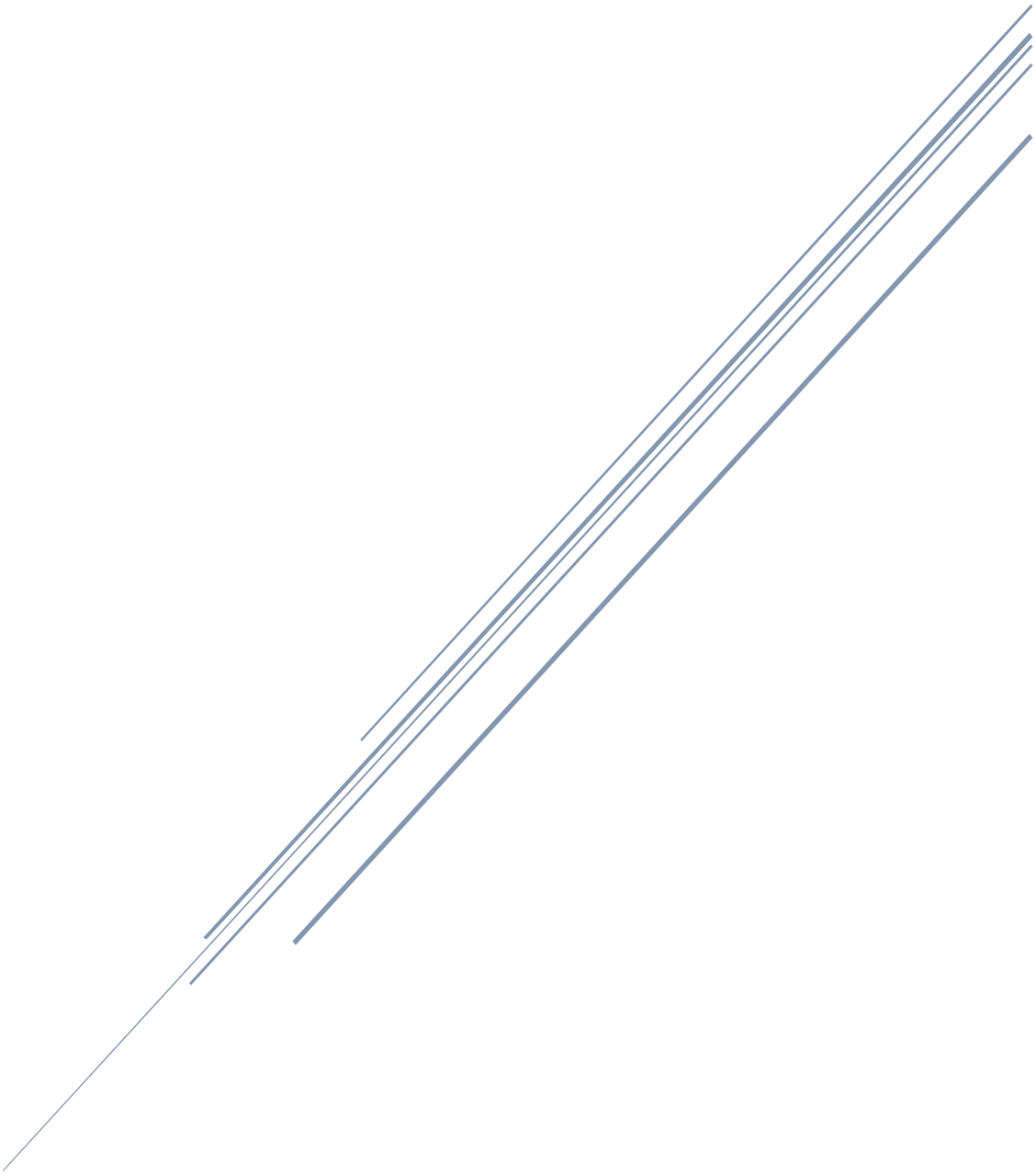
ANALYSIS OF USER NEEDS AND PREFERENCES REGARDING MOBILITY HUB FEATURES, SERVICES AND AMENITIES



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Preface

Dit verslag is het einde van een lang traject waarmee ik mijn Master Civil Engineering and Management afsluit. Daarmee komt er een einde aan mijn studietijd. Gedurende de opdracht en mijn studie heb ik veel lastige fases en hindernissen meegemaakt. Persoonlijke omstandigheden en medische ingrepen waren van grote impact die op verschillende fases van mijn studie van grote invloed waren en die tijd en inspanning kostten. Ondanks alles ben ik blij dat ik toch staande heb gehouden en van ver ben gekomen. Ik ben dankbaar voor de mooie momenten die ik in Enschede heb meegemaakt en dingen die ik heb geleerd.

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Abstract

In response to rising urban challenges such as congestion, air pollution, space inefficiency and car dependency, mobility hubs have emerged as a promising solution to increase sustainable and inclusive transport. These intermodal stations combine shared mobility services and public transport with supportive amenities and digital infrastructure. This thesis investigates how mobility hubs can be better designed and composed to meet the needs and preferences of both users and non-users of shared mobility, particularly in car-dependent contexts.

Using a survey distributed across five cities in North Holland, the research analyses user intentions, preferences, and socio-demographic influences on mobility hub usage. Despite widespread awareness of mobility hubs, actual intention to use shared mobility services remains limited, primarily due to a preference for private vehicles and a perceived mismatch with personal travel needs. However, there is strong interest in other mobility hub amenities, such as seating, parcel lockers, secure bicycle parking, and car parking, which appeal to both users and non-users alike. These findings suggest that mobility hubs offer broader community value beyond facilitating shared mobility.

Statistical analysis, including ordinal logistic regression, revealed that individual characteristics (e.g., age, gender, education, digital skills), mobility behaviours and spatial factors significantly influence usage intentions. While design preferences were broadly shared across user types, non-users prioritised comfort and safety, whereas potential shared mobility users emphasised digital integration, particularly unified booking and payment systems.

The findings support the view that mobility hubs can play a valuable role in urban mobility transitions, even in areas where shared mobility adoption is low. By aligning physical and digital hub features with the diverse needs of local populations and offering amenities besides only shared mobility, mobility hubs can enhance accessibility, promote multimodal travel and contribute positively to neighbourhood quality of life.

Executive Summary

In the face of growing urban challenges such as air pollution, congestion, space inefficiency, and car dependency, cities and regional governments are actively seeking sustainable and inclusive transportation alternatives. One increasingly popular approach is the development of mobility hubs, a multifunctional locations that combine various modes of transportation (shared mobility and public transport) with amenities and services that support comfort, accessibility, and usability.

This thesis explores how mobility hubs can be better designed and composed to increase their appeal and functionality, particularly in car-dependent areas with limited current use of shared mobility. The research investigates which features and services are most valued by both current users and non-users of shared mobility, with a focus on the Province of North Holland, where mobility hub planning is still in early stages but expected to expand.

Research Aim

The outcome of this research can help policymakers and researchers better understand these groups' perspectives on mobility hubs and explore ways to tailor the mobility hubs to their preferences and local context. Thereby better accommodating shared-mobility users and residents surrounding mobility hubs.

The aim of the research is therefore *to analyse the needs and preferences of users and non-users regarding mobility hub features, services and amenities*.

To fulfil the aim of the research, the analysis focuses on the use intention of a mobility hub and preferences for hub features based on physical and digital integration (Geurs et al., 2022). A mobility hub, understood in the context of this research, is a place with shared mobility and public transport alongside services and amenities. The research questions are:

1. What are the intentions for using mobility hub services and amenities among shared-mobility users and residents?
2. What are the priorities and preferences of users and non-users of shared mobility regarding the physical and digital integration of a mobility hub?
3. How do socio-demographic, mobility and spatial factors influence the intention to use a mobility hub, and how does that compare with earlier research?

Methodology

The research employs a survey-based methodology, with data collected from residents and visitors in five cities in North Holland: Purmerend, Zaanstad, Hoorn, Heerhugowaard and Schagen. These locations were selected based on their relatively high car dependency and low availability of shared mobility services. Flyers were distributed physically and through social media campaigns, and respondents completed a structured online survey. The survey covered socio-demographic information, mobility behaviour, intentions to use shared mobility and mobility hub services and preference for physical and digital integration features based on the integration ladder framework.

Statistical analyses, including descriptive statistics and binominal and ordinal logistic regression (OLR), were used to identify significant predictors of service usage intention and feature preferences.

Mobility hub interest

Although awareness of mobility hubs was relatively high, actual usage intentions for shared mobility services (especially shared cars, bikes and mopeds) remained modest. A primary reason was the strong

preference for private vehicles and the perception that shared mobility does not meet specific travel needs. However, those who expressed interest in using shared mobility services also highlighted the added value of mobility hubs, particularly the increased reliability and availability of vehicles through improved facilities.

Services and amenities

Beyond shared mobility, the study found a significantly higher willingness to make use of other mobility hub amenities. Amenities such as station features (e.g. seating, kiosks, and parcel lockers) and transport-related services (e.g. car parking and secure bike storage) were positively received by both current users and non-users of shared mobility. These services appear to offer a broader community value, independent of shared mobility uptake. Electric vehicle charging stations, in contrast, received the least interest. The mobility hub is well perceived among both likely and unlikely users of the mobility hub and shared mobility.

An ordinal logistic regression analysis showed that socio-demographic, behavioural and spatial factors—such as age, gender, education, household composition, digital skills, car ownership and usage, public transport frequency and even physical mobility limitations—were significant predictors of the intention to use shared mobility and mobility hub services. Notably, some variables influenced both types of usage, while others were more strongly associated with particular amenities or service types. This highlights the importance of tailoring mobility hub features to different population segments, recognising that the motivation to use shared mobility may differ from the motivation to use hub facilities more generally.

Mobility hub features

In terms of physical and digital integration, users and non-users of shared mobility shared broadly similar design preferences, suggesting a general consensus on which physical features are most valued. However, some variation was found: non-users placed greater emphasis on comfort and safety features, while future users of shared mobility expressed a stronger preference for integrated booking and payment systems. The demand for alternative digital booking options was low overall, although some respondents favoured options such as staffed service points or ticket machines. Importantly, public transport users showed a higher demand for the integration of shared mobility with existing transport apps.

Finally, when comparing these findings with earlier research (including data from the Smarthubs project), many of the same predictors of shared mobility use were identified. However, fewer significant predictors emerged for overall mobility hub service use, suggesting that general hub services may appeal to a broader user base. Interestingly, digital skills were less influential in predicting the use of physical services or design preferences. Additionally, the research showed that women, younger individuals, and those who use private cars less frequently tended to place more importance on design, service quality, and the availability of clear information.

Conclusion

Overall, this research underscores that while shared mobility adoption remains a challenge, mobility hubs can deliver substantial value by offering amenities and services that appeal to a wide range of users. By understanding the differing needs and priorities of various demographic and mobility user groups, planners and policymakers can create mobility hubs that not only support sustainable transport options but also serve as valuable community assets.

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1 Introduction

This chapter outlines the research background of mobility hubs, leading to the identification of the research gap and the formulation of the problem statement.

1.1 Background

Many urban areas face the challenge of making their transport systems more accessible and sustainable. Certain user groups often experience reduced access to transport and, as a result, limited access to activities and opportunities (Bastiaanssen & Breedijk, 2022; Krabbenborg & Uitbeijerse, 2023; Bezyak et al., 2017). At the same time, car dependency contributes to emissions and noise pollution, undermining the liveability of urban areas. High levels of car ownership also occupy valuable space that could otherwise be used for housing, green spaces and other forms of spatial development (Zijlstra et al., 2022). Land-use densification, car-use reduction and the demand for more accessible and inclusive transport form part of the global effort to develop sustainable and resilient cities (United Nations, 2023). In response, cities and governments seek ways to reduce car dependency and emissions while making transport more accessible and equitable.

Mobility hubs can contribute to these goals by integrating multi-modal transport options with amenities and place-based development (Rongen et al., 2022). Although the definition of a mobility hub can vary depending on the context, they generally offer shared-mobility options, are integrated with public transport and offer additional services and amenities (Geurs et al., 2022). A well-designed mobility hub provides a seamless transition between transport modes, increases waiting comfort and contributes to placemaking by providing amenities for travellers and local residents (Witte et al., 2021). In this way, the mobility hubs can expand mobility options, increase accessibility, reduce car dependency, encourage sustainable travel and ultimately enhance the urban living environment (Witte et al., 2021; Provincie Noord-Holland, 2023).

Mobility hubs can take many forms, varying in scale and functional purpose (Weustenenk & Mingardo, 2023; Witte et al., 2021). They range from small neighbourhood hubs with a few shared-scooters or bikes to major intermodal stations in city centres. Current literature has provided some direction on the composition and design of mobility hubs, with the integration ladder providing a framework and setting criteria for which a mobility hub is well integrated. The integration ladder provides a guideline for a well-integrated mobility hub by considering the physical, digital and democratic integration of the mobility hub, which includes criteria on the composition of shared-mobility , amenities, physical design features, information provisions and booking and payment systems. However, their design and effectiveness are not solely determined by scale, but also depend on the objectives of transport planners and the local context in which they are implemented. Currently, many mobility hubs are planned or under development across Europe Smarthubs. (n.d.). To ensure the successful implementation and efficient use of available space and resources, users' needs and preferences must be considered during the design phase.

As mobility hubs' benefits, value and opportunities become apparent, the issue arises of how to implement them in a way that makes people willing to use them. Several studies have shown that shared mobility tends to appeal to specific demographic groups. Factors such as age, gender, income, education and digital skills are known indicators for shared-mobility adoption, with generally younger, male, higher income, higher educated and those with better digital skills more likely to use shared-mobility (Mouratidis, 2022; Sophia, David, Michael, & Maximilian, 2021; Bösehans, Bell, Thorpe, & Dissanayake, 2023; Ko, Jang, & Lee, 2021; Blazanin, Mondal, Asmussen, & Bhat, 2022). While these patterns do not apply universally and may vary by transport mode, they highlight disparities in the

uptake of shared mobility. Lower adoption and use of shared-mobility and mobility hubs may reflect a lack of interest or an unfulfillment of mobility needs (Martinez et al., 2022; Garritsen, K., Grigolon, A., & Geurs, K.,2024).

Beyond being a broader societal challenge and research gap, this issue also manifests at the local policy level in the Netherlands. Local governments are increasingly tasked with urban densification, including constructing new housing in existing urban areas (PBL, s.d.). Mobility hubs are often viewed as part of the solution to address the increasing demand for mobility in compact urban settings (Provincie Noord-Holland, 2023). However, due to limited resources, local policymakers must understand which type of mobility hub is most suitable for a given area. While the design and implementation may be relatively straightforward in dense urban centres, many places have a diverse population and spatial factors that demand further understanding.

1.2 Problem Statement

As outlined in the previous section, the mobility hub's implementation and development face difficulty attracting a larger and more diverse population segment. This reflects a limited understanding of how mobility hubs can be better tailored to local conditions and individual users' needs. Until now, academic literature has primarily focused on shared-mobility adoption and mode preference. However, mobility hubs must engage more non-users to increase adoption and usage. Growing interest among different (non-)user groups (Martinez et al., 2022; Van der Meer, 2022) highlights a valuable opportunity to increase broader participation by adapting mobility hubs based on the needs and preferences. Specific features and functions of mobility hubs may have the potential to appeal to these groups and help overcome obstacles to access and usage.

Therefore, this thesis addresses the knowledge gap of what features of a local mobility hub are important to accommodate more users. Gaining a deeper understanding of the needs and preferences of these groups concerning mobility hubs is essential in determining how they might be better accommodated. Amenities and non-mobility services offer a unique aspect of the mobility hub that has not been extensively explored in relation to shared mobility. These amenities can excite potential shared-mobility users and non-users. Furthermore, the design features in relation to the integration ladder and users' attitude have been limitedly explored. This could help to understand the differences in integration and features between shared-mobility users and non-users. All combined, identifying the differences and commonalities among both user groups will be crucial in tailoring the hub's services to their needs.

2 Research Aim and Questions

To fill in the research gap discussed in the previous section, this thesis will analyse what mobility hub users and residents need and prefer from a mobility hub. These groups can have different or overlapping preferences, which can provide better insight into how to make a mobility hub more widely used and appealing to a broader range of users. The outcome of this research can help policymakers and researchers better understand these groups' perspectives on mobility hubs and explore ways to tailor the mobility hubs to their preferences and local context. Thereby better accommodating shared-mobility users and residents surrounding mobility hubs.

The aim of the research is therefore *to analyse the needs and preferences of users and non-users regarding mobility hub features, services and amenities.*

To fulfil the aim of the research, the analysis focuses on the use intention of a mobility hub and preferences for hub features based on physical and digital integration (Geurs et al., 2022). A mobility hub, understood in the context of this research, is a place with shared mobility and public transport alongside services and amenities. This combination of shared-mobility services and place-based development makes a mobility hub more than mobility alone. Therefore, this research looks beyond only shared-mobility usage intention by analysing service usage intention to review the composition of the mobility hub in a broader context. The research focuses on the Province of North-Holland with areas that currently lack extensive shared-mobility and mobility hubs and experience high car dependency, but with future needs and wishes for mobility hub development. The methodology will further elaborate on the mobility hub concept and scope.

The research questions are:

1. What are the intentions for using mobility hub services and amenities among shared-mobility users and residents?
2. What are the priorities and preferences of users and non-users of shared mobility regarding the physical and digital integration of a mobility hub?
3. How do socio-demographic, mobility and spatial factors influence the intention to use a mobility hub, and how does that compare with earlier research?

3 Literature Review

The research questions outlined the knowledge that needs to be obtained to achieve the research objective. In this chapter, the theoretical framework defines the key concepts mentioned in the research questions and describes the current state-of-the-art knowledge.

In section 3.1, the mobility hub is more defined alongside the integration ladder and mobility hub features to better define the mobility hub. In 3.2, the current literature on shared mobility and mobility hub use is discussed, while in 3.3, the related needs and preferences are described. In 3.4, the research gap and conceptual model are discussed.

3.1 Mobility hubs

Mobility hubs are a relatively recent development in land-use and transportation planning. Originating from two separate ideas (Rongen et al., 2022), first, intermodal transportation and transfer between these modes. To facilitate intermodal accessibility, transfers are made as smooth and easy as possible. The second idea is place-making and development. Because intermodal transfer nodes offer increased access to their surroundings, they make a favourable location for land-use development. Thus, mobility hubs are both an integration of transportation nodes and dense-activity places.

The Mobiliteitsalliantie (2020) defines a mobility hub as a physical location that facilitates a transfer to the most optimal modality for the subsequent trip ((Mobiliteitsalliantie, 2020), p.3). Geurs et al. (2022), have a slightly different definition. Based on a literature review, they define a hub as *a physical location where different shared transport options are offered at permanent, dedicated and well-visible locations and public or collective transport is available at walking distance* (Geurs et al., 2022, p.10). From the reviewed literature, they find that most sources include multiple modes and transfer between them. Only some clearly define the inclusion of public transport, shared mobility and non-mobility facilities. Furthermore, there is disagreement on whether non-mobility-related facilities are essential or optional for mobility hubs.

Mobility hubs can have different functionalities or objectives. They can offer a first—or last-mile connection, complement public transportation where it is not entirely available, and encourage sustainable transportation (Duran-Rodas et al., 2022; Geurs et al., 2022). These objectives can be part of societal goals to improve an area's liveability, accessibility and inclusion and reduce transport costs and congestion (Witte et al., 2021; Arnold et al., 2022).

There are multiple classifications for mobility hubs in the literature. Weustenenk & Mingardo (2023) identify six types of mobility hubs based on the transport and facilities offered at the hub. Similarly, Witte et al. (2021) identified six types of hubs based on network connection, population density and service area. The Province of North-Holland, defines four (primary) levels of mobility hubs (UUM, 2023). These mobility hubs are based on the level of urbanisation and the accessibility scale of the hub. In general, smaller mobility hubs serve a smaller population and are connected to a more local network or hub. In the context of this research, no precise type of hub is used, but it can share commonalities with a neighbourhood, suburban or city hub. Table 1 shows five types of hubs that have been identified.

Table 1: Mobility hub typology based on scale.

Community	**Local hub with shared mobility, no presence of public transportation, only for local residents**
Neighbourhood	Local hub with shared-mobility, close presence of shared-mobility, often centrally located in a neighbourhood, offers additional services

Regional hub	Rural hub without shared mobility, focus on bike and car parking and offering transfer to more frequent public transport
Suburban/city edge hub	Hub at the edge of a city or near a transport corridor, offers transfer
City hub	Major hub with shared-mobility and a high level of public transport, accessibility and services

3.1.1 Shared mobility

Shared mobility refers to the short-term use of various modes of transportation without requiring ownership (Shaheen, Cohen, & Zohdy, 2016). This includes vehicles, ride-sourcing and goods delivery. Societal and technological trends have advanced shared mobility, increasing its use. There are different ways to categorise and define shared mobility. Shaheen, Cohen, and Zohdy (2016) listed five categories based on membership, while Shaheen, Cohen, Chan, and Bansal (2020) categorise shared mobility into different types of mobility and services. This research is limited only to shared-mobility vehicles: car-sharing, bike-sharing and scooter-sharing.

Car-sharing is the temporary use of a car, driven by the borrower for a short period of the day (TRB, 2016). Unlike parking rentals, the vehicle is parked on the street or in designated parking spots. There are three types of car sharing: round-trip, where the vehicle needs to be returned to the same spot, one-way, where the vehicle can be returned to any spot but under certain geographical constraints and peer-to-peer, where an individual can make their car available for another individual. Car-sharing can enhance mobility for individuals who do not own or have access to a car. It does not need to be as competitive as privately owned vehicles, as car-sharing can be more economically advantageous than owning a car. It, therefore, can reduce greenhouse gas emissions (Shaheen, Cohen, & Zohdy, 2016).

Bike-sharing is the temporary use of a bicycle, mainly as a one-way service (TRB, 2016). The same distinction can be made for bike-sharing as car-sharing, with options for one-way or round-trip, but the definition is slightly different. Shaheen et al. (2020) distinguished three modes, which are (1) station-based, (2) dockless and (3) hybrid. Station-based requires the user to pick the bike up from a station, usually unattended. The bike can be returned to any station, unlike car-sharing, where the car usually must be returned to the same ‘station’ (i.e. parking spot). Dockless is the opposite, where the bike can be picked up and parked anywhere under certain geographical restrictions. A hybrid system combines elements of both previous models, allowing the user to start and finish at a station or predefined area. Bike-sharing can also be available only for a certain community or used in a peer-to-peer fashion, although these forms are less common (TRB, 2016).

