models of mobility. One of the main goals of today regards mobility concerns and focuses on initiating changes in the behavior of mobility from personal cars to a combination of more environmentally-friendly modes of transport (public transport, cycling, bike sharing, car sharing, etc.). The aim of mobility is to fill the gap between public and individual modes of transportation so that an intermodal mobility network can be created [19]. One of the main criteria of multimodal behavior and thus multimodal thinking that precedes behavior is the fact that shared mobility modes are always used in combination with other transport modes [19]. According to Jonuschat et al. [19] (p. 151), multimodal mobility is defined as a "mobility behavior that is characterized by flexible usage and a combination of different transport modes according to the situation and to the available transport means". Authors [20] explain multimodality as a key factor in sustainable and efficient transport systems, thus influencing the tendency to use sustainable modes of transport especially in urban areas. Their research survey was conducted to explore the transitions to more sustainable and emergent transportation modes, where they revealed the distribution of unimodal, multimodal, and nonvehicle commute behavior [20]. Authors [21] propose a model of customized day itineraries in tourism with consideration of transport mode choice that we can claim is connected to the multimodal mindset and can affect mobility in tourism. Moreover, for understanding the diversity level of a multimodal transportation system, considering urban planning strategies to enhance diversity in travel, a framework was presented and proposed [22].

The multimodal mindset is associated with multimodal planning, where different requirements can be seen, as well as the travel values of different stakeholders [23]. Multimodal transport planning and a multimodal mindset require tools for evaluating the quality of each mode. Due to multimodal transportation, and according to Litman [23] (p. 9), "society could benefit from more efficient road, parking, fuel and insurance pricing, or more efficient management of road space, that favor higher value trips and more efficient

modes in order to reduce traffic congestion, parking costs, accidents and pollution emissions". Authors [13] claim that people who have a multimodal mindset are more inclined to use MaaS.

According to the MaaS paradigm, privately owned vehicles will be replaced by multimodal mobility service [24,25] (Table 1).

Traveling without apps today is completely unthinkable. We no longer mean standard services, but applications that combine various information needed for travel planning and its implementation (Table 2).

Recognizing the importance and benefits of the MaaS concept can result in a more efficient and functional way of traveling, which can lead to faster and more innovative ways and methods of traveling (Table 3).

These constructs are part of the research conceptual model. Their relationship through the set model was used to test the set hypotheses in order to conceptualize the cause-and-effect relationship in which the independent variable has a direct causal effect on the dependent variable, but also as a result of various indirect effects of the so-called third variables, i.e., the impact of the mediation variable.

3.2. Data Collection

Empirical research was conducted through an online survey. The survey was created on the Google Docs platform and was sent to 1000 random e-mail addresses of the general public throughout the north of the Republic of Croatia. The survey was conducted during April 2021, and 401 survey questionnaires were collected, which is a survey return of 40.1%. Through insight into previous research [3,12,13,15,25] the survey (questionnaire) was created consisting of seven parts:

1. A set of demographic questions;
2. A set of questions related to modes of mobility (public transport, private transport, new transport concepts, e.g., car sharing, carpooling, bike sharing);
3. Questions about personal experiences in the field of using mobile applications related to mobility;
4. Questions about attitudes about satisfaction by combining modes of transport to travel to a tourist destination. Respondents evaluated each offered statement on a Likert scale from 1 to 5 (1—strongly disagree, 2—disagree, 3—neither agree nor disagree, 4—agree, and 5—strongly agree);
5. Questions about attitudes about satisfaction with the use of mobility applications. Respondents evaluated each offered statement on a Likert scale from 1 to 5 (1—strongly disagree, 2—disagree, 3—neither agree nor disagree, 4—agree, and 5—strongly agree);
6. Questions related to views on a multimodal way of thinking (mindset) about travel planning. Respondents evaluated each offered statement on a Likert scale from 1 to 5 (1—strongly disagree, 2—disagree, 3—neither agree nor disagree, 4—agree, and 5—strongly agree);
7. Questions related to attitudes regarding the acceptance and use of the MaaS service concept. Each offered statement was evaluated by the respondents on a Likert scale from 1 to 5 (1—strongly disagree, 2—disagree, 3—neither agree nor disagree, 4—agree, and 5—strongly agree).