Scooter-sharing involves temporarily using a scooter or e-scooter (Shaheen, Cohen, & Zohdy, 2016). The scooter, in this case, can be either electric or non-electric and can be standing or moped-style (Shaheen et al., 2020). Similar distinctions between car-sharing and bike-sharing can be used. Both scooter-sharing and bike-sharing are defined as “micro mobility” and feature electric propulsion variants. Regarding e-scooters, there are not that many differences in terms of speed, while for bikes, this is the case.

3.1.2 Integration ladder

To better define and classify a mobility hub, an integration ladder has been developed by Smarthubs project (Geurs et al., 2022). It defines and categorises mobility hubs based on the hub's services, design and goals. The aim is to identify how well different aspects of the mobility hub are integrated, beyond the mere combination of transport. A highly integrated, or ‘smart’, mobility hub increases the user value and makes it attractive to a broader audience. The ladder has three dimensions: physical, digital,

and democratic integration. These dimensions encompass various aspects of the hub's integration. Each dimension has five levels of integration, ranging from 0 to 4. The lowest level, 0, defines a hub as a single mobility service. Level 1 indicates a basic mobility hub. Levels 2 and higher define a hub as a smart mobility hub.

The physical integration of a mobility hub encompasses matters of proximity, visibility, barriers to the mobility hub, and the mobility modes that are offered. It concerns all matters users face when physically approaching and entering the mobility hub, which include proximity, barrier-free accessibility and layout to different services of the hub, as well as the provided information. The shared-mobility, public transport and services offered at the hub are part as well of the mobility hub. An overview of the physical integration classification is given in Table 2.

At the first level of physical integration, a mobility hub offers two shared transport modes within walking distance, alongside one service. Additionally, the minimum legal requirements for inclusive design are followed. At the second level, the mobility hub also features wayfinding and information on using the services and incorporates universal design principles. The third level requires that shared mobility is visible from the public transport stop, that there is information about the services and potential conflicts and that the design is attractive. The fourth level requires no conflicts in using the hub, at least two services, that the hub contributes to placemaking and that the design is attractive, pleasant, and comfortable.

Table 2: Overview of physical integration classification, derived from Geurs et al. (2022).

Level	Shared-mobility	Public transport	Service	Information	Design	Conflict
1	Two modes	Present	One		Legal minimum	Acceptable walking distance
2				Wayfinding and services information	Universal design principles	
3				Conflicts indicated	Attractive and aesthetically pleasing	Clearly visible
4			Two		Placemaking	No conflicts

The digital integration considers the integration and standardised transfer of information so that it can easily be shared among multiple platforms or retrieved by one platform (Geurs et al., 2022). As a result, users can access different sources of information on one platform and possibly even plan, book or pay for their trip on one device. Digital integration is closely linked to the Mobility as a Service (MaaS) concept and its typology has been used by the Smarthubs digital integration typology, where it is expanded to include digital accessibility and universal design principles. An overview of the classification of digital integration is given in Table 3.

At the first level, a decision support tool is offered to find the best trip on either a digital platform or digital screens at the hub. Minimum design requirements are also considered. At the second level, the booking and payment of a single trip are integrated into the platform and universal design principles are considered. At the third level, the services are bundled, allowing for subscription-based services. At the fourth level, societal and ecological goals are integrated into the platform, creating incentives that stimulate specific behaviour. This enables policy implementation regarding car ownership, neighbourhood accessibility and liveability.

Table 3: Overview of digital integration classification, derived from Geurs et al. (2022).

Level	Trip operations	Interoperability	Design
1	Decision support	Single operator	Minimum
2	Booking and payment		Universal
3	Subscriptions	Cross-platform	
4		Policy-goals alignment	

Democratic integration refers to the involvement and engagement of stakeholders in the development and maintenance of a mobility hub, as well as the consideration of the needs of different user segments (Geurs et al., 2022). Participants are informed and asked for their opinions and experiences so that the mobility hub can better suit their needs and wishes. Participatory and democratic involvement is a crucial element of local decision-making and can lead to higher public acceptance and a better-designed mobility hub. An overview of the democratic integration classification is given in Table 4.

At the first level, participants are only consulted and must recognise the information they receive. The use of the mobility hub is also part of the first level. At the second level, there is a more active engagement where participants, including vulnerable users, exchange arguments and positions with mobility hub developers. At the third level, discussions are expanded to incorporate the ideas and concerns of participants into the participation process. Participants become part of the decision-making process and are empowered to make informed decisions. At the fourth level, participants and developers have integrated into a community that engages with each other over a more extended period.

Table 4: Overview of democratic integration classification, derived from Geurs et al. (2022).

Level	Participation	User groups	Timeframe
1	Informing participants	No distinction	Development stage
2	Exchanging information	Vulnerable users considered	
3	Joint decision-making		
4			Permanent

3.1.3 Hub Features

The integration ladder shows many important characteristics of a mobility hub. It contains both the necessary facilities and important design characteristics. Some of the characteristics mentioned in the integration ladder are general guidelines (e.g., universal design principles) or apply to the mobility hub network as a whole (e.g., integration of shared-mobility providers). This section compares the integration ladder and literature to identify mobility hub features that play a role in the local context.

The definition of mobility hubs and integration ladder indicates several categories of mobility hub features. These are shared mobility, amenities and services, information provision and design derived from the mobility hub's physical integration. The digital integration also offers hub features, such as the digital information screen and physical booking alternatives. The physical features can also be categorised into available transport modes, amenities at the hub and design elements (Arnold et al., 2022). This relates to the two perspectives on how a mobility hub can be viewed: the transport function and place function (Hernández et al., 2016; Rongen at al., 2022). Hernández et al. (2016) indicate that the transport component includes the information and transfer conditions, while the placemaking includes the design and image, environmental quality, service and facilities and comfortable waiting. Safety and security are the last factors relating to transport and placemaking.

Information and booking processes are vital for ensuring the smooth use of various mobility modes (Arnold et al., 2022). Information on station infrastructure, available facilities, transportation services and real-time updates is critical in assisting users with informed decision-making regarding their choice of transportation mode. Access to such information enhances the overall user experience and creates a sense of safety and comfort throughout their journey. The booking process can be either digital or offline. Many shared-mobility providers only offer digital booking of vehicles. Related to the booking are the subscription models, payment methods and presence of staff-assisted ticketing.

In the context of a local mobility hub, the focus of this research and based on the aforementioned literature, the following mobility hub features are identified: shared-mobility, public transport, private transport facilities, amenities, physical design of the hub, and information provision of the hub. Possible amenities at the hub are a kiosk, toilets and parcel pick-up points. Safety features include security cameras, staffed stations, and lighting, which can increase a sense of security but also cause privacy concerns. Examples of design and comfort features include benches, weather protection, internet and Wi-Fi availability.

3.2 User groups

A wide range of research has been conducted into the characteristics of shared-mobility users. Although a distinction can be made between shared-mobility users and mobility hub users, they show a pattern of individual characteristics that indicate the user groups' interest in the mobility hub.

3.2.1 Individual characteristics

Age is an important factor in shared mobility use as generally younger people are more likely to use shared mobility (Mouratidis, 2022; Sophia, David, Michael, & Maximilian, 2021; Bösehans, Bell, Thorpe, & Dissanayake, 2023; Ko, Jang, & Lee, 2021; Blazanin, Mondal, Asmussen, & Bhat, 2022). This applies to bike-sharing, scooter-sharing and ridesharing. Regarding car-sharing, both a younger (Stillwater, Mokhtarian, & Shaheen, 2009) and older (Mouratidis, 2022) relationship has been found. Related to this is that households with children are more likely to use car-sharing than others (Mouratidis, 2022; Bösehans, Bell, Thorpe, & Dissanayake, 2023).

Education is another factor in shared mobility use, but with more mixed relationships. Shared e-bikes are used by higher educated people (Mouratidis, 2022; Ko, Jang, & Lee, 2021; Horjus et al. (2022)), except for Bösehans, Bell, Thorpe, & Dissanayake (2023). For shared e-scooter the results differ between higher (Jiao & Bai, 2020; Horjus et al. (2022)) and lower (Mouratidis, 2022; Bösehans, Bell, Thorpe, & Dissanayake, 2023; Garritsen, 2022) education. Ridesharing is also associated with lower education (Mouratidis, 2022).

Gender plays a role in micro-mobility, with men more likely to use e-bikes and e-scooters compared to women (Mouratidis, 2022; Sophia, David, Michael, & Maximilian, 2021; Ko, Jang, & Lee, 2021; Blazanin, Mondal, Asmussen, & Bhat, 2022). Income was found to play a role in certain research studies. Lower-income individuals might be more likely to use shared scooters (Jiao & Bai, 2020), while those with higher incomes might be more likely to use car-sharing services (Mouratidis, 2022; Bösehans, Bell, Thorpe, & Dissanayake, 2023). However, others have not found a strong relationship.

Concerning car ownership, there is a relationship between those who do not own a car and those who use shared cars (Mouratidis, 2022). This may be logical as car owners would use their own car. Households with one car are also more likely to use shared cars than households with higher car ownership. Those with lower car ownership are likelier to use bike-sharing (Mouratidis, 2022; Bösehans, Bell, Thorpe, & Dissanayake, 2023). Those with environmental concerns or a greener lifestyle

were more likely to use shared e-bikes (Mouratidis, 2022) and scooters (Blazanin, Mondal, Asmussen, & Bhat, 2022).

Experience with shared mobility increases the likelihood of someone using it (Horjus et al., 2022; Ko, Jang, & Lee, 2021). People with disabilities were less likely to use bike-sharing services, but not other shared mobility services (Mouratidis, 2022). A migration background sometimes led to higher scooter-sharing (Garritsen, 2022) and car-sharing (Mouratidis, 2022).

Besides socio-demographic factors discussed in the previous sections, spatial factors can play a role in mobility hub usage and preferences. Density plays a role in the mobility hub typology (Weustenenk & Mingardo, 2023; Roukouni et al., 2023), while population density is the most often found spatial factor that plays a role in the use of shared mobility and mobility hubs (Geipel et al., 2024).

3.2.2 Digital skills and vulnerable groups

The ability of people to use digital tools influences their willingness to use shared mobility (Garritsen, 2022; Horjus et al., 2022). Those with higher digital skills are more likely to use shared mobility. This is understandable as digital skills are more important for using shared mobility than public transportation.

The aforementioned socio-demographic characteristics are mainly derived from the survey results. Martinez et al. (2022) conducted user and expert interviews to identify vulnerable user groups who experience barriers to using the mobility hub. They could categorise needs and barriers related to the mobility hub and indicate the severity of these barriers. They concluded that the following vulnerable user groups exist: Children, digitally excluded citizens, migrants and ethnic minorities, older people, people with impairments (cognitive, physical or visual), peri-urban and rural inhabitants and women.

Shared-mobility usage remains disproportionately low among vulnerable groups and the general population, with only up to 30% of vulnerable populations (occasionally) using such services (Garritsen et al., 2024). Surprisingly, individuals with mobility impairments exhibit the highest frequency of usage, alongside higher instances of never usage, resulting in overall low occasional usage. Older individuals engage minimally with shared-mobility options, whereas migrants demonstrate the highest usage within the vulnerable groups. Regarding transport modes, shared car and bike services emerge as the most frequently utilised modes of shared mobility within the hub.

3.3 Needs and Preferences

The user groups identified already show some of the needs and preferences mobility hub users face. This section will further examine the literature on these needs and preferences, based on the mobility hub features and conceptual models from earlier studies.

Current research on shared-mobility usage has employed UTAUT frameworks to investigate the relationship between barriers and the intention to use shared mobility (Horjus et al., 2022; Garritsen, 2022; van der Meer, 2022; Claasen, 2020). Several conceptual models are based on UTAUT, which Venkatesh et al. (2003) developed based on earlier transport behaviour theories. Augmented by Venkatesh et al. (2012), these factors incorporate barriers related to performance, effort, facilitating conditions, social influence, hedonic motivation, and price. Some of these barriers are not direct obstructions that prevent people from using mobility hubs, but rather perceived benefits and enablers that indicate whether people are likely to use mobility hubs.

The performance of the mobility hub is often expressed in the way shared mobility is more affordable, faster and readily available compared to other modes of transport. Effort expectation is the perceived ease of use of the mobility hub. Facilitating conditions are resources necessary for using the mobility

hub. Price relates to the travel costs for shared mobility and trade-off compared to alternative modes of transport. Social is the acceptance of using shared mobility and the mobility hub. Hedonic motivation refers to the enjoyment people derive from using mobility hubs.

Martinez et al. (2022) conceptualised barriers based on the Capabilities Approach and categorised them into material access, skills, and cognitive appropriation. Material access encompasses the availability and reliability of transport and the financial, digital, and other resources needed for utilising mobility services. Skills refer to knowledge and competencies required to use the mobility hubs, including their operation and understanding. Cognitive appropriation is the usage of the mobility hub based on the user's perspective and beliefs, including experienced autonomy, flexibility, excitement, social status and privacy concerns. Trust issues with technology and the service and a lack of interest or familiarity with digital services emerge as prominent barriers.

3.3.1 Identified characteristics

The following needs and preferences can be identified by combining both approaches and earlier research on shared mobility and mobility hubs.

Shared-mobility vehicle usage is not exclusively related to the mobility hub itself, but has several barriers that obstruct people from using it. These include finding it too dangerous, being unfamiliar with them, and preferring one's own vehicle (Garritsen et al., 2024). Vulnerable user groups often find shared mobility dangerous or are unfamiliar with it. Older people, women, and those with low digital mobility skills face higher barriers to shared mobility. Women often find the different shared-mobility modes too dangerous, while older people prefer their private vehicle or the shared-mobility cannot fulfil their travel needs. Garritsen et al. (2024) also found that many people perceived other barriers than were put before them, which suggests that there are more (complex) barriers that should be considered.

Accessibility of the mobility hub is another issue that often poses a severe barrier for people with impairments and older adults (Martinez et al., 2022). Limited physical or cognitive abilities often cause barriers related to accessibility. Components of the hub can be too far away from each other and objects and height differences can obstruct people. Those sensitive to overstimulation often struggle with crowded places, as they can obstruct people's easy movement. Being able to sit is necessary for elderly people and those with impairments, which requires sufficient seats available. Something that is often unavailable when it is too crowded.

Safety is crucial for many users, particularly vulnerable individuals (Martinez et al., 2022). This is expressed through the design of the hub, which features sufficient lighting, cleanliness, and a clear overview. Public safety can be increased through a staffed-kiosk, which is an important feature that increases people's sense of safety. For some individuals who wish to park their vehicle at the hub, secure parking is required. Traffic safety concerns are a barrier related to shared-mobility where people may be unaccustomed to it. Overall safety is of particular concern for women, elderly and children.

Information is crucial for users to navigate the mobility hub and plan or check their trips (Martinez et al., 2022). Information presented at the hub can be too complex and overstimulating for some people, especially if it is detailed and lengthy. Some people who do not speak or have difficulty with the local language may find it challenging to consume the information. People with visual impairments have difficulty reading the text, so they need clear lighting or an audio-option or staff to consume the information.

Among many user groups, insufficient income and lack of financial means are barriers (Martinez et al., 2022). Most direct is the lack of financial funds to afford transport or more indirect ways through less economic autonomy, experienced by women and those with cognitive impairment. Other indirect ways are not being able to use digital payment options or finding them difficult to use (Martinez et al., 2022; Horjus et al., 2022). Some people do not prefer the payment and subscription options that currently exist. They often require a monthly subscription and not every person can afford that or is interested in it.'

Digital features are another need which is most prominent among digitally excluded citizens but also prevalent among other user groups (Martinez et al., 2022; Horjus et al. 2022). The issues here are the difficulty in using either apps on smartphones or digital interfaces. Potential difficulties are planning a trip, making reservations and using online payment. There are multiple types of barriers here as some might not be able to use an app but are comfortable with using an online ticket machine, while others might need more personal assistance. Another common barrier for various groups is access to digital devices (Martinez et al., 2022; Horjus et al. 2022). Those who do not have a smartphone have difficulty booking shared mobility as reservations and transport information are often only available on a smartphone. A lack of supporting technologies also impedes mobility options, such as inadequate internet access, insufficient battery on electronic devices, and a shortage of digital payment options.

Related to digital skills and -access are the fears and concerns some user groups have about using digital devices (Martinez et al., 2022). Digital-excluded citizens and others who have difficulty using apps or touch screens are more hesitant to use them due to their lack of knowledge and fear of making mistakes. Guidance and support from others would be much needed. Another concern mentioned among multiple users is related to privacy and data safety. For these set of people, the material access and skills are not an issue, but they are less inclined to use digital tools due to these concerns.

3.4 Research gap

In this chapter, the mobility hub and its main components have been described, which include shared mobility and placemaking. The integration ladder has been described, which defines and classifies the integration of a mobility hub in physical, digital, and democratic areas. It has, in turn, been used to define mobility hub features that are the focus of this research. Furthermore, user characteristics and groups have been discussed that are more likely to use the mobility hub or face barriers that prevent them from using it, which shows some of the needs and preferences related to mobility hubs.

The literature provides more insight into the research gap identified in Chapter 1. Mobility hub features have been identified concerning the integration ladder. Until now, the mobility hub has mainly been evaluated from a shared-mobility perspective. However, a mobility hub consists not only of shared mobility but also has amenities that might benefit even non-shared-mobility users. Besides, these amenities could even attract more users. Furthermore, another feature of the mobility hub is the design, which comprises of the physical design, information provision and booking options. Further research is needed to understand what shared-mobility users and non-users find important to understand better which mobility hub features can address the needs and preferences.

In order to examine the mobility hub features, the conceptual model shown in Figure 1 is used. The conceptual model is based on similar models used for the analysis of the intention to use shared-mobility (Horjus et al., 2022; Garritsen, 2022; van der Meer, 2022; Claasen, 2020) and is derived from the UTAUT framework (Venkatesh et al., 2003; Venkatesh et al., 2012). It shows the intention to use the mobility hub and influential factors based on individual characteristics, mobility behaviour and needs and preferences. The intention to use the mobility hub includes both the use of shared mobility

and amenities. The latter is an extension compared to earlier studies and is done to compare whether variables influencing the intention to use shared mobility are similar to those of amenities. The needs and preferences relate to the mobility hub's design, information and digital features. They are used to identify the importance to both shared-mobility users and non-users. Most of the variables discussed were used in previous research. New variables examined are urbanisation level (based on population density) and democratic involvement. The latter variable is of interest due to the importance of democratic integration in the integration ladder and can be linked to people's attitudes.

Not all variables listed in the conceptual model are within the scope of this research. Mobility hub characteristics related to shared-mobility performance (e.g., travel time, number of transfers, costs) are not considered, as the focus is on mobility hub features. The precise application of the conceptual model will be further discussed in the Methodology.

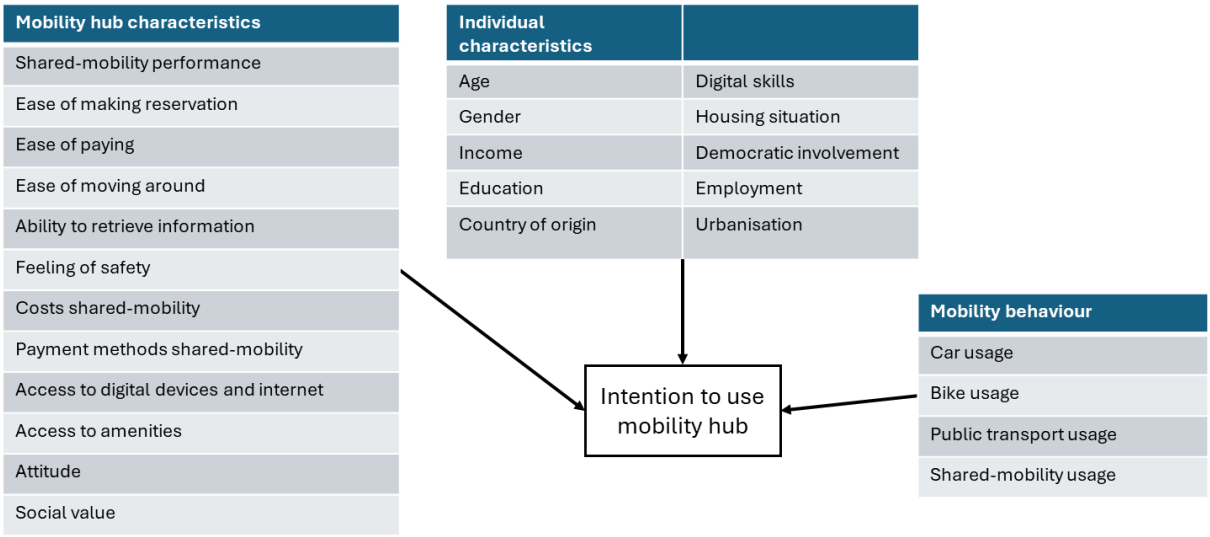

Figure 1: Conceptual model.

4 Methodology

In this chapter, the methodology is outlined of this research. The methodology contains four sub-sections. An overview of the methodology in Figure 2 shows the different parts and their relationship with each other and the research questions. The overall methodology is to conduct a survey in a selected area in North-Holland and collect responses to people's usage intention and design preferences for a mobility hub. This approach is suited for the research questions of this study as it allows for large-scale data collection that can give insight into people's perception of mobility hubs.

Section 4.1 will outline the research approach by going into more detail about what information is necessary to answer the research questions. Section 4.2 gives more context on the study area of this study. Section 4.3 describes the survey and data-collection methods used. Section 4.4 will give an overview of the data analysis and data preparation. The details of the data analysis are discussed in the Results chapter.