The purpose of this research was to collect data through the presented questionnaire on cognition and knowledge about the MaaS service concept, then to analyze the collected data to see the possible benefits of this concept as one of the main conditions for sustainable development in tourism.

3.3. Data Analysis

For the quantitative data obtained through survey questionnaire descriptive statistical analyses, testing the reliability of the scale, testing the assumptions for performing regression analysis, and analysis to investigate relations (correlation and multiple regression) were employed to explain the relationships among the variables. By testing the signifi-

cance of mutual correlations of the variables used and through regression analysis, the aim was to measure and statistically check and confirm whether the moderator or mediation influenced the relationship between the observed predictors and criterion variables. According to Baron and Kenny (1986) [16], mediation testing consists of (1) verification of predictor contributions to explain criteria; (2) verification of predictor contributions to explain presumed mediator variable; and (3) the question, does the predictor continue to have a significant contribution to the explanation of the criteria if the regression also includes the assumed mediation variable? The collected data were statistically processed using two programs: SPSS and MS Excel. Appropriate statistical methods and tests were applied to test the set research hypotheses. As there are two dependent variables through the operational conceptual model (shown in Figure 1), mediation analysis in SPSS was used. Mediation analysis is an extension of simple linear regression because one or more variables are added to the regression equation. The mediator variable describes the way in which the intervention yields an outcome. Mediator variables are "the mechanism by which X (independent variable) affects Y (dependent variable)" [17] (p. 7). In mediation analysis, it is assumed that the independent variable (X) affects the mediator (M), which in turn affects the dependent variable (Y). The relationship between the independent and dependent variables is assumed to be indirect. A simple mediation model illustrating the relationship between X, M, and Y is previously shown through Figure 1. In the case of our research and the set research model, the independent variable X (MULTIMOD) affects the dependent variable Y (MaaS). Likewise, in the mediation analysis of our case, the independent variable X (MULTIMOD) affects the mediator, the variable M (APP), which ultimately affects the dependent variable Y (MaaS).

4. Findings of the Conducted Research

4.1. Demographic Findings and Their Connection to the Ways of Mobility and the Use of Mobile Applications

The survey result illustrates that most respondents are female 69.6% with 30.4% of male respondents. The majority of respondents were between 16 and 25 years of age (33.3%), while those aged 56 represent 2.7%. Regarding education, 44.9% of respondents have a university degree, followed by those who have completed high school, i.e., 43%. The fewest respondents, 8.1% to be precise, have a Master's degree and 4% a Doctorate. Considering the working status of the respondents, 69.4% of them are employed, 26.7% are students, and in total 4% are unemployed and pensioners. Results shows that more than half of the respondents live with a partner, i.e., 53.1%, while slightly fewer live with parents, siblings and children. A total of 16.5% of them could not define the structure of their household.

Combining demographic data with data related to mobility, the survey shows that 94.6% of respondents are those whose household uses a car. Results show that 41.5% of respondents, in their household, own 2 cars, 31.6% of respondents own only 1 car, while 7.2% own 3 or more cars. A total 3.7% of respondents whose household does not own a car were recorded, which speaks to a high consumption of private vehicles and less public transport. Data related to the use of private vehicles shows a high rate of use of private vehicles, i.e., 63.5% of respondents use a car once every two weeks, 17.4% several times a week, while 11.4% of respondents use a car at least once a day. A total of 3% of them hardly use a car, and 1.1% once a week. The rest of the respondents use a car once in 2 weeks, once a month or even less than that. Regarding the use of public transport, 42.7% of respondents use public transport several times a year, and 38.8% almost never. Other respondents use it more often, i.e., once a month, once every 2 weeks, and even several times a week. A total of 2.2% of respondents use public transport once or several times a day. Respondents who use public transport mostly travel by bus, i.e., 61.1%. Almost the same percentage of respondents use a train and tram, about 36%, while 45.3% use taxi services. The smallest percentage are those who use the concept of car and bicycle sharing, probably because they are new concepts of mobility.

The aim of this survey was to examine people's awareness of new modes of mobility as well as combine new modes of mobility to ensure the sustainability of transport. Considering the above mentioned, research in that area indicates that people are familiar with new concepts of mobility such as private carpooling (77.8%), but only 24.9% used the concept of carpooling. Regarding car sharing, 59.5% recognize the concept, while only 7.7% use it. Bike sharing is familiar for 49.1% of respondents, while only 8.1% used it. When going on a multiday trip to a tourist destination, the majority of respondents, or 81.7%, use a car, while 7.7% of respondents use a plane and 5.9% use a bus. Other respondents carpool, take a ferry, catamaran/boat and train, and the smallest percentage, i.e., 0.7%, use a bicycle. The presented data continue to confirm the dominance of a private car during a multiday trip to a tourist destination.

As mobility is associated with mobile applications and smartphones today, research shows that 94.3% of respondents use a smartphone, while a relatively small percentage (5.7%) do not use one. Results show that 40% of respondents use a smartphone every time they plan a trip, while 28.9% of them belong to the category of frequent users. A total of 7.7% of respondents never use a smartphone. Regarding mobility-related applications, 89.1% of respondents use navigation applications, followed by travel planning applications, taxi applications and railway applications. The smallest number of respondents, i.e., 10.8%, use applications for car sharing and rental, as well as bicycle-sharing applications. When traveling, respondents are not ready and do not combine different modes of transport to arrive at a tourist destination, and when traveling, they consider comfort to be one of the most important factors for choosing the mode of transport. Respondents could not speak clearly about the multimodal way of thinking and combining transport (which includes carpooling, car sharing and bike sharing) and did not have a clear position on accepting this way of traveling. However, they largely agree that the way of traveling depends on the road and a parking space at the destination (if they decide to travel by car), taking into account the openness to new alternative possibilities.

As the main focus of the research was the knowledge about the MaaS concept, the research shows that only 12.8% of respondents have heard of the concept, 1.2% have installed one of the MaaS applications, while only 2% of respondents used MaaS when planning and going on a trip. The conducted research on the territory of the Republic of Croatia indicates insufficient information and use of the MaaS service as a new concept aimed at sustainable mobility. Survey data indicate that 87.2% of participants are not familiar with the concept of MaaS. As the aim of the research was to bring closer to the citizens the importance and functionality of new concepts of sustainable mobility, and above all the MaaS service, the results indicate insufficient awareness of citizens about the service. Nevertheless, the research confirms the recognition and appreciation of the concept by the respondents, which speaks to the gradual acceptance and application.

4.2. Measurement and Structural Model Analysis of Results of the Conducted Research Based on the Set Research Model

This paper focuses on the practical application of mediation analysis in social-science research practice. Through mediation analysis, a relationship is made between independent (X) and dependent (Y) variables that can be direct or indirect. A direct effect will occur if the relationship between X and Y cannot be affected by a third (or fourth) variable, while an indirect effect occurs when the relationship between X and Y is affected by one or more variables (mediated by other variables).

The course of data analysis in the conducted research is as follows: (1) scale reliability testing; (2) assumption testing for regression analysis; and (3) analysis for relation research (correlation and multiple regression). From the performed analyses, reliability and normality, input and output data, it was proved that the preconditions for the implementation of linear regression analysis were met. Input reliability testing was performed through Cronbach's Alpha coefficient, the value of which must be greater than 0.7. Table 4 shows

that the Cronbach's Alpha coefficient is greater than 0.7, which proves the good reliability and internal consistency of the data scale for testing the set hypotheses.

Table 4. Reliability Statistics.

Cronbach's Alpha	N of Items
0.939	30

Source: Authors' work, 2022.

Scale statistics (Table 5) shows descriptive input statistics.

Table 5. Scale statistics.

Mean	Variance	Std. Deviation	N of Items
104.95	451.403	21.246	30

Source: Authors' work, 2022.

In order to test the relations (correlations and multiple regressions) of the operational model of the research, the analysis was performed using the computer program PROCESS procedure for SPSS. The outputs and explanations of the tables are given below.

Table 6 shows that the model explains 10.86% (R-sq) of the variance of the mediator variable satisfaction with the use of mobility applications (APP) and is statistically significant ($p < 0.05$).