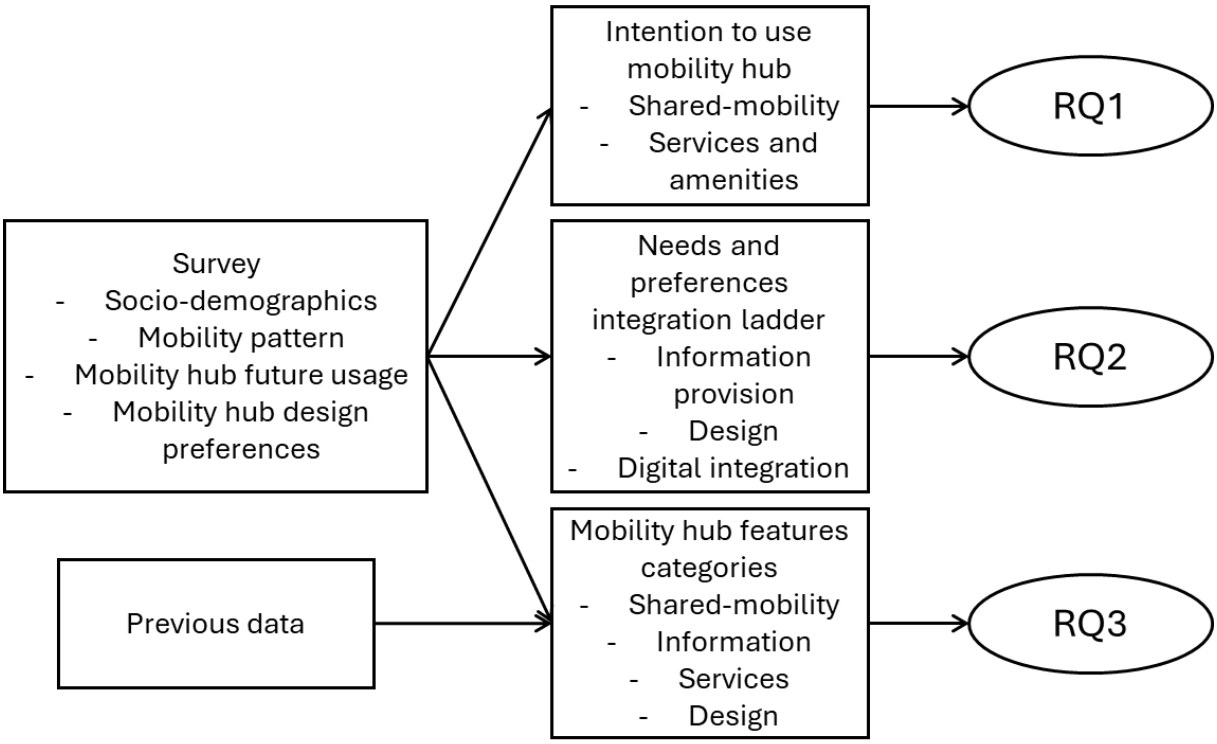

Figure 2: Overview of the methodology.

4.1 Research approach

In this section, the research approach to the research questions is explained. It goes more in-depth about how the research questions will be answered and what information is needed.

4.1.1 Intention to use

As stated in the first research question, the initial step towards understanding how a mobility hub can effectively cater to different user groups is to analyse the mobility hub usage and the specific functions people are interested in. A mobility hub has both a *transportation* component, consisting of public transportation, private vehicle parking and shared mobility, and a *place* component, such as amenities and being a comfortable place. To identify what specific component people are interested in, respondents are asked about their intent to use the mobility hub for shared-mobility and non-mobility

purposes. In combination with user characteristics identified in section 3.4, the preferred components of the mobility hub can be identified. The first research question, therefore, builds on the existing body of knowledge by going into more detail about what hub functionalities people intend to use and to further analyse the user segments by distinguishing between users and non-users of shared-mobility and public transport.

The intention to use the mobility hub is focused on two purposes: shared-mobility usage and non-mobility usage. Public transport usage is excluded as it is not part of the scope. Shared mobility can be offered by the use of different types of vehicles. Respondents are therefore asked about their intent to use either bike-sharing, e-moped-sharing or car-sharing based on a Likert-scale score. On the non-mobility component, people are asked whether they would use the mobility hub services and amenities, also using a Likert-scale score. The services included are a bench, kiosk, café, parcel locker, Wi-Fi, car parking, electric vehicle charging, secured bike parking and bike repair shop.

The literature review has established that socio-demographic characteristics, mobility patterns and spatial characteristics play a major role in someone's intention to use shared-mobility. These variables are, therefore, used in the analysis to determine the influence on non-mobility and service usage.

4.1.2 Integration preferences

To understand how to tailor the mobility hub to different user groups, an analysis is conducted of the priorities and preferences towards the integration ladder. The integration ladder, which was discussed in section 3.1.2, offers design criteria according to which a mobility hub can distinguish itself from an intermodal station. In combination with concrete design examples from literature and policy guidelines, questions are formulated that evaluate people's preferences in the design of a mobility hub. Understanding people's choices can help to further develop the integration ladder and better tailor the mobility hub to increase usage and compatibility. As the literature shows differences among people in the intention to use, a similar situation with regard to the integration ladder elements could exist.

The perception of users towards the integration ladder is measured using a survey. To get opinions on different levels of integration, the elements of the integration ladder are transformed into concrete and specific questions. The questions are a combination of a selecting preferred mobility hub elements and a ranking to examine the priorities people make. The questions are grouped into three sets of questions: information provision, design and digital integration. Democratic integration is omitted due to practical limitations, which will be explained in section 4.2.

4.1.3 Comparison

The third research question aims to combine the data with an earlier and larger dataset from Smarthubs (Garritsen et al., 2023) and analyse what people find important features at the mobility hub. Compared with the previous research questions, the third research question tries to find influential factors using a larger data set. The advantage is that this larger data set can give more insight due to the larger sample. However, more comprehensive categories are used due to the differences in questions. The outcome is compared with data from the survey and with the intention to use shared-mobility.

4.2 Study area

The study area was the Dutch province of North-Holland with a focus on the cities of Purmerend, Zaanstad, Heerhugowaard, Schagen and Hoorn. The study area was originally limited to Purmerend by focusing on residents near the train station, but later expanded to include the other cities due to sampling difficulties. These areas were of interest due to the lack of shared mobility and higher car

dependency. The socio-demographics of the study are very similar to those of the Netherlands. The share of highly educated people is slightly smaller for the study area. Table 5 shows an overview of the socio-demographics of the complete study area.

Table 5: Socio-demographics of the study area.

Variable	Share of population	Variable	Share of population
Male	50%	Born The Netherlands	84%
Female	50%	Born Europe (outside The Netherlands)	5%
Age 0-14 years	16%	Born outside Europe	11%
Age 15-24 years	12%	Lower educated	21%
Age 25-44 years	25%	Middle educated	35%
Age 45-64 years	27%	Higher educated	20%
65 years and older	20%		

All cities of the study area are connected with railways and motorways, all directly to Amsterdam. Zaandam is the closest to Amsterdam, followed by Purmerend. Purmerend has an HOV bus route to Amsterdam, which often serves as a better public transport connection than the train to that city. Shared mobility is very limited in the study area. There are no on-street shared scooters and bicycles available. Shared cars are offered in a limited capacity (CROW, n.d.). NS offers bicycles at some of the train stations (NS, n.d.).Table 6 shows the (at least) weekly use of different mobility modes based on the ODiN survey (CBS, 2024a). It shows that residents from Schagen and Heerhugowaard use public transport less often and more often use the car. Bike use is the highest in Hoorn, while it is lower in Purmerend and Zaanstad.

Table 6: Share of ODiN respondents using mobility mode at least once a week.

	Walking	Bus, tram metro	Train	Public transport	Car (driver)	Bike/e-bike
Purmerend (N=475)	85%	14%	7%	17%	64%	58%
Schagen (N=223)	88%	3%	4%	4%	73%	64%
Hoorn (N=275)	91%	8%	13%	15%	62%	75%
Heerhugowaard (N=249)	89%	6%	6%	10%	73%	68%
Zaanstad (N=630)	85%	14%	17%	20%	61%	62%

4.2.1 Description study areas

The city of Purmerend is located north of Amsterdam and has a population of 95.168. Although it has three train stations, total ridership is relatively low compared to nearby Zaanstad. This is partly due to Purmerend's extensive bus network, which connects the city to Amsterdam, particularly its city centre. The proportion of jobs relative to the population is the lowest among the study areas, at 36%.

The main train station in Purmerend currently lacks many amenities and facilities. Due to the low ridership, it is not served by intercity trains. The area surrounding the station is low-density but is undergoing redevelopment, including new housing, amenities and office space (Gemeente Purmerend,

n.d.). This transformation will require the neighbourhood to adjust its mobility infrastructure to accommodate increased car traffic and offer alternatives modes of transport.

In 2024, the Municipality of Purmerend conducted a survey (N=2061) among its resident panel to gauge opinions on shared mobility, particularly car-sharing (Gemeente Purmerend, 2024). The results showed a generally positive attitude towards car-sharing. However, there was significant opposition to reducing existing parking spaces to support it. Younger residents and those without a car or with only one car were more favourable towards the concept. The three most common reasons for not using shared mobility were: preference for having a car parked at home, concerns about car availability, and already owning a car. The main reasons given for using car-sharing were lower costs and environmental sustainability. This suggests that in Purmerend, there is a positive attitude towards shared mobility, but there are concerns about the availability of current car parking.

Zaanstad encompasses the city of Zaandam and several suburban neighbourhoods, with a combined population of 161.389, making it the most populated study area. The city has six train stations, of which Zaandam Station is the busiest and the only one with intercity connections. On an average workday, the train ridership as share of the population is 24%, the highest ridership among the study areas. This high usage can be attributed to the presence of tourist attractions (e.g., Zaanse Schans) and numerous hotels. Zaanstad also has the highest share of foreign-born residents (21%), the lowest share of residents aged 65+ (19%), and the highest proportion of low-income households (39.5%).

Heerhugowaard (part of the Municipality of Dijk en Waard) is located next to the larger city of Alkmaar and has a population of 90.076. The train station features a large, free park-and-ride facility, a small shop, an indoor waiting area and a public toilet. Car ownership is higher here than in other study areas (excluding Schagen) and also exceeds the national average. The proportion of low-income residents is lower (29.8%), while the share of high-income households is higher (22.9%). The city centre is situated somewhat farther from the train station, which is currently surrounded by a low-density business district. However, the municipality has begun redeveloping this area with new housing, aiming to transform the station area into a mobility hub to meet growing transportation needs.

Hoorn, located in the northeast of the province of North Holland, has a population of 75.645. The city has two train stations. The main station is located near a hospital and an educational facility, and already includes a kiosk, indoor waiting area, supermarket, and secure bike parking, along with a large park-and-ride area. Hoorn has a job-to-population ratio of 47%, the second highest among the study areas, following Schagen. The city also features a historic centre with shops, a library and other amenities.

Schagen, in the northern part of North Holland, is characterized by lower density and a more rural environment. Its population is 47.744, making it the smallest city in the study with a density classification of 4 (the lowest among the areas studied). Schagen's train station includes a small café, kiosk, and indoor waiting area. The city has a higher proportion of residents over 65 (26%) and a lower share of foreign-born residents (8%). It also has the lowest proportion of households with children, though still above the national average. Car ownership in Schagen is higher than in other study areas (excluding Heerhugowaard) and above the national average. Schagen also has the highest share of jobs compared to its population (49%).

4.3 Survey

To address the research questions and gather data on people's preferences regarding the mobility hub features as discussed in section 4.1, a survey was developed. The survey framework consisted of three themes: (1) background of the respondents, (2) intention to use the mobility hub and (3) design

features and integration preferences. The previous Smarthubs survey served as the foundation for the questions and structure, while surveys from Horjus et al. (2022), Claasen (2020) and Garritsen (2022) were used for validation, simplification and refinement. The Smarthubs survey questions were adjusted to fit the specific context of this research, with answer options adjusted to definitions used by the CBS and ODiN, particularly for socio-demographic and mobility behaviour questions. Given the scope and time constraints, the number of questions was minimized to maintain a survey duration of approximately 10 minutes, reducing the risk of respondent fatigue and survey abandonment.

Newly developed questions focused primarily on services and design aspects of the mobility hub. The usage intention questions regarding services were derived from existing literature on mobility hubs and the Province of North Holland's mobility hub strategy (Provincie Noord-Holland, 2023). To the best of the author's knowledge, no prior mobility hub surveys have included questions about specific station facilities and services, particularly regarding usage intention. Services included in the survey were selected based on two criteria: (1) they could reasonably be present at a local mobility hub (excluding large amenities such as supermarkets) and (2) they represented a distinctive feature of a mobility hub (e.g., bicycle parking was excluded as it is a standard feature of Dutch mobility hubs).

Questions on mobility hub design focused on the level of integration, drawing on the integration ladder of Smarthubs, as discussed in 3.1.2. Initially, Likert-scale questions were considered for each design characteristic, however, due to the survey length constraints, a multiple-choice format was adopted for three key design themes. The elements identified in the integration ladder were translated into concrete and specific questions, covering three categories: information provision (physical integration), design characteristics (physical integration) and trip booking (digital integration). Questions related to participation and democratic integration were omitted to avoid potential confusion with existing plans and the sensitivity expressed by local governments.

The survey underwent two rounds of feedback to improve clarity, efficiency, and relevance. In the first round, the survey was evaluated for errors, clarity and completion time. Several questions were removed for (1) redundancy with other questions or the ability to derive answers from other questions, (2) excessive detail beyond the scope of the study, (3) high time and effort demand from respondents relative to the value of the data or (4) limited influence on findings based on prior research (particularly socio-demographic and mobility behaviour questions). The second round of feedback involved policymakers who gave more content-specific feedback based on their expertise. This round led to further question reductions due to concerns about survey length and complexity. Additionally, the structure was adjusted to improve the flow of the survey and combine similar questions.

The final version of the survey can be found in Appendix A (English version) and B (original Dutch version). The following section provides an overview of the survey content.

4.3.1 Survey description

The survey consisted of seven sections, excluding the welcome and final pages. The welcome page introduced the survey and required respondents to read and agree to the privacy statement before proceeding. Upon completion, respondents could participate in a voucher prize draw and/or receive a one-time email with the survey results. Additionally, they were given the possibility to provide comments. Table 7 gives an overview of the survey and the variables covered by the questions.

Figure 3 shows the mobility hub impression used in the survey, designed to help respondents better understand the concept and its offerings. All questions on shared-mobility, services and design preferences used pictograms to give a better understanding of the questions. Each service and design element was further complemented with a concise description to provide additional context.

Table 7: Overview of the survey. Some questions have been combined into a single variable. The full survey can be found in Appendix A and B.

Description	**Variables**	
▪ Select one	❖ Select multiple	- Select one/multiple
Introduction and informed consent		
<u>Socio-demographics and background</u> *questions on the resident location of respondents and the socio-demographic background of the respondents.*	▪ Urbanisation level ▪ Gender ▪ Age ▪ Country of origin ▪ Education level ▪ Occupation status	▪ Net income ▪ Housing situation - Smartphone usage - Democratic participation
<u>Mobility behaviour</u> *questions on the respondents' available transport modes, mobility capabilities and travel frequency per transport mode.*	▪ Car possession ▪ Walking difficulty and assistance ▪ Frequency walking ▪ Frequency car usage ▪ Frequency bike/e-bike ▪ Frequency moped ▪ Frequency taxi	▪ Frequency bus/tram ▪ Frequency metro ▪ Frequency train ▪ Frequency shared-bike/e-bike ▪ Frequency shared e-moped ▪ Frequency shared car
<u>Mobility hub and shared-mobility</u> *explanation and context on mobility hubs and questions on the intention to use shared mobility*	▪ Heard about hub before ▪ Intention to use shared-mobility (car, bike, moped, cargo-bike, e-scooter)	❖ Reasons for not using shared mobility ❖ Reasons for using shared mobility
<u>Services</u> *questions on the intention to use services and facilities at the mobility hub*	▪ Bench ▪ Kiosk ▪ Café ▪ Toilet ▪ Parcel locker ▪ Wi-Fi	▪ Car parking ▪ Electric vehicle charging ▪ Bike/moped secured parking ▪ Bike repair shop ▪ Beneficial neighbourhood
<u>Design and integration</u> *questions on the importance of hub design features and information provision.*	▪ Important information provision ▪ Import design and comfort features	▪ Ranking mobility hub elements ▪ Mobility hub usage when preferences are considered
<u>Digital integration</u> *questions on respondents' preferences on digital trip booking and payment and asks them about possible preferred alternatives*	▪ Difficulty using an app ❖ Import app features ❖ Barriers to using an app	❖ Relieving barriers app ❖ Preferred alternative booking app ❖ Preferred payment option
Closure and voucher prize		

Figure 3: Impression of a mobility hub shown in the survey.

For most of the variables, categories are used based on CBS and ODiN classifications. The urbanisation level is derived from the postal codes of respondents and linked with CBS built-environment data. For digital skills, the classification from Horjus et al. (2022) is used. This framework defines four levels of digital skills:

- Level 0: no access to a smartphone.
- Level 1: access to a smartphone but it is not used for trip-related activities.
- Level 2: smartphone used for planning a public transport trip
- Level 3: smartphone used for booking or paying for public transport or shared-mobility trip.

4.3.2 Survey distribution and sample size

The sampling strategy was based on convenient sampling, where participants were recruited through both physical flyers and online social media posts. The flyers contained a URL link and a QR code to access the survey. The final version of the flyer can be found in Appendix C. The different versions of the flyer only had some slightly adjusted phrasing and URL links. Various social media posts were made with the support of a communication specialist. They were published on the social media accounts of the Province of North-Holland and Mobipunten. In order to increase the response rate, three vouchers were randomly awarded to participants.

The flyers were put in mailboxes in Purmerend, Zaandam and Heerhugowaard in neighbourhoods surrounding train stations. Neighbourhoods were selected based on their proximity to the local train station. Furthermore, flyers were handed out to train travellers at train stations in Krommenie-Assendelft, Heerhugowaard, Schagen and Hoorn. These train stations were selected because they are located in the study area and practical considerations (i.e. most train users could be offered a flyer from an entrance). Around 50 flyers were available at the library in Purmerend. In total, around 5000 flyers were distributed.

The necessary sample size could range from 30 (Vittinghoff & McCulloch, 2007) to around 385 (SurveyMonkey, n.d.) and could be based on the number of variables or the population of the analysis. Based on resources and time available, the original aim was to acquire a sample size of around 600 to 700 respondents, of which 450 respondents would have a background of lower income, lower education and older people, and 200 respondents would be local employees.

4.4 Data-analysis

The data analysis comprised both descriptive statistics and ordinal logistic regression analysis. Most details of the data analysis will be discussed in the Results chapter. This section will give an overview of the approach and the data preparation. For both the usage intention and the importance, a logistic regression is conducted. Logistic regression is a statistical method that estimates the probability of

predictors on independent variables using a logistic function and is often used when categorical variables are involved (Field, 2024). In the case of ordinal logistic regression, there is an ordinal relationship between the categorical outcomes of the dependent variable. Independent variables can be ordinal, nominal or continuous. SPSS software has been used to perform the analyses.

The quality of the model is assessed through multiple parameters. The model fitting and the proportional odds assumption are strict requirements.

- The model fitting information indicates if the model with the variables (final model) is significantly better than a model that does not use any explanatory variables and is fitted using an intercept only (ReStore, n.d.; UCLA, n.d.). This is done by comparing the log-likelihood of the intercept-only model and the final model, in which the log-likelihood is maximised when varying the parameters. SPSS shows the -2log-likelihood of both models, the Chi-square, the degree of freedom and the significance of the Chi-square test. When the test is significant, at least one variable is not zero, and the model is an improvement over the intercept-only model. This is a strict requirement for the model.
    - Strict requirement: p =< 0,05
- The goodness-of-fit is based on the Pearson and Deviance statistics, which indicate how well the model fits with the observed data. The null hypothesis is that the model is a good fit and if not rejected. However, sometimes the goodness-of-fit tests tend to be more significant when the sample size is large or when there are a lot of empty cells (ReStore, n.d.; Field, 2024).
    - Preferred: p not =< 0,05
- The pseudo-R-squared indicates how much of the variance is explained by the independent variables. As R-squared statistics are not possible for logistic regression, different approaches are used (Restore, n.d.; Field, 2024). There is no consensus on which approach is the best, so these values should not be interpreted too strictly. They have a maximum value of 1, and the higher the R-squared, the more the model variables explain the variance in the outcome.
    - Preferred: higher is better
- The Test of parallel lines tests the proportional odds assumption. The null hypothesis is that the coefficients of the variables are equal among all thresholds. When a model with different variables across the thresholds is significantly better, the proportional odds assumption does not hold and the OLR model should be rejected.
    - Strict requirement: p > 0,05
- The AIC is used to compare models with each other to determine which best fits the data so that the minimum number of variables is used to explain the greatest amount of variance (Bevans, 2023). The AIC compares models based on the maximum likelihood and degree of freedom (based on the independent variables) to determine whether extra variables decrease the maximum likelihood of the model in a way that is useful to have these variables. Therefore, when two models have a similar maximum likelihood, the one with fewer variables is chosen.

4.4.1 Use Intention Services

The usage intention data is analysed in two steps. First, a factor analysis is performed to see what similarities there are between the different services and select a limited number of services from the data for further analysis in the Ordinal Logistic Regression analysis. A more comprehensive and precise analysis was made by selecting only services that show differences in the factor analysis. The second step is to perform the Ordinal Logistic Regression analyses. This analysis examines the influence of socio-demographic and mobility factors on the intention to use the services.

For the ordinal logistic regression analysis, different models were developed to experiment and examine which combination of data was best suited. Due to the small sample size and low counts for specific categories, different models were tested with fewer and more combined data variables. This resulted in six models based on three independent variable combinations and two independent variable combinations where the Likert scale was changed from 5 to 3. The first model was composed of all variables from the data collection, whereby all independent variables were combined based on CBS and ODiN definitions. This model is used as a benchmark to compare the data. For the second model, categories with low counts were combined into logically larger categories. Some variables were omitted due to low variance. The third model combined transport usage frequency data from five categories into three. Models 4-6 were a replication of models 1-3, but with the adjusted Likert scale for the dependent variable. Table 8 gives an overview of the models.

The combined categories for models 2 and 5 were:

- Combined categories: Birth country (merged all foreign-born values), employment (merged into active occupation (work/student) and inactive occupation, car ownership (merged 2 and 3+)
- Merged variables: bus/tram and metro (became btm), current shared mobility use (combined car, bike, moped use into two categories: use or no use of shared-mobility), bike and moped/motor (combined)
- Removed: Assistance walking (low count), taxi (low variance)

The combined categories for models 3 and 6 were merged for walking, car use, bike/moped use and public transport:

- Never, 1-11 days per year, 1-3 days per month were merged
- 1-3 days per week and 4 or more days per week were not merged

Table 8: OLR models developed and tested.

Independent variables	**Dependent variables**	
	5-point Likert scale	3-point Likert scale
CBS and ODiN definitions	Model 1	Model 4
Combine categories	Model 2	Model 5
Combine all current usage frequencies	Model 3	Model 6

The outcome of the models' quality was mixed, making it challenging to find the appropriate model directly. The more complex models 1 and 4 had, in general, higher goodness-of-fit compared to the other models. Also, the Nagelkerke R^2 was generally higher for model 1, followed by model 4. However, the test of parallel lines was often violated for various models, particularly models 2 and 3. Five models violated the proportional odds assumption for the kiosk variable, with only model 1 not violating it. Most variables, except for bench, kiosk, Wi-Fi and secured parking, saw better results for the Deviance in models 1-3.

Based on the goodness-of-fit and R^2 values, models 1 and 4 fit best (if the proportional odds assumption did not fail). The downside of these models is their relatively high degree of freedom, with many categories having lower counts. Therefore, the Akaike Information Criterion was calculated. The AIC was significantly better for model 6 for 8 of the 10 service dependent variables. The exceptions were Kiosk and Café, for which model 5 was better. In order to simplify the analysis, considering the small sample size and to make comparisons between the results possible, the 6th model was chosen for all

variables. The model quality parameters can all be found in Appendix G. Table 9 shows the variables used in the analysis.

Table 9: Variables used in the ordinal logistic regression analysis for the intention to use mobility hub services.

Independent variables		**Dependent variables**
Sociodemographic	Mobility behaviour	Bench
Gender	Car ownership	Kiosk
Age	Walking difficulty	Café
Birth country	Walking assistance	Toilet
Education	Frequency walking	Parcel locker
Employment	Frequency car	Wi-Fi
Homeownership status	Frequency bike/e-bike	Car parking
Household composition	Frequency moped/motorcycle	Electric vehicle charging
Digital skill	Frequency Taxi	Bike/moped secured parking
Democratic involvement	Frequency bus/tram	Bike repair shop
	Frequency metro	
Spatial	Frequency train	
Urbanisation	Frequency shared-mobility	

4.4.2 Combined analysis

The combined analysis augments the data from the survey with the data from Smarthubs as explained in 3.1.3. The Smarthubs dataset contains 805 responses from a survey conducted in 2022-2023 in the Rotterdam-The Hague area (Garritsen et al., 2023). Many socio-demographic and mobility behaviour questions are similar, but have no questions on the intention to use services, and have less detailed questions on mobility hub features. The Smarthubs dataset only contains design-related questions on the importance of different shared-mobility options, non-mobility services, attractive landscaping, information provision and an app. The merged dataset is therefore used for a logistic regression analysis to determine what is important in the services and design of a mobility hub.

In order to merge the primary and Smarthubs datasets, the categories need to be matched. Because Smarthubs has fewer but more comprehensive categories, the categories of the primary dataset are divided into four categories. Table 10 shows the combinations of the categories. The importance of different shared-mobility options and mobile apps is omitted due to the lack of a comparable question in the survey. For non-mobility services, only the bench, kiosk, café, toilet and parcel locker are considered as these services were similar to the examples used in the Smarthubs survey and literature. The ratio of answers selected on the design questions is considered for attractive landscaping. Although the design questions from the survey are not only about attractiveness but also about safety and accessibility, there is no better way to combine these questions. Information provision at the mobility hub is combined with the information from the survey.

Table 10: Combination Smarthubs data with survey data.

Smarthubs categories	**Primary data set (dependent variables / itu and design preferences)**
Shared-mobility adoption • Intention to use any mode of shared mobility	Shared-mobility • Intention to use any mode of shared mobility
Different options of shared mobility	*No comparable question*
Non-mobility services, such as a parcel locker or a coffee place	Mean of the intention to use: bench, kiosk, café, toilet, parcel locker

Attractive landscaping, using art, benches or other placemaking elements	Ratio selected answers on design question • Clear visibility and sufficient lighting. • An attractive and pleasing design • A pleasant and welcoming environment • All parts are within a short and convenient walking distance from each other. • Easily visible and recognizable from a distance. • Accessible design • Security cameras • SOS-button • Sufficient space for pedestrians • Presence of security employee
Information provision, such as wayfinding or a digital information kiosk	Ratio selected answers on information question • Clear directions to the transport and services. • A detailed explanation of the present services. • Road crossings and other obstacles are clearly indicated and explained. • Simple and clearly worded information. • Information should also be provided in other languages than Dutch. • Real-time information screen
A mobile app to plan, book and pay for the trips made at the hub (i.e. MaaS-application)	*No comparable question*

Different models were made, both ordinal logistic regression models and binomial models. For the information variable, the proportional odds assumption was frequently violated, while for a majority of the attractive design variables, this was the case. To simplify the analysis, the results from the binomial logistic regression model were taken to minimise the impact of combining the Likert-scale questions from the different datasets. Different models were also tested using combined variables and categories. However, similar independent variables were used as for the analysis described in 4.4.1. Another model experimented with was the inclusion of the building year based on CBS data. However, this variable was excluded due to the complexity of how that variable was computed and the lack of support in the literature to use this variable. It showed only a significant category for the importance of information.

Dependent variables that are similar in both datasets are used. A full overview of variables is provided in Table 11.

Table 11: Variables used in the ordinal logistic regression analysis for the importance categories.

Independent variables		**Dependent variables**
<u>Sociodemographic</u>	<u>Mobility behaviour</u>	Non-mobility services
Gender	Car ownership	Attractive design
Age	Walking difficulty	Information provision
Birth country	Frequency walking	
Education	Frequency car	
Employment	Frequency bike/e-bike	
Home ownership status	Frequency moped/motorcycle	
Household composition	Frequency Taxi	
Digital skill	Frequency bus/tram/metro	
	Frequency train	
<u>Spatial</u>	Frequency shared- bike/e-bike	

Urbanisation	Frequency shared-moped Frequency shared-car	

5 Results

This chapter contains the results. In section 5.1 the sample composition will be presented. Section 5.2 contains the results on shared-mobility usage and barriers. Section 5.3 discussed the results of mobility hub services from the survey while 5.4 discusses the results of the design and integration ladder. 5.5 discusses the data analysis of the combined dataset.

5.1 Sample composition

The total number of respondents after data cleaning was 220. Around half of the respondents were residents from Purmerend, the other half was a combination of residents from cities around North-Holland with a few respondents from outside the province. These remain included as they are possible travellers to North-Holland. The breakdown of the respondents is shown in Table 12.

Table 12: Residency of the respondents.

Area	Respondents
Purmerend	49%
Zaanstad	14%
Dijk en Waard (Heerhugowaard)	14%
Schagen	1%
Hoorn	8%
Province North-Holland (other)	11%
Outside Province North-Holland	2%

5.1.1 Background respondents

Table 13 presents the sample composition based on the respondents' socio-demographic background and compares it to the population of the study area by combining CBS data from 2022 (CBS, 2025a) and 2024 (CBS, 2025b). In this table, responses indicating a preference not to answer a specific question were omitted and categories with low values or combined. The survey sample shows slight differences compared to the population of the area. There were relatively more male and non-migrant respondents to the survey compared to the area's population. The age distribution of the sample and population is similar, except for the 15-24 year old age group. The share of higher-educated people in the sample is much larger than the population of the area. For other education categories, there is no comparable data available.

Table 13: Socio-demographic background of the survey sample and the population of the study area.

	Sample survey	Population study area		Sample survey
Gender	N=214		**Employment**	N=220
Male	56%	50%	Employed less than 30 hours	9%
Female	44%	50%	Employed 30 hours or more	59%
Age	N=220		Own household	1%
15-24 year	7%	14%	Student	4%
25-34 year	15%	30%	Unemployed	0%
35-44 year	14%		Unable to work	4%
45-54 year	18%	32%	In retirement	23%
55-64 year	18%		Working unpaid	1%

65 year and older	28%	24%	**Type of employment**	N=148
Birth country	N=218		Paid employment	92%
The Netherlands	93%	84%	Independently working	6%
Europe (not The Netherlands)	2%	5%	Business owner	2%
Outside Europe	6%	11%	**Income**	N=174
Education	N=220		Less than €2667	15%
Primary education	0%		€2667-€4833	45%
Secondary education	5%		More than €4833	40%
MBO or equivalent	25%		**Homeownership Status**	N=168
HBO/university bachelor	45%	20%	Homeowner	93%
University master	24%		Renter	0%
Household composition	N=220		Other	7%
Single person	27%			
Pair	37%			
Family with children	30%			
Living group	0%			
Other	5%			

Table 14 shows the level of digital skills of the respondents. More than 90% of the respondents possess either level 2 or level 3 skills, indicating that a large majority of the sample is familiar with using a phone for planning a trip and 52% also know how to book or pay for trips. The relatively high level of digital skills was in part expected due to the sampling strategy, which relied mainly on online participation in the survey. In contrast, the earlier democratic involvement of the respondents is low, with 18% having participated in a participation process before. Of those 18%, the three most used forms of earlier participation were a survey, receiving information and giving feedback or ideas. Comparing this to the democratic integration ladder (marked L1/L2/L3), the current experiences with the participation of respondents are low.

Table 14: Digital skills and democratic involvement of the respondents.

Digital skill level	N=220
Level 0	1%
Level 1	6%
Level 2	40%
Level 3	52%
Democratic involvement	N=220
No participation	82%
Participated, no specifics	0%
Participated	18%
Type of participation*	N=39
Got information (L1)	34%
Participated in a survey (L2)	82%
Gave feedback or ideas (L2)	34%
Participated in a workshop (L2/3)	3%
Active long-term group (L3)	8%
Other types of participation process	16%

*Multiple answers were possible

5.1.2 Mobility

In Figure 4, the travel frequency is shown. Walking, car and bike/e-bike are the most frequently used modes of transport. Public transport is used far less frequently, which is similar to the OdiN sample. The respondents in the sample have limited experience with shared mobility. Car usage and public transport among the sample are higher than in the ODiN sample. The latter is understandable considering the flyers for the surveys were in part distributed at train stations. 10% of the respondents indicated difficulty walking for longer than 10 minutes. From this group, 48% use assistance when walking. Car ownership was high, with 83% of the respondents owning a car, 75% owning one car, 22% owning two cars, and 3% owning more than two cars.

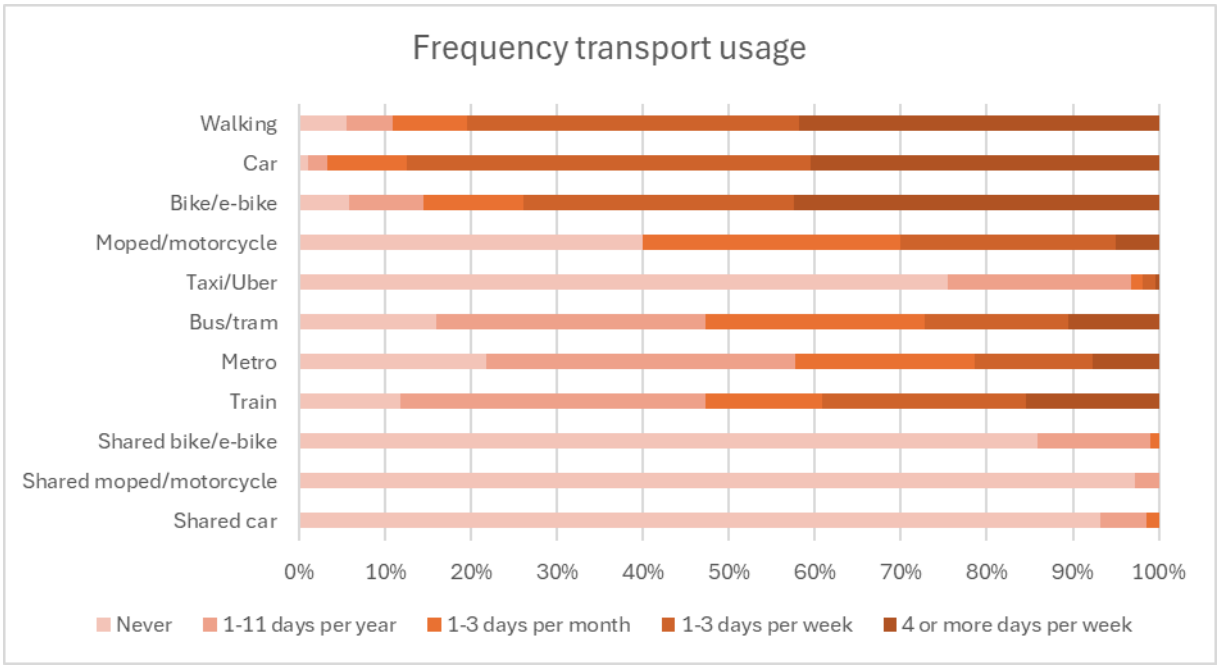

Figure 4: Mobility frequency of respondents (N=220).

5.2 Shared-mobility

Figure 5 shows the intention to use shared mobility at the mobility hub among the sample. There is a clear low usage intention for all forms of shared mobility. The cargo bike is the least likely to be used by the respondents, while the car and e-bike are the most likely to be used forms of shared mobility. Overall, it can be said that each form of shared mobility has little enthusiasm for future shared mobility use. However, when considering whether the respondents would use at least one form of shared mobility, the group that is likely to use it is 41%. The results align with earlier research, indicating that around 10-20% of respondents are interested in shared mobility. For this sample, that is not much different.

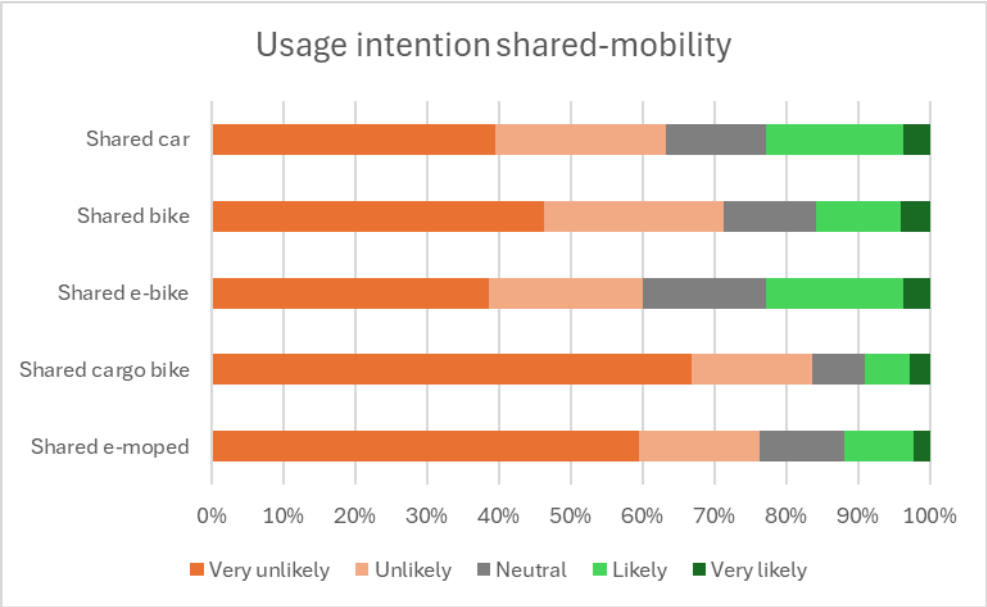

Figure 5: Shared-mobility usage intention for different modes (N=220). Response to the question: How likely is it that you will use the modes below in case they are present at the mobility hub?

Of all the respondents, 41% would likely or very likely use one of the shared-mobility modes. From this group, 56% chose at least two modes of shared mobility. Figure 6 shows which shared-mobility mode respondents chose based on whether they intended to use only 1 or 2+ shared-mobility modes. The first row in the figure (N=40) shows that shared-car is most often selected when people prefer only one mode of transport, followed by e-bike and e-moped. Car-sharing is viewed as a distinct form of shared mobility, separate from the others. The second row of Figure 6 shows the share of shared-mobility modes selected by people who intend to use multiple shared-mobility modes (N=51, selected 141 modes in total). Here, the share of the car is much lower than for the first row, and the shared e-bike is more often selected.

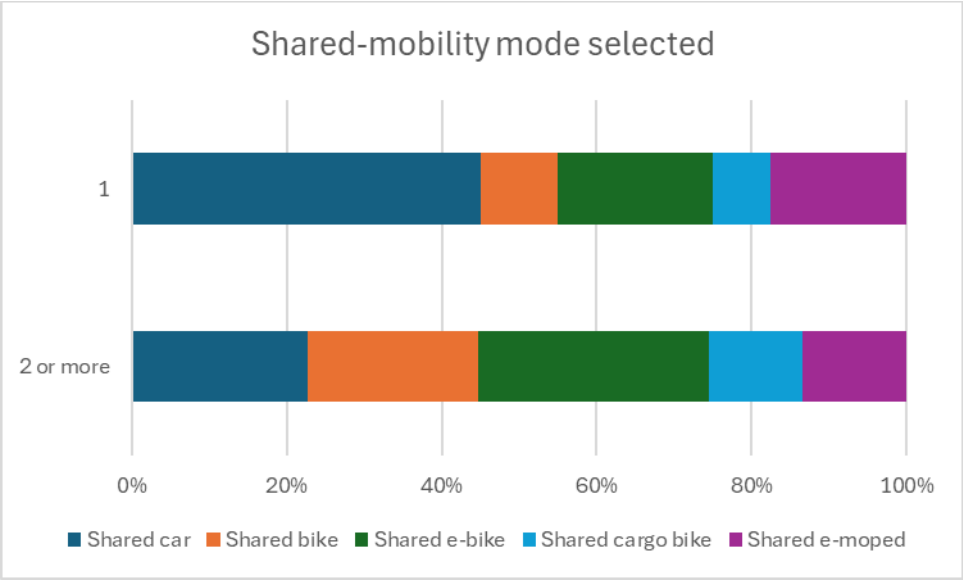

Figure 6: Preferred shared-mobility mode of respondents that indicated that they intend to use only one mode of shared-mobility (first row, N=40) and 2 or more modes of shared-mobility (second row, N=51, 141 modes selected in total).

For those who indicated they would not use a single form of shared mobility, a follow-up question was asked to determine the main barrier to not using it. From the results shown in Figure 7, two main

reasons can be derived: people's preference to use their own vehicle and the fact that shared mobility cannot fulfil their travel needs. Other barriers related to the vehicles themselves were much lower.

The outcome indicates that the main reason for not using shared mobility is the preference for one's own vehicles, which is understandable considering the sparse presence of shared mobility and high car ownership in the study area. Therefore, current mobility options are mainly limited to cars, bikes and public transportation. The car is currently easily accessible to respondents, which explains why their own vehicle is viewed as more comfortable. When own vehicle usage (particularly cars) becomes more restricted, the outcome might suggest that barriers related to shared mobility are low and can offer a viable alternative to most people. However, the fact that people have little experience with shared mobility might influence the results as they have not met other barriers. These results might change when people become more familiar with shared mobility.

Other barriers besides those listed in Figure 7 may play a role. Literature review showed that digital skills, costs and accessibility often form barriers to using shared mobility. Although the focus was on preferred features and less on features of shared-mobility, these factors may play a role in how people perceive shared-mobility and thus influence their decision to use or not use shared-mobility. Costs were no major problem for non-users. Furthermore, it should be noted that only 52% of the respondents have the digital skills to use shared mobility. However, less than 10% of non-users noted that they have difficulty arranging a vehicle, suggesting that the lack of shared-mobility adoption of the sample is primarily driven by different preferences and less by barriers related to shared-mobility.

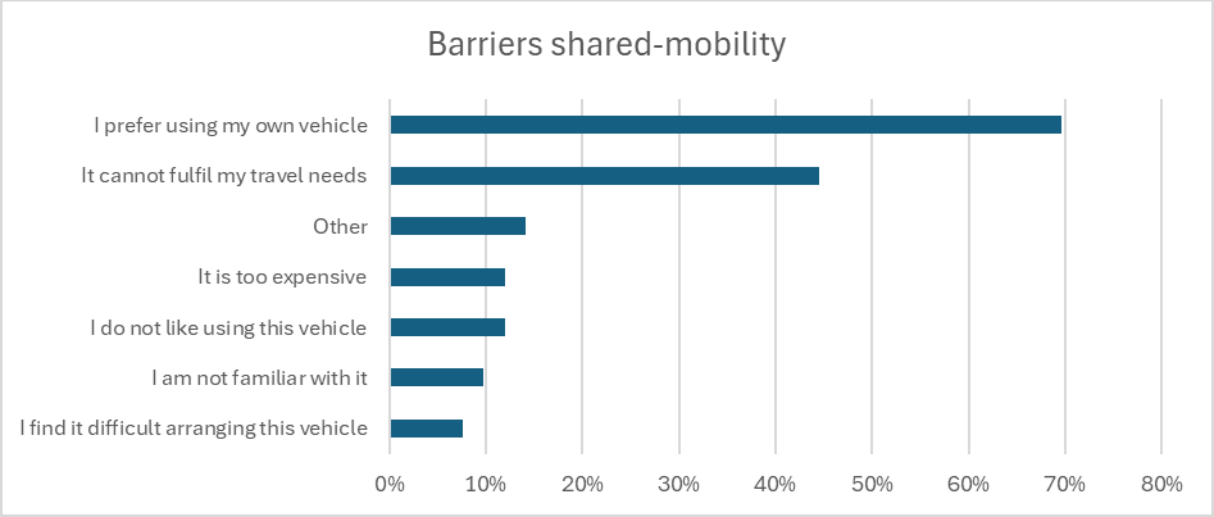

Figure 7: Barriers to shared-mobility selected by respondents who intend not to use a single form of shared-mobility (N=92). Multiple answers were possible. Answers are sorted from high to low. Answer to the question: What are the main reasons why you never or hardly intend to use shared-mobility at the mobility hub?.

Respondents who indicated that they intended to use at least one form of shared mobility were asked what the main reasons they would use shared mobility were. In Figure 8, the results are shown. Contrary to the previous outcome on barriers to using shared mobility, there is no clear outstanding reason why people intend to use shared mobility. It seems that the benefits of shared mobility at the mobility hub relate to it being an alternative mode compared to cars and public transport, and it offers greater accessibility. The contribution specifically of a mobility hub for shared mobility is less perceived, but still by 44% of the respondents. The fact that shared-mobility is concentrated at the hub and there is a higher chance of finding a vehicle are the least selected benefits (alongside the 'Other ' option).