Table 6. Representativeness indicators of the regression model with dependent variable multimodal mindset "MULTIMOD" (outcome variable APP).

Model Summary	R	R Square	MSE	F	df1	Df2	*p*
	0.3296	0.1086	1.1692	48.6218	1.0000	399.0000	0.0000 *

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 7 shows that there is a positive correlation between multimodal mindset (MULTIMOD) and satisfaction with using mobility applications (APP). The nonstandardized correlation coefficient a = 0.49 is statistically significant because $p < 0.05$ and the area between LLCI and ULCI does not contain zero, which means that the correlation coefficient cannot be zero. These results confirm hypothesis H1.

Table 7. Regression analysis of multimodal mindset (impact of MULTIMOD (X) on APP (M) (path "a")) (Outcome variable APP).

Model	Coeff	se	t	*p*	LLCI	ULCI
constant	2.0125	0.2383	8.4456	0.0000 *	1.5441	2.4810
MULTIMOD	0.4905	0.0703	6.9729	0.0000 *	0.3522	0.6288
Standardized coefficients	-	-	-	-	-	-
MULTIMOD	0.3296	-	–	-	-	-

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 8 shows that the model explains 61.95% (R-sq) of the variance of the dependent variable MaaS and is statistically significant $p < 0.05$. (path c').

Table 8. Representativeness indicators of the regression model with dependent variable MaaS (outcome variable MaaS).

Model Summary	R	R Square	MSE	F	df1	df2	*p*
	0.7871	0.6195	0.2901	324.0467	2.0000	398.000	0.0000 *

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 9 shows that there is a positive direct effect between multimodal mindset (MULTIMOD) and MaaS. The nonstandardized correlation coefficient $c' = 0.22$ is statistically significant because $p < 0.05$ and the area between LLCI and UCCI does not contain zero, which means that the correlation coefficient cannot be zero. This confirms hypothesis H0. There is a positive relationship between the variable satisfaction with the use of mobility applications (APP) and MaaS. The nonstandardized correlation coefficient is b = 0.53, $p < 0.05$ and cannot be zero (LLCI 0.4843 ULCI 0.5824), which confirms hypothesis H2.

Table 9. Regression analysis of multimodal mindset (MULTIMOD) and satisfaction using mobility applications (APP) on MaaS (impact of MULTIMOD (X) on APP (M) on MaaS (Y) (path "b")) (Outcome variable MaaS).

Model	Coeff	se	t	*p*	LLCI	ULCI
constant	0.9812	0.1289	7.6133	0.0000 *	0.7278	1.2345
MULTIMOD	0.2223	0.371	5.9897	0.0000 *	0.1493	0.2953
APP	0.5333	0.0249	21.3865	0.0000 *	0.4843	0.5824
Standardized coefficients	-	-	-	-	-	-
MULTIMOD	0.1961	-	–	-	-	-
APP	0.7004	-	-	-	-	-

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 10 shows that the model explains 18.23% (R-sq) of the variance of the dependent variable MaaS and is statistically significant ($p < 0.05$) (path c).

Table 10. Representativeness indicators of the regression model with dependent variable MaaS (outcome variable MaaS).

Model Summary	R	R Square	MSE	F	df1	df2	*p*
	0.4270	0.1823	0.6220	88.9587	1.0000	399.0000	0.0000 *

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 11 shows the total nonstandardized effect of the mediation model on MaaS where c = 0.48 and is statistically significant ($p < 0.05$) (path c).

Table 11. Regression analysis of multimodal mindset on MaaS (impact of MULTIMOD (X) on MaaS (Y) (Outcome variable MaaS).

Model	Coeff	se	t	*p*	LLCI	ULCI
constant	2.0545	0.1738	11.8212	0.0000 *	1.7129	2.3962
MULTIMOD	0.4839	0.0513	9.4318	0.0000 *	0.3830	0.5848
Standardized coefficients	-	-	-	-	-	-
MULTIMOD	0.4270	-	-	-	-	-

Source: Authors' work, 2022. Note * $p < 0.001$.