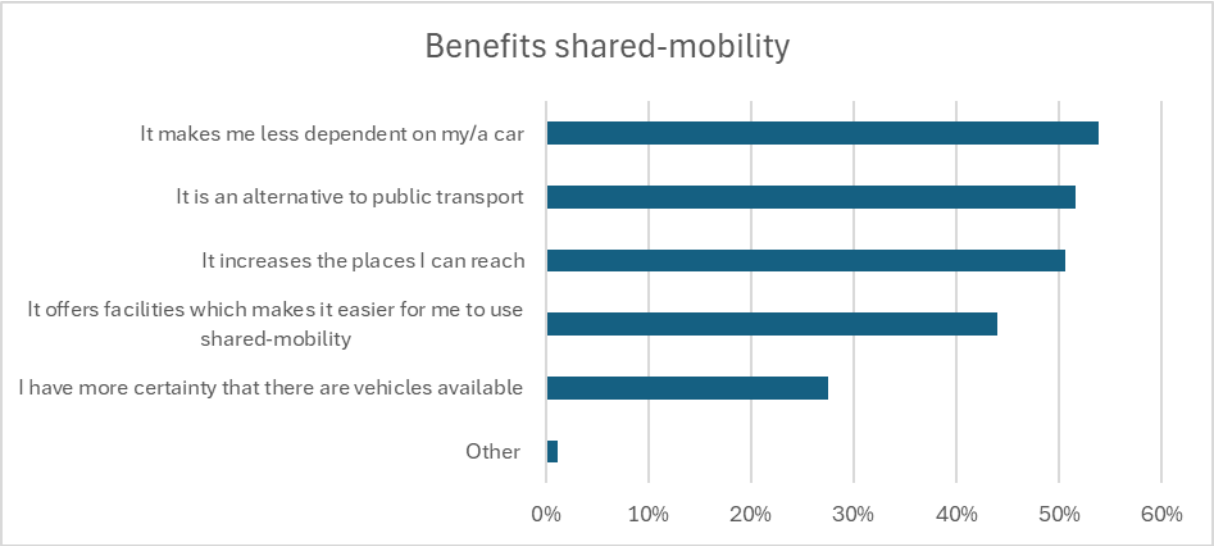

Figure 8: Benefits perceived of using shared-mobility by respondents who intend to use at least a single mode of shared-mobility (N=91). Multiple answers were possible. Answers are sorted from high to low. Answer to the question: What are the most important reasons why you are going to use shared mobility from the hub?.

5.2.1 Shared-mobility BLR

A binary logistic regression analysis was conducted to identify significant predictors of shared-mobility adoption and compare these to variables significant for services usage. The dependent variable is the adoption of any mode of shared-mobility, defined as a likely use of at least one mode of shared-mobility. This resulted in 129 unlikely and 91 likely users of shared mobility. The model is statistically significant (Chi-square = 76,460, p < 0,001) and has a Cox & Snell R Square of 0,294 and a Nagelkerke R square of 0,395. In Table 15, a complete overview of the model output and parameter estimates can be found.

The youngest age group showed a higher intention to use, with an odds ratio of 10,631. Earlier participation in participatory processes significantly predicts higher shared-mobility adoption (1/0,233=4,292). Not owning a car shows an odds ratio of 7,428 compared to those owning 2 or more cars, while current shared-mobility use has an odds ratio of (1/0,181=5,525). Besides the participatory process variable, the significant categories and independent variables are similar to those found to influence in the literature review. This indicates that the sample shows similar shared-mobility adoption patterns as earlier research.

Table 15: Parameter estimates of the ordinal logistic regression for the intention to use shared mobility at the mobility hub. Only the independent variables with at least one significant category are shown. The complete analysis can be found in Appendix F.

	B	**Std. Error**	**Wald**	**Sig.**	**exp(B)**	**CI lower bound**	**CI upper bound**
Constant	2,099	1,594	1,734	0,188	8,155		
Age = 16-24	**2,364**	**1,104**	**4,584**	**0,032***	**10,631**	**1,221**	**92,537**
Age = 25-34	1,427	0,846	2,847	0,092	4,167	0,794	21,871
Age = 35-44	1,176	0,845	1,939	0,164	3,243	0,619	16,985
Age = 45-54	1,116	0,815	1,877	0,171	3,053	0,618	15,077
Age = 55-64	0,872	0,692	1,59	0,207	2,392	0,617	9,282
Age = 65+	0a						
Participation = no	**-1,458**	**0,477**	**9,356**	**0,002***	**0,233**	**0,091**	**0,592**
Participation = yes	0a						
Car ownership = 0	**2,005**	**0,953**	**4,424**	**0,035***	**7,428**	**1,146**	**48,123**

Car ownership = 1	0,141	0,517	0,075	0,785	1,152	0,418	3,174
Car ownership = 2+	0a						
Shared-mobility use = no	**-1,709**	**0,572**	**8,917**	**0,003***	**0,181**	**0,059**	**0,556**
Shared-mobility use = yes	0a						

[a]*This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

5.3 Mobility hub services

This section discusses the results of the mobility hub services' usage intention. In section 5.3.1 the general results are presented. In section 0-5.3.4 the data analysis is discussed.

5.3.1 Usage intention

Figure 9 shows the intention to use mobility hub services and facilities. Compared to the shared-mobility usage intention, these services have a significantly higher usage intention. 6 out of the 10 services would be used by a majority of the respondents and the share of likely users is almost higher for all services except the electric vehicle charging. This service seems to offer minimal benefit to the respondents. The most beneficial services seem to be benches, kiosk, toilet, parcel locker, Wi-Fi and secured parking. Café, car parking and bike repair shop also seem valuable for a large part of the respondents. 95% of the respondents selected at least one service they would likely use.

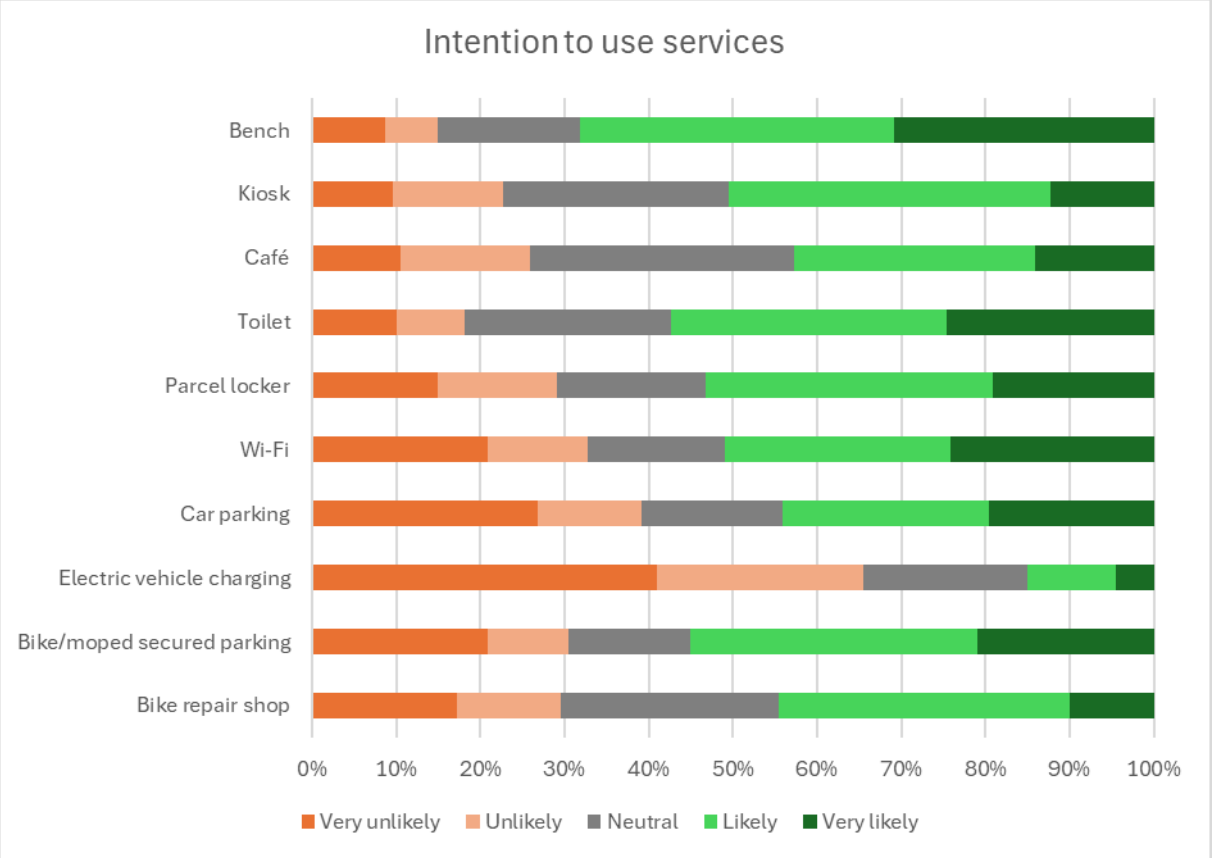

Figure 9: Services usage intention for different services and facilities (N=220). Response to the question: How likely is it that you will use the following facilities?

Table 16 below gives a more detailed overview of the share of respondents with a positive likelihood of using mobility hub services. The groups are dissected on future shared-mobility users, local residents of train stations and frequency of public transport usage. Future shared-mobility users are divided into

unlikely and likely intention, which is determined by their highest intention to use at least one mode of shared-mobility. Local residents are respondents whose postal code is the same as the train station where the flyers have been distributed. Frequent public transport users are those who travel at least once a week by train, bus, tram or metro.

Likely shared-mobility users seem to have a higher intention to use the services but only for four services is there a significant difference, namely café, parcel locker, secured bike parking and a bike repair shop. For local residents and for frequent public transport users there is each one significant service indicating less of a distinction in use between these groups.

Table 16: Share of respondents to (very) likely use mobility hub service if present. The darkness of the green corresponds to the percentages.

	Full sample	Future shared-mobility usage		Local residents train station		Frequency public transport usage	
	(N=220)	Unlikely (N=129)	Likely (N=91)	Local (N=132)	Not local (N=88)	Irregular (N=104)	Frequent (N=116)
Bench	68%	66%	71%	67%	69%	68%	68%
Kiosk	50%	46%	57%	52%	48%	45%	55%
Café	43%	**37%***	**51%***	45%	40%	39%	46%
Toilet	57%	53%	64%	**64%***	**48%***	59%	56%
Parcel locker	53%	**43%***	**68%***	52%	55%	**44%***	**61%***
Wi-Fi	51%	56%	44%	52%	50%	55%	47%
Car parking	44%	45%	43%	42%	48%	47%	41%
Electric vehicle charging	15%	12%	20%	17%	13%	18%	12%
Secure bike parking	55%	**48%***	**65%***	50%	63%	57%	53%
Bike repair shop	45%	**35%***	**58%***	48%	40%	46%	43%

*Significant difference between sub-group based on the Chi-square test (p=<0,05)

5.3.2 Correlation

Before conducting the data analysis with the ordinal logistic regression analysis, the 10 dependent variables on services were assessed for the level of correlation to check whether this was too high and whether it was possible to select one or combine dependent variables with a high correlation. To test for correlation among the service variables, a correlation analysis using Kendall's Tau is conducted. Kendall's Tau is more suited for data where there is a small sample and where basic assumptions are not met (Field, 2024).

The results of the Kendall's Tau analysis can be found in Appendix D. For a majority of the service variables, there is a significant correlation. The highest correlation is between the kiosk and café variables, with a value of 0,653. Also, there is a lower but still high correlation between the bench, kiosk, café and toilet variables, with correlation coefficients lying between 0,336 and 0,652. The kiosk and café variables have many similarities and medium similarities with the bench and toilet. Secure bike parking and a bike repair shop variables also had a correlation coefficient of 0,393.

A Principal Component Analysis (PCA) was conducted to see which components could be formed. The variables parcel locker, Wi-Fi, car parking and electric vehicle charging were omitted due to the most

values having a low correlation, which makes them not suited for the PCA (Field, 2024). Table 17 shows the results from the Principal Component Analysis and contains the rotated component matrix. The rotation was performed using orthogonal rotation (varimax). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0,740 which is above the 0,50 acceptable threshold and is a 'middling' score (Field, 2024). All KMO values for the individual variables were greater than 0,669, which is also above the limit of 0,5. Bartlett's Test of Sphericity was significant. The number of components was based on Kaiser's criterion of 1, which resulted in two components. Inflexions based on the scree-plot justified this approach as well as the correlations extracted from the Kendall's Tau analysis.

Two components could be identified. The first one represents services that provide comfortable stays for both mobility users and residents and are named station amenities. The second component is bike facilities, as it contains secured parking for biking and moped vehicles and a bike repair shop. High correlation and shared high factor loadings are logical findings as people who possess a bike or value bike facilities as important would value both these services. For the ordinal logistic regression analysis, variables are combined by taking the rounded-off mean value of independent variables with a factor loading of at least 0,400.

Table 17: Rotated component matrix of the Principal Component Analysis of the service variables. Factor loadings over 0,400 are in bold.

Services	**Component**	
	1 (comfort amenities)	2 (bike facilities)
Bench	**0,703**	0,216
Kiosk	**0,879**	0,152
Café	**0,826**	0,076
Toilet	**0,740**	0,139
Bike/moped secured parking	0,104	**0,865**
Bike repair shop	0,206	**0,830**

Besides assessing the correlation between the dependent variables, the independent variables are tested to assess for high correlation and multicollinearity. The multicollinearity of the independent variables was tested by calculating the variance inflation factor (VIF). This value indicates the level of correlation and whether there is multicollinearity (Statistics Solutions, n.d.; Statology, 2020). A value between 1 and 5 indicates a moderate correlation, while a value above 5 indicates a high correlation. The results can be found in Appendix E. The maximum value was 2,353, indicating no multicollinearity.

5.3.3 Station amenities

Section 4.4 discussed the model development, model quality, factor analysis and used variables. The model results are discussed in two parts due to the size of the results. In this section the results from the station amenities are discussed which are services that mainly provide a comfortable stay at the mobility hub and are not directly related to mobility.

The factor analysis showed that the services bench, kiosk, café and toilet could be combined into a single component. The mean of the Likert-scale scores was taken and rounded off to the nearest integer. Individual ordinal logistic regression analyses from the bench, café and toilet variables are included in this section to highlight additional significant categories found in these results. The OLR from the kiosk is excluded due to a violation of the proportional odds assumption ($p = 0.048$ significance). Furthermore, the results from the variables parcel locker and Wi-Fi are discussed. They did not correlate highly with the aforementioned dependent variables, but are part of the station amenities.

Table 18-Table 20 show the significant parameter estimates. For the variables that make up component 1 (comfort amenities), only the exp(B) values are included in Table 19. The full results can be found in Appendix H.

Table 18: Parameter estimates of the ordinal logistic regression for the intention to use a component 1 (bench, kiosk, café, toilet) at the mobility hub. Only the independent variables with at least one significant category are shown. The full analysis can be found in Appendix H.

Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Component 1 = 1	-4,747	1,483	10,249	0,001	0,009	0,000	0,159
Component 1 = 2	-2,894	1,456	3,949	0,047	0,055	0,003	0,961
Gender = male	**-0,991**	**0,348**	**8,106**	**0,004***	**0,371**	**0,188**	**0,734**
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-0,062	0,947	0,004	0,947	0,940	0,147	6,013
Age = 25-34	-0,016	0,738	0,000	0,983	0,984	0,232	4,179
Age = 35-44	0,408	0,746	0,299	0,584	1,504	0,349	6,482
Age = 45-54	0,179	0,713	0,063	0,802	1,196	0,296	4,836
Age = 55-64	**1,459**	**0,679**	**4,621**	**0,032***	**4,302**	**1,138**	**16,265**
Age = 65+	0a	.	.	.	.	.	.
Occupation = active	**-2,234**	**0,649**	**11,858**	**<,001***	**0,107**	**0,030**	**0,382**
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = homeowner	**-1,055**	**0,453**	**5,422**	**0,020***	**0,348**	**0,143**	**0,846**
Homeownership = renting	0a	.	.	.	.	.	.
Difficulty walking = no	**1,972**	**0,598**	**10,887**	**<,001***	**7,185**	**2,228**	**23,196**
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency public transport = low	**-1,327**	**0,521**	**6,495**	**0,011***	**0,265**	**0,096**	**0,736**
Frequency public transport = medium	-0,627	0,496	1,599	0,206	0,534	0,202	1,412
Frequency public transport = high	0a	.	.	.	.	.	.

[a]*This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

Table 19: Parameter estimates of the ordinal logistic regression for the intention to use a component 1 and bench, kiosk, café, toilet variables. Only the exp(B) values and independent variables with at least one significant category are shown. The full analysis can be found in Appendix H.

	Comfort amenities (Co1)	Bench	Café	Toilet
Gender = unknown				
Gender = male	0,371	0,438	0,554	
Gender = female				
Age = 16-24				
Age = 25-34				
Age = 35-44				
Age = 45-54				
Age = 55-64	4,302			6,135
Age = 65+				
Education = low			4,076	
Education = neutral			2,423	
Education = high				
Occupation = active	0,107	0,131		0,067
Occupation = not-active				
Homeownership = unknown				

Homeownership = homeowner	0,348		0,331	0,295
Homeownership = renting				
Household = unknown				
Household = alone				0,368
Household = pair				
Household = multiple				
Digital skill = 0/1				
Digital skill = 2				2,494
Digital skill = 3				
Participation = no		0,252		
Participation = yes				
Car ownership = 0				
Car ownership = 1				2,333
Car ownership = 2+				
Difficulty walking = no	7,185	15,643	3,158	
Difficulty walking = yes				
Frequency walking = low				0,260
Frequency walking = medium				
Frequency walking = high				
Frequency bike/moped = low				4,993
Frequency bike/moped = medium				3,013
Frequency bike/moped = high				
Frequency public transport = low	0,265	0,305	0,383	
Frequency public transport = medium				
Frequency public transport = high				

Table 20: Parameter estimates of the ordinal logistic regression for the intention to use a parcel locker at the mobility hub. Only the independent variables with at least one significant category are shown. The complete analysis can be found in Appendix H.

Variable	**B**	**Standard error**	**Wald**	**Sig.**	**Exp(B)**	**CI lower bound**	**CI upper bound**
Parcel locker = unimportant	-1,895	1,192	2,527	0,112	0,150	0,015	1,554
Parcel locker = neutral	-0,968	1,187	0,666	0,414	0,380	0,037	3,885
Education = low	**1,817**	**0,786**	**5,346**	**0,021***	**6,153**	**1,319**	**28,732**
Education = neutral	0,656	0,360	3,312	0,069	1,927	0,951	3,904
Education = high	0a	.	.	.	.	.	.
Homeownership = homeowner	**-0,964**	**0,421**	**5,252**	**0,022***	**0,381**	**0,167**	**0,869**
Homeownership = tenant	0a	.	.	.	.	.	.
Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Wi-Fi = unimportant	-2,850	1,224	5,422	0,020	0,058	0,005	0,637
Wi-Fi = neutral	-1,943	1,215	2,559	0,110	0,143	0,013	1,550
Urbanisation = 1	**-0,942**	**0,479**	**3,865**	**0,049***	**0,390**	**0,152**	**0,997**
Urbanisation = 2	-0,444	0,457	0,945	0,331	0,641	0,262	1,570
Urbanisation = 3	0a	.	.	.	.	.	.
Age = 16-24	-1,655	0,865	3,664	0,056	0,191	0,035	1,041
Age = 25-34	**-2,362**	**0,723**	**10,682**	**0,001***	**0,094**	**0,023**	**0,388**
Age = 35-44	-0,910	0,713	1,631	0,202	0,403	0,100	1,627
Age = 45-54	**-1,532**	**0,673**	**5,187**	**0,023**	**0,216**	**0,058**	**0,807**
Age = 55-64	-0,985	0,580	2,889	0,0898	0,373	0,120	1,163
Age = 65+	0a	.	.	.	.	.	.

*[a]This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

Gender plays a role in the intention to use station amenities. Women are more likely to use station amenities. Additionally, the individual analyses for the bench and café reveal a significantly higher odds ratio for women to use these services. In contrast, no significant relationship was found for the toilet variable. The odds ratio difference is the highest for station amenities and café variables. While the literature on shared-mobility adoption indicates that men are more often using shared mobility, women do significantly prefer services such as benches and kiosks.

Only for three age classes is there a significantly different odds ratio, but the difference is quite large. The age group 5 has an odds ratio of 6,135 compared to age group 6, indicating that people between 55 and 65 years old have a significantly higher intention to use this service. Age groups 2 and 4 have a lower odds ratio for the intention to use Wi-Fi. Age group 6 has an odds ratio of 10,638 and 4,630 times larger than age groups 2 and 4, respectively. Age groups 1 and 5 suggest a lower odds ratio than age group 6, but had a significance between 0,05 and 0,10. Based on these results, it can be derived that older people value Wi-Fi as more important, which might indicate a need for internet accessibility for older ages. The large differences in odds ratios could be caused by the high level of categories for the age variable, each of which had a lower count.

Digital skills only influenced the intention to use the toilet variable, with digital skill level 2 having an odds ratio of 2,494. People with a skill level of 2 are more inclined to use the toilet than someone with a skill level of 3. Participation is a significant predictor of the intention to use station amenities and the bench variable. People who have previously participated in mobility offerings have an odds ratio of 2,304 and 3,967, respectively, indicating that individuals who have been involved in participation processes are more likely to use these services. This does not mean that having more people involved in the participation process necessarily increases the usage of services, as it may simply indicate that only the most involved group has a higher intention to use. Nevertheless, it is an interesting finding that warrants further research.

The odds ratios of the Employment predictor were among the highest. People with no active employment have an odds ratio of 7,937 compared to those with active employment regarding the use of station amenities. Dissection for the individual services shows a similar odds ratio for the bench variable (1/0,131=7,634) but a much higher ratio for the toilet variable, where people with no active employment have an odds ratio of 14,925 (1/0/067). This means that station amenities in general, but especially a toilet and café, are important services for people who are not actively employed.

Education is a significant predictor, with lower-educated people more likely to use a café and those with a medium-educated background more likely to use a parcel locker. Especially lower-educated people had a high odds ratio of 6,153 compared to higher-educated people for the café variable. For medium-educated people, the odds ratio was 2,625 compared to higher-educated people for using a parcel locker. Homeownership had similar significant variables, with people who rent having a higher intention to use a café and parcel locker (3,021 and 2,625). Renters also had a higher odds ratio for the toilet variable.

Significant mobility predictors were car ownership, walking difficulty and the frequency of transport modes of walking, biking and moped and public transport. People who own only one car compared to two or more have a higher probability of using a toilet (2,333). People with no walking difficulty are less likely to use station amenities and especially benches. This is a counterintuitive finding as people who find it difficult to walk would prefer a bench even more, but for this sample, this is not the case. There may be other reasons that this group has a lower preference for benches. The small sample size for this characteristic could also be the cause of these results.

Regarding the transport frequency predictors, both biked/moped frequency levels have higher odds ratios compared to high bike/moped usage. Low bike/moped usage had an odds ratio of 4,993, while medium usage had an odds ratio of 3,013. This indicates an apparent increase in the preference for a toilet as the bike/moped frequency decreases. The opposite is the case for walking frequency. People with a low walking frequency show a lower intention to use a toilet. For public transport usage, there is a higher intention to use for people with 2 and frequent usage for using station amenities and, more specifically, a bench and café.

The urbanisation level was not significant for all services except Wi-Fi. People living in very densely populated neighbourhoods were less likely to use Wi-Fi compared to those living in less densely populated neighbourhoods.

5.3.4 Mobility services

This section will discuss the results of the Ordinal Logistic Regression (OLR) analysis for mobility-related services. These are car parking, bike repair shop and secure bike parking. The results of electric vehicle charging are not discussed due to a low adoption rate and only one category being significant. The results can still be found in Appendix H along with the other Logistic Regression analyses. Table 21 shows the parameter estimates for the ordinal logistic analysis of the intention to use a car parking at the mobility hub.

People who own two cars or more have a 13,888 (1/0,072) odds ratio compared to those who own no vehicle. This is very high compared to other variables. People who own only one car have no significant difference in odds compared to those who own two cars, which suggests that they have similar, relatively high odds of intending to use car parking. The significant difference in odds ratio can be explained by the fact that parking spaces are only of benefit for car owners. The large differences in odds ratios indicate that car ownership in an area can be a significant predictor of its necessity and value in specific neighbourhood development. Interestingly, car usage was not of significant influence, but irregular bike and moped users had a significantly higher odds ratio compared to frequent bike and moped users. This suggests that all car users value car parking as important, but increased cycling frequency leads to a lower need for car parking at the mobility hub.

Age was a significant predictor of car parking. Age group 16-25 year olds had a lower odds ratio compared to age group 6. These predictors seem logical when considering that younger people own fewer vehicles (Zijlstra et al., 2022) due to the life phases people are in. An increase in income, independent living and having a family are reasons why people will adopt car ownership. The income variable was omitted from the analysis due to high non-response, but a lower educated background, which correlates with lower income (CBS, 2024b), showed a lower odds ratio, indicating that higher educated people are more likely to use a car parking. People living together as a pair household have a higher odds ratio compared to those living as families or living groups.

Table 21: Parameter estimates of the ordinal logistic regression for the intention to use car parking at the mobility hub. Only the independent variables with at least one significant category are shown. The full analysis can be found in Appendix H.

Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Car parking = unimportant	-2,902	1,242	5,463	0,019	0,055	0,005	0,626
Car parking = neutral	-1,971	1,233	2,555	0,110	0,139	0,012	1,562
Age = 16-24	**-2,096**	**0,925**	**5,138**	**0,023***	**0,123**	**0,020**	**0,753**
Age = 25-34	-0,190	0,732	0,068	0,795	0,827	0,197	3,473
Age = 35-44	-0,471	0,733	0,413	0,520	0,624	0,148	2,627

Age = 45-54	-0,025	0,717	0,001	0,972	0,975	0,239	3,975
Age = 55-64	-1,025	0,592	2,999	0,083	0,359	0,112	1,145
Age = 65+	0a	.	.	.	.	.	.
Education = low	**-1,561**	**0,744**	**4,400**	**0,036***	**0,210**	**0,049**	**0,903**
Education = neutral	-0,042	0,370	0,013	0,910	0,959	0,464	1,982
Education = high	0a	.	.	.	.	.	.
Household = alone	-0,131	0,499	0,069	0,793	0,877	0,330	2,333
Household = pair	**1,184**	**0,475**	**6,209**	**0,013***	**3,267**	**1,288**	**8,290**
Household = multiple	0a	.	.	.	.	.	.
Car ownership = 0	**-2,638**	**0,836**	**9,956**	**0,002***	**0,072**	**0,014**	**0,368**
Car ownership = 1	-0,118	0,436	0,073	0,787	0,889	0,378	2,090
Car ownership = 2+	0a	.	.	.	.	.	.
Frequency bike/moped = low	**1,440**	**0,427**	**11,354**	**<,001***	**4,221**	**1,826**	**9,757**
Frequency bike/moped = medium	-0,429	0,369	1,352	0,245	0,651	0,316	1,342
Frequency bike/moped = high	0a	.	.	.	.	.	.

[a]*This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

Table 22 shows the parameter estimates for the ordinal logistic analysis of the intention to use biking facilities. It contains only significant variables with at least one significant category. The biking facilities component is the means of a bike repair shop and secure bike parking dependent variables. Secure bike parking had additional significant categories, but these showed no clear pattern and are therefore omitted. The bike repair shop resulted in no significant categories. Therefore, only the individual OLR result of the bike facilities component is shown.

Table 22: Parameter estimates of the ordinal logistic regression for the intention to use the biking facilities parking at the mobility hub. Only the independent variables with at least one significant category are shown. The full analysis can be found in Appendix H.

Variable	**B**	**Standard error**	**Wald**	**Sig.**	**Exp(B)**	**CI lower bound**	**CI upper bound**
Bike facilities = unimportant	-3,360	1,370	6,017	0,014	0,035	0,002	0,509
Bike facilities = neutral	-1,770	1,357	1,701	0,192	0,170	0,012	2,435
Urbanisation = 1	**-1,119**	**0,491**	**5,200**	**0,023***	**0,327**	**0,125**	**0,855**
Urbanisation = 2	-0,752	0,466	2,599	0,107	0,471	0,189	1,176
Urbanisation = 3	0a	.	.	.	.	.	.
Occupation = active	**-1,147**	**0,557**	**4,231**	**0,040***	**0,318**	**0,107**	**0,947**
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = homeowner	**-1,161**	**0,421**	**7,600**	**0,006***	**0,313**	**0,137**	**0,715**
Homeownership = tenant	0a	.	.	.	.	.	.
Participation = no	**-0,835**	**0,422**	**3,919**	**0,048***	**0,434**	**0,190**	**0,992**
Participation = yes	0a	.	.	.	.	.	.
Difficulty walking = no	**1,505**	**0,543**	**7,691**	**0,006***	**4,504**	**1,554**	**13,040**
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency bike/moped = low	**-0,890**	**0,384**	**5,372**	**0,020***	**0,411**	**0,193**	**0,872**
Frequency bike/moped = medium	-0,335	0,371	0,816	0,366	0,715	0,345	1,481
Frequency bike/moped = high	0a	.	.	.	.	.	.

[a]*This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

Bike facilities shared the same significant predictors with the combined variable secure bike parking, but the latter one had more significant predictors, which gives a better indication of who these services are important to. Frequent bike and moped users have a higher odds ratio compared to irregular users for both dependent variables. Secure bike parking also has a higher odds ratio for frequent bike and moped users compared to neutral users. This indicates the importance of bike facilities for frequent

bike users. Residents in more dense neighbourhoods are less likely to use bike facilities, meaning that bike facilities are more important in less crowded areas. Tenants, people who do not have difficulty walking, also show a higher probability of using bike facilities.

Other variables that were found to be significant for the secure bike parking included medium walking frequency, digital skill level 2, age group 4 and two-person households. These variables, except for household, fall into the middle category of an ordinal variable, which makes it more challenging to discern an overall pattern or find an explanation.

5.3.5 Summary

Table 23 below summarizes the results from Table 18-Table 22 and gives an overview of how each predictor influences the dependent variable (services). Most variables show a similar positive or negative relationship across the service variables suggesting an overall higher or lower intention to use mobility hub services. Based on the results, vulnerable user group predictors (women, older, digital skill, difficulty walking) saw specific preferences in services. Women had higher intention to use for the bench and café, while those with difficulty walking saw a lower intention to use for comfort amenities, bench and secured bike parking.

Table 23: Overview of significant predictors for each variable.

Component		Comfort amenities				-			Bike facilities	
Dependent variable	Shared-mobility	Co1	Bench	Café	Toilet	Parcel locker	Wi-Fi	Car parking	Co2	Secured bike parking
Urbanisation							-		-	-
Female (gender)			++	++						
Age	-				-/+		-/+	+		-/+
Education				-/+		-		+		
Homeowners				-	-	-			-	-
Active employment		--	--		-					
Democratic involvement	+	++	++							
Household composition					+			-/+		-/+
Digital skills					-/+					-/+
Car usage										
Car ownership	-				-/+			+		
Public transport usage		+	+	+						
Walking frequency					+					-/+
Bike/moped usage					--			-	+	++
Difficulty walking		--	--						-	--
Shared-mobility use	+									
		Negative category (-)			Negative category all (--)			-/+ mixed/middle category		
		Positive category (+)			Positive category all (++)					

5.4 Mobility hub design and integration

This section includes the results on mobility hub design preferences. Section 5.4.1 discusses the most preferred features for the information provision and design features. Section 5.4.2 presents the ranking

and discusses the priority of design features. Section 5.4.3 discusses the results on digital integration, while section 5.4.4 discusses the results on people's perception and knowledge of the mobility hub.

5.4.1 Important features

The preferred design characteristics of the mobility hub are shown in Figure 10. They showed that many of the respondents selected these characteristics as important, specifically at the mobility hub. The characteristics are sorted based on the share of respondents. The most selected features are real-time information screens, clear directions at the mobility hub and simple and clearly worded information. Universal design principles and level 2 physical integration requirements are the highest ranked features, while an indication of obstacles (level 3) is less often selected.

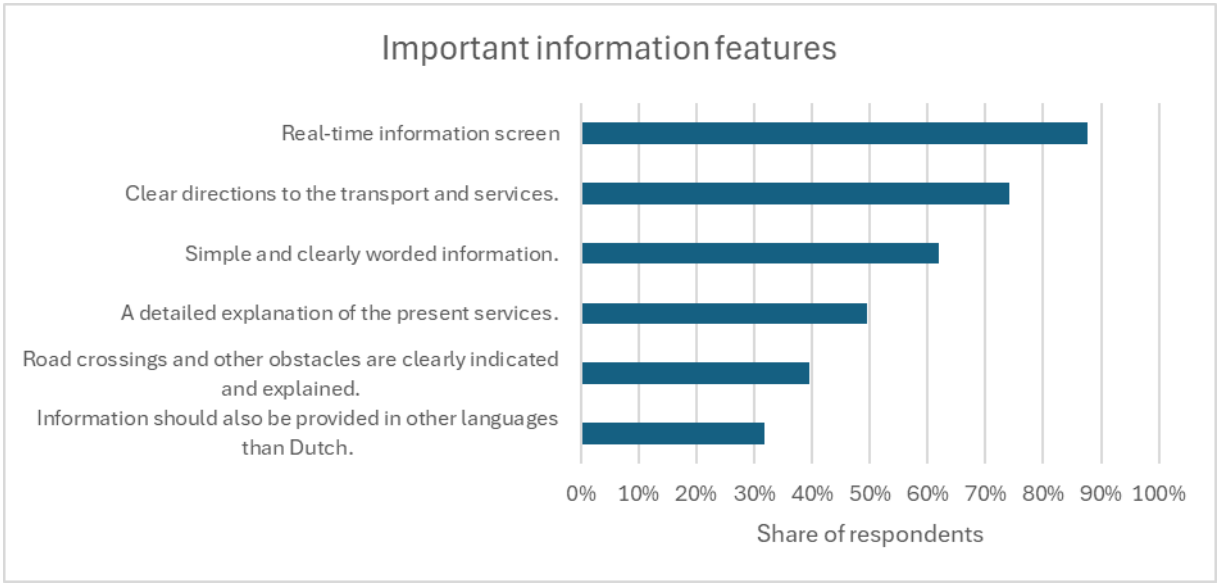

Figure 10: Preferred information characteristics of the mobility hub (N=220). Multiple answers were possible. Response to the question: What is important to you regarding the information provision on the mobility hub?

Figure 11 shows the important design features of the hub. Sufficient lighting is selected by almost 90% of the respondents and stands out compared to the other results. The second most selected is a pleasant and welcoming environment. Both these features indicate that the mobility hub must be a safe and pleasant environment at all times of the day. Security cameras (the fifth most selected) relate to this aspect of safety. The third and fourth most selected were short and convenient walking distances and sufficient space for pedestrians. This relates to the ease of movement and walkability of the mobility hub, indicating the importance of prioritising walking space and minimising the disturbance to other modes of transport. The aesthetic features of the mobility hub, such as easy recognisability and an attractive and pleasing design, are less often selected but remain important to a sizable minority.

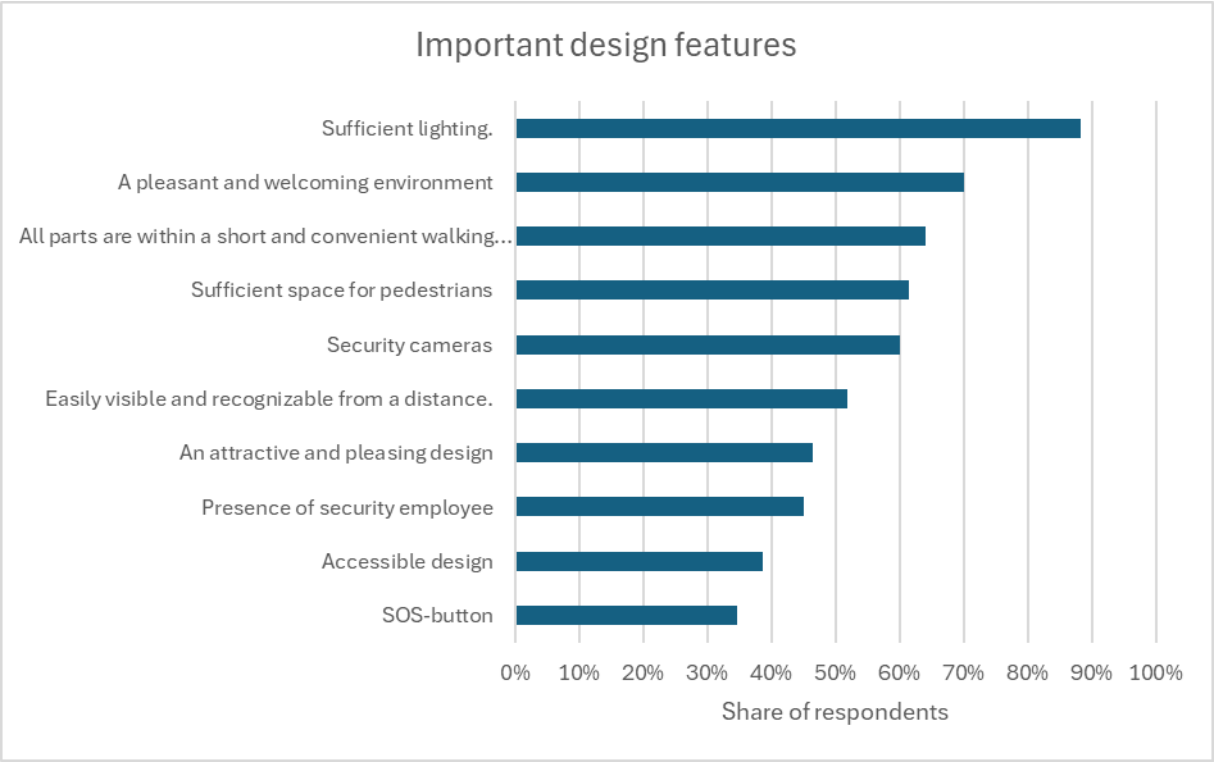

Figure 11: Preferred design features of the mobility hub (N=220). Multiple answers were possible. Response to the question: How important are the following design and comfort features of a mobility hub?

A chi-square test was conducted for the information and design features, comparing the sub-groups used in 5.3.1. Only two significant differences were identified: people who would likely use shared-mobility in the future selected significantly higher the real-time information screen, and non-local residents selected significantly higher sufficient space for pedestrians.

5.4.2 Ranking

Another way to interpret the preferences in mobility hub features is to examine which features and design elements are more prioritised over the other. Table 24 presents the results of the respondents' ranking of design elements. Respondents could rank the design elements they selected from Figure 11 alongside a real-time information screen, but they were not required to rank all items. Table 24 shows the ranking of the respondents. The first column contains the rankings based on Figure 10 and Figure 11. The second column contains the top 3 non-weighted rankings, which are determined by how many times a design element was in the top 3 ranking of respondents. The third and fourth columns contain the ranking based on a weighted ranking where the first ranked element was weighted 11 up to 1 for the (possible) eleventh ranked element. The third column shows a ranking only based on including the first three rankings of respondents, while the fourth column includes all the rankings of respondents.

Although the rankings all follow a similar pattern compared to the order from Figure 10 and Figure 11, there are some differences in priority. Security cameras, an attractive and pleasing design and the presence of security employees are less often selected but are considered more important by the respondents.

Table 24: Ranking of design elements. Respondents were not required to rank all elements.

	Most often selected	Non-weighted (top 3)	Weighted (only top3)	Weighted (all)

Real-time information screen	1	1	1	1
Sufficient lighting.	2	2	2	2
A pleasant and welcoming environment	3	3	3	3
All parts are within a short and convenient walking distance from each other.	4	4	4	4
Sufficient space for pedestrians	5	9	8	9
Security cameras	6	5	5	5
Easily visible and recognizable from a distance.	7	8	9	8
An attractive and pleasing design	8	6	6	6
Presence of security employee	9	7	7	7
Accessible design	10	11	11	11
SOS-button	11	10	10	10

Table 25 shows the ranking of design elements for different sub-groups, which were also used in 5.3.1 (shared-mobility users, local residents and public transport users).

Although all the results follow a similar pattern to the full sample, there are some differences in priority. Probable shared-mobility users value short walking distances, and an appealing design with clearer visibility from a distance is more important. On the contrary, future non-users rank the importance of a pleasant environment, security cameras and the presence of service employees higher. The distance of residents living near or further away from a train station has smaller differences. The presence of a service employee is more important to nearby residents, while an appealing design is more important for people living further away. Frequent public transport users find a pleasant environment and appealing design more important than non-frequent public transport users. This last group finds short walking distances and the presence of a service employee more important.

Table 25: Ranking of design elements for sub-groups. The order of the design elements is based on the top-3 weighted order from Table 24.

	Future shared-mobility usage		Local residents train station		Frequency public transport usage	
	Unlikely (N=129)	Likely (N=91)	Local (N=132)	Not local (N=88)	Irregular (N=104)	Frequent (N=116)
Real-time information screen	1	1	1	1	1	1
Sufficient lighting.	2	2	2	2	2	2
A pleasant and welcoming environment	3	4	3	3	5	3
All parts are within a short and convenient walking distance from each other.	5	3	4	4	3	4
Security cameras	4	6	5	6	4	6
An attractive and pleasing design	7	5	7	5	7	5
Presence of security employee	6	9	6	8	6	9
Sufficient space for pedestrians	8	8	9	7	9	7
Easily visible and recognizable from a distance.	9	7	8	9	8	8
SOS-button	11	10	10	11	11	10
Accessible design	10	11	11	10	10	11

5.4.3 Digital integration

In Figure 12, the importance of app features is shown, which is a combination of two questions. The survey had two different questions based on how much difficulty people experienced using an app. The two questions had overlapping options but different phrasing for what respondents either found important or barriers they perceived. The share of respondents who have much difficulty using an app is 8%. Due to this small share, the results of the questions are combined. Therefore, only the option 'Offers that encourage social and sustainable behaviour' was available to 92% of the respondents who do not have any difficulty using an app and is therefore omitted from the analysis.

Booking and paying in one app is the most important feature. Integration is also important. Offers that encourage social and sustainable behaviour are considered far less important. An interesting observation is that the importance of app features follows the digital integration ladder. Booking and paying in one app (level 1) is most important, followed by integration with shared-mobility providers and public transport (level 2) and encouraging social and sustainable behaviour (level 3). The digital integration ladder follows the design demands of people.

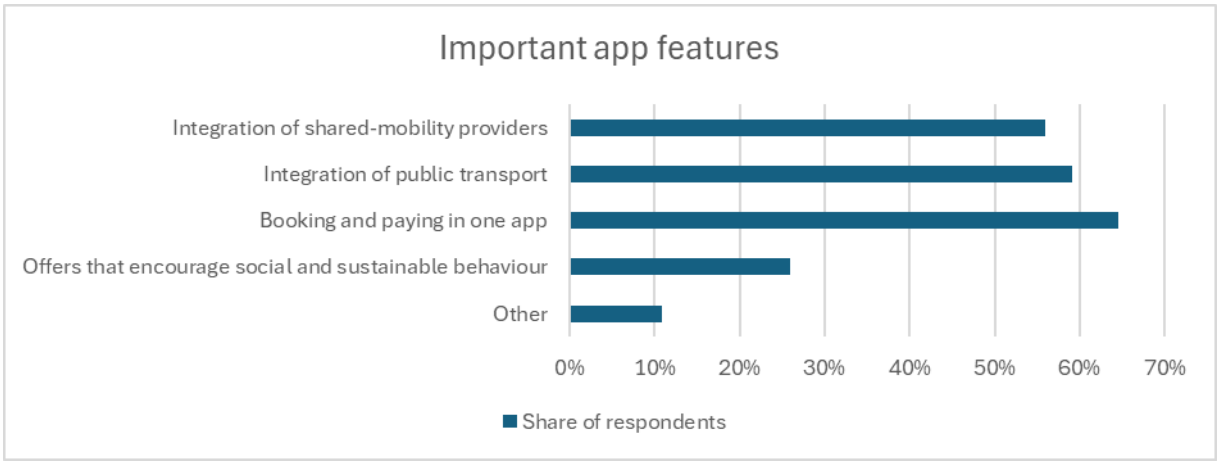

Figure 12: Important app features for respondents (N=220, except for 'Offers that encourage social and sustainable behaviour (N=204)). Multiple answers were possible. The results are a combination of the questions: What is important in the app for you? And: Why do you find booking shared mobility difficult?