Table 12 shows the total and direct (direct and indirect) effect of the independent variable MULTIMOD (X) on the dependent variable MaaS (Y). The total nonstandardized effect of the mediation model on MaaS is c = 0.48 and is statistically significant because $p < 0.05$ and the LLCI-ULCI range does not include 0. Total effect is the effect that creates the whole model, indirect and direct effect. It is the sum of indirect effects (a * b) and direct (c′) effects. The direct effect of the independent variable MULTIMOD on MaaS is $c' = 0.22$ and is statistically significant ($p < 0.05$), while the LLCI-ULCI range does not include zero.

Table 12. Bootstrap Estimates of Total and Direct Effects of MULTIMOD (X) on MaaS (Y).

	Effect	se	t	*p*	LLCI	ULCI	c_ps	c_cs
Total Effect of X on Y	0.4839	0.0513	9.4318	0.0000 *	0.3830	0.5848	0.5555	0.4270
Direct Effect of X on Y	0.2223	0.371	5.9897	0.0000 *	0.1493	0.2953	0.2552	0.1961

Source: Authors' work, 2022. Note * *p* < 0.001.

Table 13 shows the indirect (indirect) impact of MULTIMOD (X) on MaaS (Y). The indirect mediation effect is positive and amounts up to 0.26; the BootLLCI-BootULCI range does not include zero, so hypothesis H3 is confirmed. Preacher and Hayes (2008) [26] emphasized that in many situations, the bootstrapping method is the most reasonable method because of its reliability limits for specific indirect effects.

Table 13. Bootstrap Estimates of Indirect Effects of MULTIMOD (X) on MaaS (Y).

	Effect	BootSE	BootLLCI	BootULCI
Indirect effect(s) of X on Y (APP)	0.2616	0.0454	0.1735	0.3527
Partially standardized indirect effect(s) of X on Y (APP)	0.3003	0.0480	0.2043	0.3930
Completely standardized indirect effect(s) of X on Y (APP)	0.2308	0.0382	0.1539	0.3042

Source: Authors' work, 2022.

The results of regression analysis show that multimodal mindset (independent variable X) is an important predictor of satisfaction with the use of mobility applications (a = 0.4905, 95% CI (0.3522, 0.6288), t = 6.9729 *p* < 0.000)). The correlation coefficient between APP and MaaS is also significant (b = 0.5333, 95% CI (0.4843, 0.5824), t = 21.3865, *p* = 0.000). Furthermore, while controlling satisfaction with the use of mobility applications (mediator), the results of the second regression analysis show that multimodal mindset is a significant predictor of MaaS service (dependent variable c′ = 0.2223, t = 5.9897, *p* < 0.0000). A bootstrapping method was performed using the SPSS Process Macro to examine whether satisfaction with the use of mobility applications mediates the relationship between the multimodal mindset and the MaaS service. The results of the indirect effect based on 5000 repetitions (for normal distribution) show a significant indirect positive association between multimodal mindset (MULTIMOD) and the MaaS services concept (MaaS) mediated by the satisfaction of using mobility applications (APP) (a * b = 0.2616, Bootstrap CI95 = 0.1735 and 0.3527). Table 14 and Figure 3 show the results of mediation analysis.

Table 14. Mediation Analysis.

Variable Effect	Effect	se	t	*p*	95% Confidence Interval	
MULTIMOD → MaaS (Direct effect–path c′)	0.2223	0.371	5.9897	<0.00	0.1493	0.2953
MULTIMOD → APP	0.4905	0.0703	6.9729	<0.00	0.3522	0.6288
APP → MaaS	0.5333	0.0249	21.3865	<0.00	0.4843	0.5824
Indirect effect	0.2616	0.0454	-	-	0.1735	0.3527
Total effect–path c	0.4839	0.0513	9.4318	<0.00	0.3830	0.5848

Source: Authors' work, 2022.