A majority of the respondents (73%) did not prefer an alternative booking option. In Figure 13 the preferred alternative booking options are shown for those who preferred other options. The OV-card is the most preferred option, followed by online, kiosk/station-assistant and ticket machine. Booking by phone is preferred by only 20% of the respondents. The OV-card can now be used for bike-sharing with NS. Expanding this option to more shared-mobility providers enhances interoperability and provides users with a simpler option. The kiosk/station assistant and ticket machine were found to be interesting alternatives by 47% and 42%, respectively. This is interesting in relation to the mobility hub, as it is a unique feature that the mobility hub can offer, highlighting the importance of a kiosk and a central point where shared mobility can be booked.

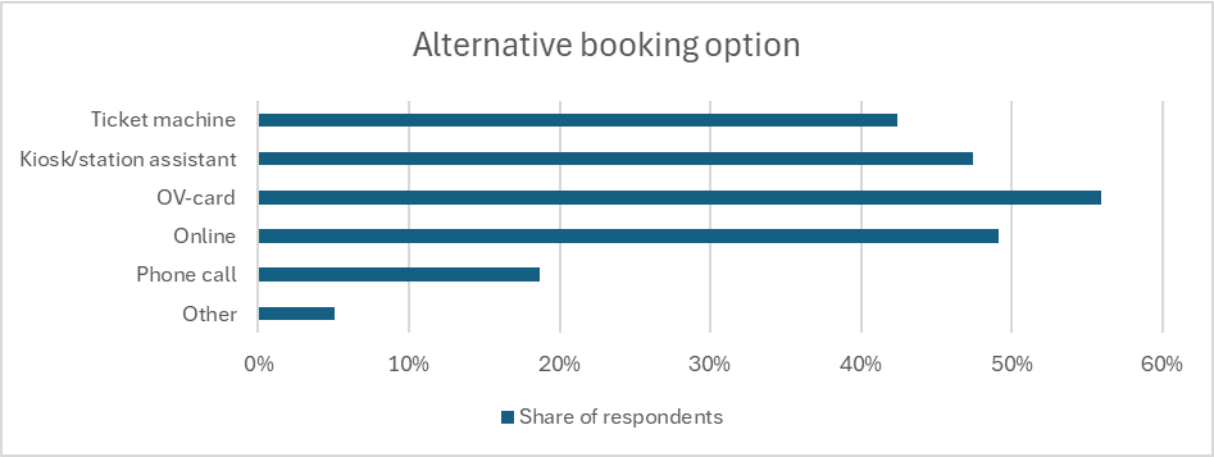

Figure 13: Alternative booking options (N=59). Multiple answers were possible. Response to the question: What (alternative) booking options do you prefer?

Table 26 shows the results on how the barriers could be resolved. Not many people had difficulty using the app, so the response to this question is very low. An alternative booking option was the most preferred solution. 38% preferred personal assistance at the mobility hub, while 19% preferred a personal app explanation. 31% indicated that the listed solutions could not resolve the barriers. Based on this small sample, an alternative booking option and personal explanation of shared mobility can alleviate obstacles for many respondents.

The preferred payment option is how people would like to pay for a trip using shared mobility. A large majority of 68% preferred to pay only per ride. Future shared-mobility options should focus on simple payment options.

Table 26: Solution to resolve barriers (left). Preferred payment option (right). Multiple answers were possible.

What could resolve barriers? (N=16)	***Share of respondents***	**Preferred payment option (N=220)**	***Share of respondents***
Personal explanation of the app	19%	Pre-paid	12%
Personal assistance on the hub	38%	Payment per ride	68%
Alternative booking options	44%	Subscription	24%
None of the above	31%	No preference	20%

Comparing the digital integration preferences among user groups, there are significant differences between future non-users, users of shared mobility, and public transport users. Table 27 shows the share of respondents indicating whether the digital feature is important. Future shared-mobility users found integrated booking and payment options an important feature of an app and indicated significantly higher preferences for payment methods. Public transport users found integration of the app with other shared-mobility providers and public transport providers significantly more important.

Table 27: Share of respondents who find digital feature important. The darkness of the green corresponds to the percentages.

	Future shared-mobility use		Frequency public transport usage	
	Low (N=129)	High (N=91)	Low (N=104)	High (N=116)
Integration shared-mobility providers	53%	60%	**48%***	**63%***
Integration public transport	60%	58%	**47%***	**70%***
Booking and paying in one app	**57%***	**76%***	63%	66%

Prepaid	**7%***	**19%***	9%	15%
Payment per ride	**60%***	**78%***	74%	62%
Subscription	**17%***	**33%***	**13%***	**34%***

*Significant difference between sub-group based on the Chi-square test (p<0,05)

5.4.4 Perception

The perception of the mobility hub comprised three questions. The awareness of the mobility hub is shown in Table 28, which indicates that a majority of respondents have not heard before of mobility hubs. It is therefore a relatively new concept.

Table 28: Awareness mobility hubs (N=220). Response to the question: Have you ever heard before about a mobility hub?

	Awareness mobility hubs
Yes	40%
No	53%
Not sure	6%

Figure 14 shows the perceived impact of the mobility hub. Three-quarters of respondents agree with the statement that mobility hubs have a positive impact on their neighbourhood. This is significantly higher compared to the shared-mobility usage intention, which was at most 23%. This means that many people think that a mobility hub can be a positive contribution to their neighbourhood without necessarily benefiting themselves. This reinforces the advantages discussed in the literature review, where mobility hubs are integrated into larger urban developments, serving as tools to achieve other sustainable and societal improvements. Figure 15 shows the mobility hub usage if design wishes are considered. Around 50% intend to use the mobility hub, with around one-third of the respondents having a neutral intention to use it. This is in line with the results on the usage of mobility hub services.

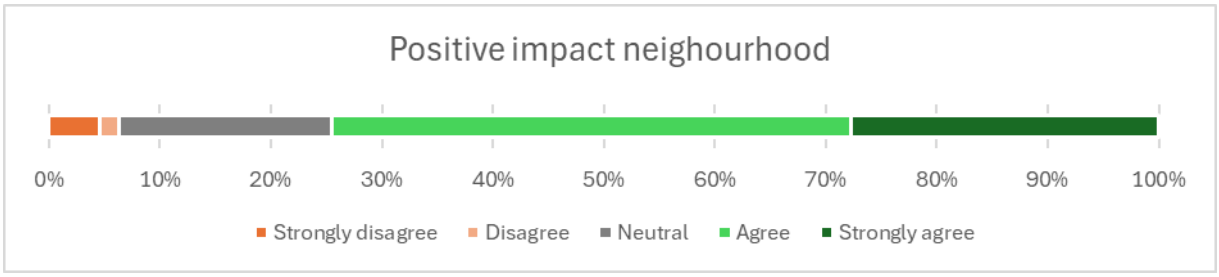

Figure 14: Agreement respondents with the positive impact of a mobility hub (N=220). Response to the question: The mobility hub can be beneficial to my neighbourhood.

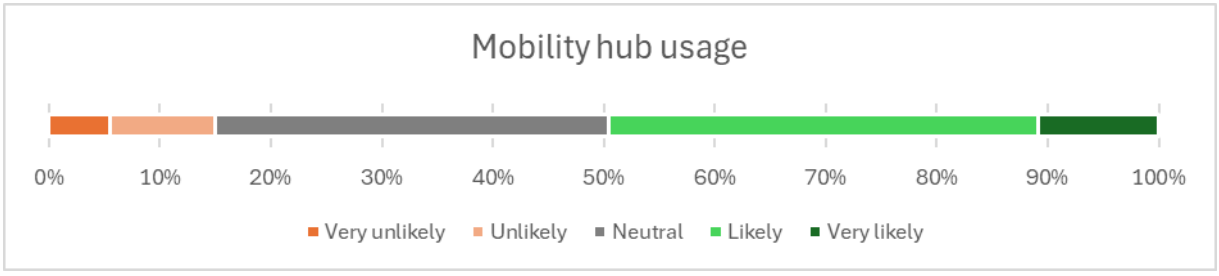

Figure 15: Mobility hub usage of respondents when their design wishes are considered (N=220). Response to the question: Are you more often going to use the hub if your design preferences are considered?

5.5 Mobility hub importance

The importance of mobility hub feature categories is based on the analysis of the combined data from the survey and the Smarthubs data-set. The combined dataset contain more data (N=1025) but only for more generalised categories as explained in the Methodology. The process of combining the data was explained in section 0. This section contains the results of the logistic analysis for shared-mobility use (5.5.1) and mobility hub services, design and information categories (0).

5.5.1 Shared-mobility

Table 29 shows the independent variables with at least one significant category for the intention to use shared mobility. The intention to use is based on the likely intention to use at least one mode of shared mobility. The results are shown in Table 29 below. The significant variables are similar to those in the existing literature: younger, higher educated, higher digitally skilled, less car-owning, and frequent bike, moped, and shared-mobility users show a higher intention to use shared mobility.

Table 29: Independent variables with a significant influence on the intention to use shared-mobility (N=1025).

Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Constant	5,849	1,229	22,634	<,001	346,8		
Urbanisation = 1	**-0,716**	**0,319**	**5,023**	**0,025***	**0,489**	**0,261**	**0,914**
Urbanisation = 2	-0,626	0,351	3,179	0,075	0,535	0,269	1,064
Urbanisation = 3	0a						
Age = 16-24	**1,085**	**0,471**	**5,311**	**0,021***	**2,959**	**1,176**	**7,444**
Age = 25-34	**1,103**	**0,393**	**7,857**	**0,005***	**3,012**	**1,393**	**6,511**
Age = 35-44	0,65	0,384	2,861	0,091	1,915	0,902	4,067
Age = 45-54	0,288	0,384	0,564	0,453	1,334	0,629	2,833
Age = 55-64	0,521	0,367	2,018	0,155	1,683	0,821	3,452
Age = 65+	0a						
Education = low	**-0,776**	**0,273**	**8,059**	**0,005***	**0,46**	**0,269**	**0,786**
Education = neutral	-0,393	0,227	3,005	0,083	0,675	0,433	1,053
Education = high	0a						
Digital skill = 0/1	**-1,109**	**0,33**	**11,307**	**<,001***	**0,33**	**0,173**	**0,63**
Digital skill = 2	**-0,621**	**0,199**	**9,762**	**0,002***	**0,537**	**0,364**	**0,793**
Digital skill = 3	0a						
Car ownership = 0	**0,904**	**0,432**	**4,385**	**0,036***	**2,471**	**1,06**	**5,761**
Car ownership = 1	**0,613**	**0,291**	**4,443**	**0,035***	**1,846**	**1,044**	**3,266**
Car ownership = 2+	0a						
Difficulty walking = no	**-0,895**	**0,287**	**9,693**	**0,002***	**0,409**	**0,233**	**0,718**
Difficulty walking = yes	0a						
Frequency bike = low	**-0,558**	**0,232**	**5,771**	**0,016***	**0,573**	**0,363**	**0,902**
Frequency bike = medium	-0,142	0,237	0,36	0,548	0,868	0,546	1,379
Frequency bike = high	0a						
Frequency shared moped/motorcycle = low	**-3,346**	**0,473**	**49,97**	**<,001***	**0,035**	**0,014**	**0,089**
Frequency shared moped/motorcycle = medium	**-2,263**	**0,543**	**17,393**	**<,001***	**0,104**	**0,036**	**0,301**
Frequency shared moped/motorcycle = high	0a						
Frequency shared car = low	0,004	0,487	0	0,994	1,004	0,386	2,608
Frequency shared car = medium	**1,721**	**0,617**	**7,785**	**0,005***	**5,59**	**1,669**	**18,725**
Frequency shared car = high	0a						

*[a]This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

5.5.2 Importance hub features

Three independent variables were analysed using binary logistic regression. Table 30 presents the significant variables for the ordinal logistic regression of the importance of different services in mobility. The table only contains variables with at least one significant category. The full analysis with all other variables can be found in Appendix I. Table 30 shows significant relationships for five categories. There are fewer significant categories compared to the shared-mobility BLR in Table 29.

Table 30: Independent variables with a significant influence on the importance of different services (N=1025).

Variable	**B**	**Standard error**	**Wald**	**Sig.**	**Exp(B)**	**CI lower bound**	**CI upper bound**
Importance of different services							
Constant	-1,124	0,875	1,65	0,199	0,325		
Age = 16-24	**0,727**	**0,37**	**3,867**	**0,049***	**2,070**	**1,002**	**4,274**
Age = 25-34	**0,865**	**0,307**	**7,963**	**0,005***	**2,376**	**1,302**	**4,333**
Age = 35-44	0,38	0,306	1,543	0,214	1,462	0,803	2,664
Age = 45-54	0,149	0,301	0,246	0,62	1,161	0,644	2,092
Age = 55-64	0,238	0,293	0,659	0,417	1,269	0,714	2,256
Age = 65+	0a						
Digital skill = 0/1	**-1,36**	**0,273**	**24,796**	**<,001***	**0,257**	**0,15**	**0,438**
Digital skill = 2	-0,298	0,169	3,118	0,077	0,742	0,534	1,033
Digital skill = 3	0a						
importance of an attractive design							
Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Constant	-0,155	0,897	0,03	0,863	0,856		
Gender = male	0a						
Gender = female	**0,357**	**0,154**	**5,389**	**0,02***	**1,429**	**1,057**	**1,932**
Household = alone	0,209	0,219	0,907	0,341	1,232	0,802	1,893
Household = pair	**0,466**	**0,208**	**5,041**	**0,025***	**1,594**	**1,061**	**2,395**
Household = multiple	0a						
Digital skill = 0/1	**-1,113**	**0,297**	**14,066**	**<,001***	**0,329**	**0,184**	**0,588**
Digital skill = 2	**-0,622**	**0,184**	**11,486**	**<,001***	**0,537**	**0,375**	**0,769**
Digital skill = 3	0a						
the importance of information							
Variable	B	Standard error	Wald	Sig.	Exp(B)	CI lower bound	CI upper bound
Constant	-0,799	0,816	0,959	0,327	0,45		
Digital skill = 0/1	**-1,133**	**0,25**	**20,598**	**<,001***	**0,322**	**0,197**	**0,525**
Digital skill = 2	-0,264	0,167	2,485	0,115	0,768	0,554	1,066
Digital skill = 3	0a						
Car usage = low	**0,717**	**0,255**	**7,925**	**0,005***	**2,049**	**1,243**	**3,376**
Car usage = medium	0,034	0,181	0,035	0,852	1,034	0,725	1,475
Car usage = high	0a						

[a]*This parameter is set to 0 because it is redundant. *Significant at the 0,05 level.*

Age class was a significant predictor of the importance of different services. Younger age classes of 16-25 and 25-34 had almost similar odds ratios compared to the 65+ reference, namely 2,070 and 2,376,

respectively. Other non-significant age classes did have odds around 1,5, but only with certainty can it be said that different services are more important for younger people.

Another significant predictor for all three important aspects was digital skills. A clear relationship is visible for this variable as all categories were significant. There is an ordinal pattern where the digital level 3 has odds ratios between 3,0 and 3,9 compared to digital level 1, and only for the design variable did digital skill level 3 have an odds ratio of 1,862 compared to level 2. This means that the higher the digital capabilities of respondents, the more they appreciate multiple mobility hub facilities, appealing design and sufficient information provision. For information, this is a bit of an unexpected result as clear information might be important for this group.

Other variables only showed significance for one of the three importance categories. Gender significantly influenced design importance, with women more likely than men to prioritize design elements (odds ratio of 1,429). Household composition was also a significant predictor of design importance, with respondents living in a pair (odds ratio 1,594) more likely to prioritise design aspects compared to those living in families or living groups.

Car usage also played a role, with infrequent users more likely to emphasize the importance of information. Interestingly, no other mobility pattern variable significantly influenced the dependent variables. In the analysis of the survey data, mobility characteristics showed a significant influence of biking, walking and public transport frequency on the intention to use services.

Table 31 gives an overview of the significant variables in this section. For age and digital skills, there are similar differences in odds ratios for the intention to use shared-mobility and important hub feature categories. There are no similar patterns among the independent variables for many of the other variables. Education, walking difficulty, car ownership and the frequency of using bike, shared moped and shared car were significant predictors for shared-mobility, while not for other categories. On the contrary, gender and car usage were significant predictors for importance categories but were not significant for shared mobility. This might suggest that mobility hub features do not always align with tendencies in shared-mobility use.

Table 31: Overview significant variables importance aspects.

	Shared-mobility	Importance different services	Importance attractive design	Importance information
Female (gender)			++	
Age	-	-		
Education	+			
Household composition			-/+	
Digital skills	++	+	++	+
Difficulty walking	++			
Car usage				-
Car ownership	--			
Frequency bike	+			
Frequency shared moped	++			
Frequency shared car	-			
		Negative category (-)	Negative category all (--)	-/+ mixed/middle category

		Positive category (+)	Positive category all (++)	

5.5.3 Summary

Comparing the results from this chapter alongside that of 5.3 gives the following overview shown in Table 32.

Table 32; Overview of significant variables for the results from the intention to use services and hub feature categories from the combined dataset.

	Services											Combined dataset		
	Bench	Café	Toilet	Parcel locker	Wi-Fi	Car parking	Electric vehicle	Bike/moped secured	Bike repair shop	Co1	Co2	Services	Design	Information
Urbanisation = 1														
Urbanisation = 2														
Urbanisation = 3														
Gender = male														
Gender = female														
Age = 16-24														
Age = 25-34														
Age = 35-44														
Age = 45-54														
Age = 55-64														
Age = 65+														
Birth country = abroad														
Birth country = Netherlands														
Education = low														
Education = neutral														
Education = high														
Occupation = active														
Occupation = not-active														
Homeownership = homeowner														
Homeownership = renting														
Household = alone														
Household = pair														
Household = multiple														
Digital skill = 0/1														
Digital skill = 2														
Digital skill = 3														
Participation = no														
Participation = yes														
Car ownership = 0														
Car ownership = 1														
Car ownership = 2+														
Difficulty walking = no														
Difficulty walking = yes														
Frequency walking = low														
Frequency walking = medium														
Frequency walking = high														
Frequency car = low														
Frequency car = medium														
Car usage = high														
Frequency bike/moped = low														
Frequency bike/moped = medium														

Frequency bike/moped = high														
Frequency public transport = low														
Frequency public transport = medium														
Frequency public transport = high														
Shared-mobility use = no														
Shared-mobility use = yes														

6 Discussion

This thesis started with the problem of designing a mobility hub that would cater to residents and visitors. This chapter will discuss the results and their theoretical and practical contributions.

6.1 Interpretation

This section will interpret the results' findings by briefly summarizing them and comparing them with other results and literature on variables and the integration ladder.

6.1.1 Mobility hub interest

The literature review revealed that the uptake of shared mobility is very low, typically ranging from 10% to 20%. This was partly the reason for this research, which examined what prevents people from using shared mobility and mobility hubs. The survey results were similar to the literature. The interest in shared mobility was also low, with the intention to use all forms of shared mobility being below 25%. The most popular form of shared mobility was the e-bike. However, when considering how many people intend to use at least one form of shared mobility, a larger percentage of respondents seems to be interested (41%). Furthermore, distinguishing between people who would likely use only one form of shared-mobility or multiple forms showed differences in mode preferences, with the car and moped more likely to be used by the group that selected only one form of shared-mobility. Predictors influencing shared-mobility adoption were similar to those in the literature.

The potential of the mobility hub should therefore not only be examined through the most preferred vehicle and the combination of shared-mobility modes. To increase people's interest in shared mobility, a mix of shared mobility options should be present that covers as many of the residents' preferences as possible, with the resources available to policymakers. From this research, car-sharing can be viewed as a more distinct category. Therefore, a car in combination with another mode of shared mobility would be a balanced option. However, due to the sample size, it is hard to generalise the findings for other areas.

Barriers to not using shared mobility were primarily related to preferences for other or one's own modes of transport. Garritsen et al. (2024) have shown similar results. Also, the lack of digital skills for a large share of the respondents is an indirect barrier. Those who intend to use shared mobility show that a sizeable group sees advantages in a mobility hub for booking shared mobility in that it offers more facilities and gives greater certainty for the availability of shared mobility. Literature on mobility hubs has often focused on shared-mobility use but has made less explicit the relationship in what a mobility hub can offer to shared-mobility users. Although for many forms of shared mobility, a mobility hub is necessary, this is not always the case for e-mopeds and neighbourhood car-sharing programs. Despite the uncertainty with the smaller sample size, the results indicate that a mobility hub has the potential to facilitate shared-mobility users better.

Besides the direct benefits from shared-mobility or non-mobility services, the mobility hub can contribute to a neighbourhood by being more than only functional to users. The mobility hub is very well perceived by respondents, with three-quarters thinking mobility hubs were beneficial to their neighbourhood. Literature on mobility hubs has often listed the additional advantages of mobility hubs in improving the liveability and inclusion of an area (Witte et al., 2021; Rongen et al., 2022; Duran-Rodas et al., 2022). Residents share this view and it could be helpful for policymakers in that when developing mobility hubs, a wider range of stakeholders benefits from this development.

6.1.2 Services and amenities

Ten mobility hub services were presented to respondents to ask their intention to use them. Most services had a much higher intention to use them than shared-mobility services. Benches, kiosks, parcel lockers, Wi-Fi, and secure bike and moped parking are the services that were most preferred at a mobility hub.

There were significant differences in the usage intention of six services between shared-mobility users and non-users, as well as distance from a train station and public transport use. Notably, future shared-mobility users show higher interest in mobility hub services. However, among all sub-groups, there is a higher intention to use services than shared-mobility usage. This suggests that mobility hub services attract more shared-mobility users and are of interest to other mobility users and residents. There is no similar research that compares the amenities people find important in the context of mobility hub services. A large share of the respondents were interested in using mobility hub services.

The key implication from this result is that mobility hub services show a much higher adoption rate among future shared-mobility users and non-users. Based on only three services showing significant differences between future users and non-users of shared-mobility, it shows that part of the mobility hub services provide a universal benefit to users and residents, while a select part of the services mainly benefit shared-mobility users. This suggests that the services can be distinguished between the universal and shared-mobility targeted groups.