Simple mediation diagram: a, b, c and c′ are path coefficients representing unstandardized regression weights and standard errors. The c′ path coefficient represents the direct effect of multimodal mindset (MULTIMOD) on the MaaS. The c path coefficient refers to the total effect of the multimodal mindest (MULTIMOD) on the MaaS (all analyzed paths were significant, ** *p* < 0.01). For the relationship between multimodal mindset (MULTIMOD) satisfaction of using mobility-related applications (APP), the coefficient suggests that one unit increase of multimodal mindset (MULTIMOD) results in a 0.49 increase in satisfaction of using mobility-related applications (APP). For the b Path, a one unit increase

in satisfaction of using mobility-related applications (APP) results in a 0.53 increase in the MaaS concept. The coefficient for the c Path (MULTIMOD to MaaS) without APP is very significant a 0.48, while the c′ Path is no longer significant (0.22). Putting in this mediator reduces the significance for the c′ Path, which suggests that this is a good mediator.
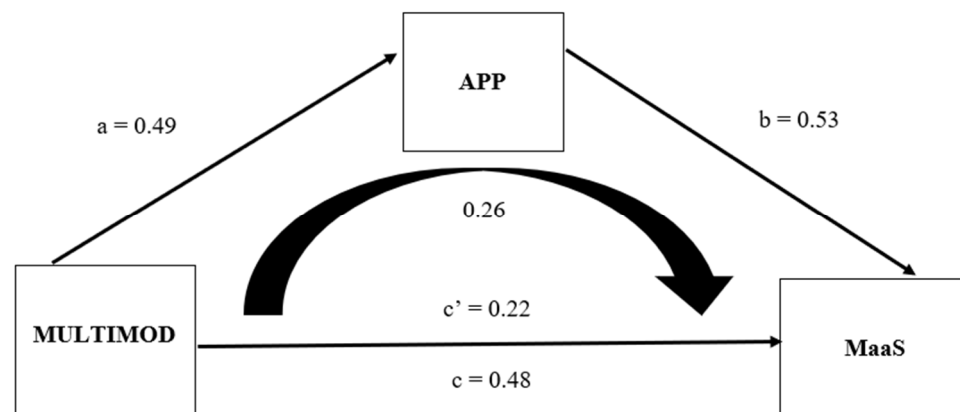

Figure 3. Results of Mediation analysis. Source: Authors' work, 2022.

Our following set of research questions are now explained and connected to research results: (1) Is there a statistically significant relationship between multimodal mindset (way of thinking) (independent variable X) and the MaaS service in the function of tourism (dependent variable Y), and can this relationship be mediated by a third variable, mediation variable of satisfaction with the use of mobility-related applications (mediation variable M)? (2) To what extent is MaaS (Y) related to multimodal mindset (X), and is this relationship mediated by the satisfaction of using mobility-related applications (M)? Multiple regression analyses were conducted to assess each component of the proposed mediation model. Firstly, it was found that multimodal mindset was positively associated with MaaS. It was also found that multimodal mindset was positively related to satisfaction with the use of mobility-related applications. Lastly, the results indicated that the mediator, satisfaction with the use of mobility-related applications, was positively associated with MaaS. Results of the mediation analysis confirmed the mediating role of satisfaction with the use of mobility-related applications in the relation between multimodal mindset and MaaS. In addition, the results indicated that the direct effect of multimodal mindset on MaaS became nonsignificant when controlling for satisfaction with the use of mobility-related applications, thus suggesting full mediation. To summarize the results from the obtained research and to answer the set research questions, we can conclude the following: the first research question is highlighted through the research results, showing that there is a positive direct effect between multimodal mindset (MULTIMOD) and MaaS confirmed by a nonstandardized correlation coefficient that is statistically significant, also showing that this relationship is mediated by a third variable (APP). The second question is highlighted through the results that confirm, while controlling satisfaction with the use of mobility applications (mediator APP), that multimodal mindset (MULTIMOD) is a significant predictor of the MaaS service, showing that this relationship is mediated by the satisfaction of using mobility-related applications (APP). Here we find that our total effect model shows a significant positive relationship between MULITMOD (X) and MAAS (Y). Research results show that a multimodal mindset (MULTIMOD) is a significant predictor of MaaS when controlling for satisfaction with the use of mobility applications (mediator–APP), which answers our set research questions.

5. Discussion and Recommendations for Future Research

In this paper, the concept of MaaS and its implementation in the field of tourism, as well as the mediation testing based on the set research model, was conducted to confirm the research hypotheses. The research proved that there is a statistically significant relationship

between multimodal mindset (way of thinking) and MaaS service in the function of tourism and that this relationship is mediated by the satisfaction with the use of mobility-related applications. The change in the way of thinking about mobility and types of mobility affects the choice of new ways of mobility, which is the MaaS service concept that increases user satisfaction and speeds up and facilitates the mobility in tourist destinations. Through this paper, the importance and benefits of the MaaS concept and its relation to tourism are highlighted. MaaS is changing the way of traveling and visiting certain tourist destinations, thus reducing the negative effects on the environment, but it is also changing the way individuals interact with each other. The process of applying the MaaS concept includes the implementation and integration of digital technology, which changes the way of traveling and providing services to consumers (tourists).

In order to prove the set goals, the following research hypotheses were tested:

1. H0: Increasing the multimodal mindset (way of thinking) (MULTIMOD) has a positive effect on the MaaS service concept in tourism;
2. H1: Multimodal mindset (way of thinking) (MULTIMOD) affects the satisfaction of using mobility-related applications (APP);
3. H2: Increasing the satisfaction with the use of mobility-related applications (APP) has a positive impact on the application of the MaaS service concept in the field of tourism;
4. H3: There is a mediated connection between multimodal mindset (way of thinking) (MULTIMOD) and the MaaS service concept through satisfaction of using mobility-related applications (APP).

The obtained results confirmed all the set research hypotheses; therefore, it is concluded that all the stated hypotheses of the model are accepted. The results of the regression analysis show that multimodal mindset (independent variable X) is an important predictor of satisfaction with the use of mobility applications, and while controlling satisfaction with the use of mobility-related applications (mediator), the results of the second regression analysis show that multimodal mindset is a significant predictor of MaaS.

After the presented connection of independent and dependent variables, through the presented mediation model, the limitations and recommendations for future research can be stated, based on the conducted empirical research and the obtained results. Depending on the intention and goal of future research, the number of independent and dependent variables in research can be reduced or increased, but also changed. Regression analysis and the applied mediation model were used to test the set research hypothesis but also to assess the connection between multimodal mindset and the MaaS service concept through satisfaction with using mobility-related applications. The sample of this research is the general population, citizens of the Republic of Croatia (RH) from the northern part of the Republic of Croatia. As the analysis was conducted in the north of the Republic of Croatia, for future research it would be desirable to include other areas of the Republic of Croatia, i.e., the entire Republic of Croatia, other EU countries, neighboring countries and citizens of other continents, in order to be able to compare data according to certain criteria and areas. As the research comprises the citizens of the northern part of the Republic of Croatia, the impact of the use of the MaaS service concept by companies and service providers themselves could be further investigated. If the research would include companies and service providers, it would be desirable to investigate in more detail how the implementation or level of development of information and communication technologies affects business processes within the organization, and consequently competitiveness and business results related to the use of the MaaS concept. It would also be desirable to investigate in more detail how the adoption and implementation of new technology, i.e., the MaaS concept, can provide tourists support, training and education to use it as quickly and efficiently as possible. Through the conducted research, certain scientific and applied goals have been achieved. A critical review of the existing research area was conducted. Based on the conducted research, a lack of research in this area was established.

The paper explains the MaaS service concept and the benefits and advantages of its use. It also defines some of the key determinants of the adoption and application of the

MaaS concept as one of the key predictors of creating sustainable development and mobility in the field of tourism. "Following trends and using new modes of transport (with the introduction of the new trend (MaaS)), changes in the lifestyle of younger generations, the trend of urbanization, changing consumer expectations, urban innovation, rapid growth of technology-all of the above affects and shapes future mobility" [27] (p. 504).

6. Conclusions

This study revealed a connection between multimodal mindset and the MaaS concept and reported the importance of satisfaction of using mobility-related applications as mediator variables. This study was designed to survey the awareness about the MaaS concept in the Republic of Croatia in the field of tourism. So far, no research has been conducted in the Republic of Croatia examining the application and use of the MaaS service concept in the field of tourism and its importance and contribution to strengthening tourism mobility. MaaS is still under development, but it could change the way we conceive transport and travel. The MaaS concept is not recognized enough and will continue to grow as a concept in the manner of creating a more sustainable environment and sustainable modes of traveling.

The aim of this paper was to explore and determine the relationship between multimodal mindset and satisfaction of using mobility-related applications in predicting the usage of the MaaS concept. In line with theoretical assumptions, the satisfaction of using mobility-related applications mediated the relationship between multimodal mindset and the MaaS concept in the field of tourism. However, multimodal mindset remained a significant predictor of the MaaS concept even when controlling for satisfaction of using mobility-related applications.

As recommendations for further research have been stated in Section 5, we should state the impact of the conducted research. The impact of this research is visible in the awareness of both researchers and the general public about the MaaS concept. There is a lack of research on sustainable modes of transport and their combination. It is the understanding of the MaaS concept and its application and use that can have an impact on the sustainable development of society, especially in the field of tourism. Although research shows that people are willing to combine and use sustainable modes of transport in tourist destinations, the results still do not show sufficient awareness and its full implementation. Citizens are still not sufficiently environmentally aware, and congestion in cities has not yet reached a level that would effectively change travel behavior. Due to research results we can state its impact representing a new model that combines multimodal mindset and the MaaS concept mediated by satisfaction of using mobility-related applications. Our research model is the first to show the results of this type in the Republic of Croatia and beyond, where we can argue about the great importance and impact of the presented results that can strengthen and affect the application and usage of the MaaS concept in the field of tourism. Our research shows the great impact of a multimodal mindset on the application and usage of the MaaS concept in tourism, which should be given more attention in the near future among citizens, but also among researchers in this field and all stakeholders. The obtained research results can be used to expand the current knowledge about the MaaS concept and its impact on the creation of sustainable development and mobility in the field of tourism.

Contribution to existing knowledge is obvious in presenting and testing a new research model. The presented model and used constructs have not been included in any research so far, which improves the current state of the research area. Existing knowledge about the MaaS concept in this research has been expanded with knowledge about the importance and impact of multimodal mindset on the acceptance and use of the MaaS service in tourism that is under the influence of the mediator variable. Research provides the connection and influence of the multimodal mindset about mobility concepts on the very concept of MaaS through the satisfaction of mobility-related application users. Through the applicative contribution of this paper, the idea was to make the citizens of the Republic of Croatia

aware about the importance of accepting, adopting, implementing and using the MaaS service concept in the national market (but also abroad) for tourist purposes. This research should be considered as a review of the current status due to conducted research and an overview of the majority of available MaaS applications.

This research, however, is not without limitations. The conducted research includes the general public in the northern part of the Republic of Croatia. A better overview of the researched topic would be obtained if the sample included the whole territory and citizens of the entire Republic of Croatia, which is certainly a recommendation and goal for future research. Thus, in the future, the research might be extended with new participants from the market. Moreover, this research did not include MaaS operators or regulators, constructs that would be necessary in future research to understand the typical features and directions in the development of the MaaS concept on the market. The obtained results can provide valuable inputs for future research to investigate the possibility and identify methods of measurement for the current model, but also to expand the current model with new constructs that can capture the conceptual differences between the current model and its construct as well as a potential new one.

In conclusion, there are many opportunities for future investigation and methodological developments of the MaaS concept in many areas related to this research. By analyzing the relevant scientific literature and by the results of the conducted research, it is possible to conclude that there is currently insufficient awareness and use of the MaaS, concept especially in the field of tourism. Still, research results show a slow shift in the recognition and appreciation of the MaaS concept, which should ultimately lead to its increasing application.

Finally, this review depicts directions which should be investigated in future work. Although the concept itself is relatively new, full implementation is not yet fully done, so it should strive for systematic and strong recognition of the concept, further development and its full implementation and application in tourism. A deeper understanding of the interactions between the multimodal mindset and the MaaS concept under mediator variable may help target specific mobility in order to strive and reduce personal vehicle use and transition to more sustainable and emergent transportation modes in tourism. In accordance with all the above, the concept of MaaS is an inevitable tool in the local but also in the foreign and global market, and it should not be neglected in developed societies.

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