There was some moderate correlation between the intention to use mobility services. Two groups were identified based on a factor analysis: station amenities and bicycle services. The services that belong to each component share some similarities. The 'comfort amenities' component consisted of station amenities that can be used while waiting. The 'bike facilities' contained both services related to bike use. The Ordinal Logistic Regression analyses of the individual services saw more significant variables than the components, highlighting the importance of reviewing both analyses. It should be noted that the additional variables found in the individual analyses often did not give a clear pattern (i.e., only the middle category was significant). These components are of interest for future research to determine whether the focus should shift to these categories and if more services can be included.

Comparing the ordinal logistic regression variables with those found in the literature review reveals a wide-ranging set of outcomes to consider. Socio-demographic factors, including age, gender, household composition and educational background, often influence service intention. Literature found that these variables also influence shared-mobility adoption. Women were more inclined to use services. Age and education showed more mixed results depending on the type of service variables. Higher education was shown to be of greater importance in various services. Household composition also influenced services, but some mixed results were seen as well.

Mobility factors also had an influence. Those with difficulty walking for more than 10 minutes had significantly lower intentions to use services. The literature has identified this group as a vulnerable user group with lower adoption of shared mobility. They had a lower adoption rate for non-mobility services, meaning that a mobility hub does not offer many benefits for them. However, the sample size of this group is small, so this finding should be taken with caution.

6.1.3 Mobility hub features

Mobility hub features based on the integration ladder were analysed. These included design features, information provision and digital features.

Key design aspects identified were real-time information, clear directions, sufficient lighting and a pleasant and welcoming environment. The analysis revealed limited significant differences in service preferences among various sub-groups, suggesting that these design features are universally valued. However, non-users of shared mobility considered real-time information significantly less important compared to existing shared-mobility users. Despite the overall preference consistency, differences emerged when prioritising specific design elements. Non-users placed greater emphasis on features such as a pleasant environment, security cameras and the presence of service employees. This indicates that non-users prioritize comfort and security in mobility hub environments, highlighting a potential area for further research.

Digital integration is key in developing mobility hubs and facilitating intermodal transport. Inexperience with booking shared mobility does not mean people experience difficulty using shared mobility. The results showed that people without experience with booking or paying do not perceive difficulty using shared mobility. Participants reported no significant issues and did not strongly desire alternative booking methods. Consequently, widespread adoption of shared-mobility services might not necessitate extensive app alternatives. Nevertheless, a considerable segment still prefers alternatives to mobile apps, favouring options such as OV-cards, ticket machines, kiosks with station assistants, and online booking platforms. OV-cards' preference underscores the desire for seamless integration with other transportation providers. Additionally, ticket machines and station assistance could enhance user support and accessibility at mobility hubs.

The order of preference is similar to that of the integration ladder. This means that the digital integration levels align with what people prefer in mobility hub design, meaning that achieving low levels of digital integration can accommodate many users' digital needs. There were more significant differences in digital features preferences among future shared-mobility users and public transport users. Frequent future shared-mobility users and frequent public transport users showed specific preferences regarding app features and payment options. The results highlight the importance of digital integration among shared-mobility and public transport providers. For other digital features, such as alternative booking options, there is not sufficient data to make this analysis.

Combined data analysis revealed a negative relationship between digital skills and the importance placed on information provision. Users who were less proficient with digital apps had a lower preference for services, design features, and information provision. Women found the design features of the hub more important, which can be linked to their greater concern for safety. Younger people found services more important at the hub. People living in pair households found design important, suggesting their preference for accessibility and aesthetics. Infrequent car users found information provision important, which might have to do with their mobility behaviour.

Overall, the combined dataset had fewer independent variables that were significant. This can be caused by the combination of study areas, the higher share of vulnerable users in the Smarthubs dataset, or a mismatch in questions that have been combined from the survey to match the Smarthubs dataset.

6.2 Theoretical Implications

This research deviated from the traditional mobility hub context by looking at amenities. The outcome shows that a mobility hub with amenities benefits a larger group of people. It could be argued that attracting more non-users for only the amenities leads to the mobility hub concept or development becoming more of an addition to non-mobility services than the other way around. However, with the

current limitations in shared-mobility adoption, this way of looking at the mobility hub might be more favourable for the implementation.

Regarding the conceptual model, the results from sections 5.3.3-5.3.5 and 5.5 and the discussion in 6.1 highlight some additional significant variables. All variables used in the logistic regression analyses had at least one significant category. This means that individual characteristics, including socio-demographic characteristics, digital skill level, participatory involvement and mobility behaviour variables, were influential variables. Overall, the predictor variables seem to be less often significant, but do still provide valuable insight into the intention to use. The conceptual model is therefore also applicable and useful for examining the mobility hub use, including the amenities.

The added variables, participation and population density (urbanisation), also showed significance. Urbanisation is only one spatial variable, which makes it interesting for future research to determine whether more spatial variables should be integrated into the conceptual model. People with earlier involvement in participatory processes often showed a higher intention to use shared mobility and services and found more mobility hub features important.

Compared to earlier research, this thesis used new types of independent variables with the intention of using analysis. In the literature review, different studies on shared-mobility intention usage were discussed. Common independent variables used in these studies were basic socio-demographic factors, such as gender, age, education, country of origin, education and income. Income questions were often not answered by respondents. The survey results show a similar share of respondents preferring not to answer that question. As an alternative, other questions were introduced: employment status, type of employment and homeownership status. These variables were sometimes significant predictors of the dependent variables. The employment status had too slight a variance and can be omitted for this type of research.

Spatial factors were included in the ordinal logistic regression analysis in two forms. The intention of the analysis was to use both urbanisation level and design importance levels, which used both urbanisation and age of the neighbourhood. Urbanisation levels are a useful factor to include in the analysis. It has only five categories and combines data from different study areas based on their composition. Density often indicates how much space there is for cars and other mobility infrastructure. The fact that it resulted in multiple significant relationships indicates that neighbourhood built-up is important. Another spatial factor used was the building year of the neighbourhood. This value was only used for the importance levels and was an index comprised of the neighbourhood's average ratio of building age. The challenge with developing and using such an index is that neighbourhoods with buildings of different periods can distort the index. Although some categories had to be combined, some significance has been found. This indicates that the age of a neighbourhood can be an important spatial environment predictor and be used to understand the preferences of residents living there.

6.3 Practical Implications

For the province of North-Holland the results give a guideline for further mobility hub development. The study areas discussed comprised cities without a currently large-scale network of shared mobility. The results showed, however, a positive attitude among residents with a large majority seeing benefits in a mobility hub, with actual shared-mobility use being lower. Although some of the main train stations already offer the facilities of a smart mobility hub, suburban and regional mobility hubs still lag in this area. These stations are the first suitable options to advance mobility hubs. The respondents' urbanisation level mainly was not significant for the intention to use and hub features preferences,

suggesting that amenities and hub features are preferred in different urban settings. Although further research is necessary to strengthen and validate the findings of this research, it is clear that the mobility hub has the potential to offer more than shared mobility alone.

Amenities that make a stay at the hub more comfortable, such as benches, a kiosk and a toilet, show a high adoption rate by residents. The mobility hub design should have benches, alongside a kiosk or café, as they are widely appreciated. These services have overlapping functionalities and show a high correlation between them. The advantage of a kiosk or café is that it serves residents and assists shared-mobility users. People who experience difficulty using an app or prefer alternatives indicated that personal assistance at the hub was preferred.

Mobility services can distinguish between car facilities and bike facilities. In areas with high car usage, parking facilities are much preferred. Users do not widely adopt electric vehicle charging, but it can be offered in a limited capacity. Secure bike parking is very important for bike users. A bike repair shop can be an interesting supplemental facility. The adoption rate was lower, and they showed a weaker relationship with cycling usage, but it is still an amenity that would be adopted.

In contrast to the local design of a mobility hub, digital integration is often arranged at a higher level, as apps and mobility providers often operate on a larger scale. However, governments can try to coordinate or set requirements with shared-mobility providers. Integration with public transport and shared mobility was important for a significant part of the respondents. Alternatives to an app are also appreciated with OV-card, online or at-the-hub alternatives. For example, NS is already renting bicycles that can be paid with an OV-card. Furthermore, payment per ride was the most preferred payment option among respondents.

6.4 Limitations and Methodology Reflection

Several limitations in the survey, data collection and analysis, should be considered.

As previously mentioned, the scope of the research changed during the study. Initially, it only focused on the central neighbourhoods of Purmerend, but later this was expanded to multiple cities across the province of North-Holland. The questions were formulated in a general way, which ensured applicability to different locations. However, the introduction of the mobility hub varied slightly. In Purmerend, the hub was explicitly defined as being located at the train station, whereas, for other respondents, it was described more generally as being within a 10- to 15-minute walking distance from a public transport stop. The impact of these different descriptions might in practice be limited as the Purmerend hub was for most respondents within the same time window.

The structure of the digital integration questions led to some unexpected results. The first question in this section asked respondents to estimate their general difficulty level in using an app. Based on their response, they were then asked slightly different follow-up questions, either about what they found important in an app or the barriers they perceived. Many respondents indicated they had no difficulty using apps, resulting in very few responses to the questions about perceived barriers. This structure aimed to minimise the number of questions for respondents and was based on the assumption that asking about barriers would be unnecessary for those who did not experience difficulty. However, given the low response rate, it is possible that while respondents did not struggle with apps in general, they can still experience challenges specific to a shared mobility app. It is still possible that this sample does not encounter barriers related to a shared mobility app. There was some overlap between the different follow-up questions, but some non-overlapping multiple-choice questions had to be omitted. The effect on the results was minimal, but this approach could be better avoided in future research to simplify the analysis and provide more thorough insights.

The sample size of this thesis (N=220) is small compared to similar research on mobility hubs and shared mobility. Due to the aforementioned problems in the Methodology, the sample size is smaller than the original target of 500-700. Despite this, the ordinal logistic regression analysis results still established multiple significant relationships. The rules of thumb discussed in the Methodology also show that the ratio between variables and responses (10 per variable, minimum of 100) is still acceptable. However, the small sample size is a significant point of caution when interpreting the results. A large sample size can increase the reliability of the results and reveal additional relationships, particularly for ordinal variables where not all categories show a significant difference in odds ratio.

The sample composition is not fully representative of the study area. Although this was not a requirement of the sampling strategy, the sample is compared to the study area, which comprises more male, older, but especially more highly educated people. The age of the sample was representative of the population area. The same applies to the combined datasets, which are overrepresented with vulnerable users.

Also affecting the sample composition is the broad geographic scope of five study areas, which means possible local factors that might influence the use intention and other results. These could already be amenities, built environment characteristics, and local perceptions. Some study areas are currently rolling out plans for mobility hubs and redevelopment. Local opposition to these plans might lead to higher responses of those against shared mobility or influence respondents' answers to some of the questions. The impact of the various study areas is partially limited by using the urbanisation level of respondents. Furthermore, many significant variables were still found, indicating that the impact of different study areas is limited.

Related to combining the dataset is the fact that not all questions were precisely similar. The linked questions did cover similar features, and a binary logistic regression analysis was used to minimise the impact of the different Likert scales. But more variables might have been uncovered if matching questions had been used.

6.5 Future research

This research explored new ways to evaluate the mobility hub concept by examining mobility hub services and design preferences. Compared with earlier research, this research shows the potential to broaden the target groups/demographics of mobility hubs by focusing not only on shared mobility but also on the benefits of the mobility hub itself. Based on these findings, several directions for future research emerge.

First, the current research can be replicated on a larger scale to get a more detailed analysis of the role of variables on people's intention to use the mobility hub services. The current results show that socio-demographic and mobility behaviour variables were significant. However, some variables were not significantly different, showed unclear results, or had to be combined due to low counts. A larger sample can help to strengthen the findings and lead to new insights. It could also analyse the needs and preferences related to democratic integration, which were not part of the scope of this research. Individuals with earlier participation showed a higher interest in using station amenities. Section 5.3 briefly discussed the causality of whether more involvement creates a higher usage intention or whether it is a medium variable for other relationships.

Second, new research can continue on the mobility hub services and design preferences that are found to be important, applying other types of methods to validate these findings. The methods used in this research were limited to hypothetical mobility hubs. As mentioned earlier, the initial approach was to apply this survey to an existing plan for a mobility hub, making it more tangible for participants. Future

research could apply a form of the survey used in this research to validate the results for specific neighbourhoods and use other methods, such as focus groups, to review which priorities they would make.

7 Conclusion

This research aimed to better understand mobility hub usage intentions and design preferences to effectively accommodate user needs and preferences. Through a survey (N=220) conducted across cities in North-Holland and data analysis from a prior survey, valuable insights were obtained concerning socio-demographic factors, mobility behaviours, and spatial considerations.

The first research question was *What are the intentions for using mobility hub services and amenities among shared-mobility users and residents?* The intention to use mobility hubs was assessed through respondents' intention to use shared mobility and other hub-related services. Consistent with earlier studies, the intention for shared-mobility usage was low, with a likely adoption rate of between 10% and 20% for different shared-mobility modes. Those interested predominantly favoured car-sharing or a combination of shared mobility options. Similar variables found in the literature that influence shared mobility use were significant in this research. The main reasons for not using shared mobility at the mobility hub were mainly a preference for one's own vehicle and not fulfilling travel needs. Those interested in using shared mobility highlighted the benefits of the mobility hub in that it offers more facilities to support the use of shared mobility. It gives more certainty in finding sufficient vehicles.

However, intentions to use various mobility hub services were notably higher, highlighting broad appeal beyond shared mobility alone. Services consisting of station amenities (e.g. kiosk, benches and parcel locker) and mobility services (e.g. car parking and secure bike parking) showed high adoption rates among both shared-mobility users and non-users. However, shared-mobility users still show higher overall adoption rates. Only electric vehicle charging saw a low uptake. Furthermore, the benefits of a mobility hub were widely perceived as positive. This indicates that beyond the benefits a mobility hub offers to shared-mobility users, a mobility hub can potentially offer more to a neighbourhood and users.

The ordinal logistic regression analysis of the intention to use shared-mobility and each of the mobility hub amenities showed the influence of individual, mobility behaviour and spatial characteristics of respondents on the intention to use shared-mobility and mobility hub amenities. Age, gender, education, homeownership, active occupation, participatory attitude/involvement, household composition, digital skills, car usage and ownership, public transport usage, walking frequency, bike/moped usage and having difficulty with walking were significant predictors for using mobility hub services. The significant variables for the use of services were in part similar to that for the use of shared-mobility, indicating that the preferences for services is not always driven by the same factors as shared-mobility and might be influenced by other needs for certain demographics.

The second research question was *What are the priorities and preferences of users and non-users of shared mobility regarding the physical and digital integration of a mobility hub?* The design and information features analysed in the survey showed that some hub design features are more preferred and prioritised. Only two significant differences were found in design preferences, indicating that, compared to service preferences, design features are more universally preferred. Some differences were found in the priority of services, with non-users of shared mobility giving comfortable and safety features a higher priority. Overall, it can be concluded that specific physical integration characteristics are more important for users, but there are not many significant differences based on expected shared-mobility use, proximity to the train station or frequency use of public transport.

There was a low demand for alternative booking options compared to an app regarding digital integration. For some of those who preferred alternative options, a staffed mobility hub or a ticket machine was suggested as one of the solutions. Public transport users did have a significantly higher

need for integrating shared-mobility apps with public transport and other shared-mobility providers, while future shared-mobility users showed a significantly higher need for integrated booking and payment options.

The third research question was: *How do socio-demographic, mobility and spatial factors influence the intention to use a mobility hub, and how does that compare with earlier research?*

Besides the significant predictors found for the intention to use the mobility hub, the data from the survey was augmented with data from earlier research on Smarthubs. Shared-mobility use of the combined dataset showed significant variables similar to those in the literature. There were fewer significant predictors for the combined dataset compared to the intention to use services. Digital skills were the only predictor that showed less importance for services, information, and design features. Women, younger people and infrequent car users found, respectively, the design, services and information provision of the mobility hub more important.

The conceptual model used to analyse mobility hub intention to use was based on earlier research focused on shared mobility use. Spatial and participatory involvement have been added to the conceptual model. The ordinal logistic regression analysis of the intention to use mobility hub services was similar to that used for shared mobility use. Some variables influenced both shared mobility use and service use (e.g.). Other variables were only significant for mobility hub services.

The overall aim was *In order to accommodate more users and increase adoption of the mobility hub, what are the needs and preferences of users and non-users regarding mobility hub features, services and amenities*. From the previously discussed research questions, it becomes clear that mobility hubs' amenities have a clear preference among both future shared-mobility users and non-users. These amenities can make a mobility hub more attractive and increase the value for local communities. A broad consideration of physical and digital features can help future mobility hub design development by accommodating different user groups.

For future research, the main recommendation is to further develop the physical and digital features of the mobility hub and analyse the trade-offs between mobility hub services, features, and amenities. This research shows broad interest in mobility hub amenities, but for further implementation, a more in-depth analysis could determine which amenities are most important to people and which trade-offs they are willing to make.

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A. Survey

This appendix contains the survey distributed in the case study areas discussed in sections 4.3. This appendix contains the English version which was not itself distributed but is a translation of the Dutch version of Appendix Survey Dutch. Pictograms used in section C and D of the survey are omitted.

Introduction and informed consent	
Research mobility hubs Version 3A Dear participant, thank you for completing this questionnaire about mobility hubs. This questionnaire is part of a **graduation research project** in collaboration with the *Province of North Holland*. **What should a mobility hub look like in your area? We will ask you some questions about this.** The questionnaire takes about 10 minutes to complete. By participating you have a chance to win one of three €20 gift cards.	
Data protection Your answers to this questionnaire will be used for a study and will be treated confidentially. You can participate in this questionnaire voluntarily and can stop at any time without any consequences. Your answers will be stored according to the privacy guidelines and deleted after completion of the investigation. The survey is processed using LimeSurvey.	
I understand and agree	*Confirm*

Background

The following questions are about your personal background.

Identification	Question	Answer options
A1 introduction		
A1.1	What are the first four digits of the zip code of your residential location?	*Number*
A1.2	***If A1.1 is in Purmerend*** What neighbourhood do you live in? [map of neighbourhoods in Purmerend]	*List of neighbourhoods within the given postal code*

Background

Identification	Question	Answer options
A2 basic socio-demographics		
The following questions are about your personal background		
A2.1	Gender	*Select one* Male Female Other Prefer not to share
A2.2	Age	*Select one* 16 to 17 year 18 to 19 year 20 to 24 year 25 to 29 year 30 to 34 year 35 to 39 year 40 to 44 year 45 to 49 year 50 to 54 year 55 to 59 year 60 to 64 year

		65 to 69 year 70 to 74 year 75 to 79 year 80 years or older
A2.3	Where were you born?	*Select one* Netherlands Europe (not the Netherlands) Outside Europe Prefer not to share
A2.4	What is your highest level of education?	*Select one* Primary school Secondary school MBO or similar HBO/university bachelor University Master's PhD or similar
A2.5	What is your main work situation?	*Select one* Working less than 30 hours per week Working 30 hours or more per week Own household Student Unemployed Unable to work Retired/early retirement Unpaid work
A2.5b	What type of employment do you have?	*Select one* Payroll Self-employed Entrepreneur/own business
A1.3	***If A1.1 is in Purmerend*** Where do you work?	*Select one* [List of North-Holland cities]
A2.6	What is the net income of your household per month?	*Select one* Less than €2667 €2667-€4833 More than €4833 Prefer not to share
A2.8	What is the living situation of your household?	*Select one* Homeowner Tenant/renter Other
A3 household		
A3.1	What is the composition of your household?	*Select one* One person Pair Family with children Residential group Other

Digital skills and participation

Identification	Question	Answer options
A4 digital skills		
Below are a few questions about smartphone use and participation.		
A4.1	Do you have a smartphone with an internet connection?	*Select one* Yes, I use apps that require an internet connection

		Yes, but I only use it for calling/messaging and other offline activities No
A4.2	***Only if A4.1 is 'Yes' and use online connection*** Do you use apps on your smartphone for the following functions?	*Multiple choice* Plan a trip *(e.g. Google Maps, NS app, 9292 app)* Buy tickets or reserve a spot for public transport *(e.g. NS app, 9292 app)* Booking/paying for a shared vehicle *(e.g. Felyx, Check, Go Sharing, Greenwheels)* None of the above
A5 democratic involvement		
A5.1	Have you ever participated in plans to improve the transport offer (in your neighbourhood)? *Involvement can mean, for example, participation in surveys, neighbourhood meetings or other participation moments*.	*Select one* Yes No
A5.2	***Only if answer A5.1 is 'Yes'.*** What kind of involvement did you have in this?	*Multiple choice* Got information Participated in a survey Gave feedback or ideas Participated in a workshop Was active in a long-term group Other types of participation processes

Transport options and travel behaviour

The following questions are about your transportation and travel options.

Identification	Question	Answer options
B1 mobility capabilities and ownership		
B1.1	Which of the following vehicles are available within your household?	*Multiple choice* Bicycle E-bike Car Scooter/Motorcycle Other None of the above
B1.2	***Only if B1.1 includes 'Car'*** How many cars does your household own?	*Select one* 1 2 More than 2
B1.3	Do you have trouble walking for more than 10 minutes?	*Select one* Yes No
B1.4	***Only if B1.3 is 'Yes'.*** Do you use support while walking? *Support can include, for example, using a wheelchair, walker, scooter or walking dog or being accompanied by a caregiver.*	*Select one* Yes No
B2 Mobility patterns		
B2.1	How often do you walk to reach a destination *(except for running for leisure)?*	*Select one* 4 or more days a week 1-3 days a week 1-3 days per month

	- Walking *(except running for leisure)*	1-11 days per year Never
B2.2	How often do you use your household's own vehicles? - Car as driver or passenger - Bicycle/e-bike - Scooter/motorcycle	*Select one* 4 or more days a week 1-3 days a week 1-3 days per month 1-11 days per year Never
B2.3	How often do you travel with the following means of transport? - Taxi/Uber - Bus/tram - Subway - Train	*Select one* 4 or more days a week 1-3 days a week 1-3 days per month 1-11 days per year Never
B1.6	**Only if public transport used in B2.3** Which subscriptions and payment methods do you use for public transport?	*Multiple choice* Student travel product NS-Business Card NS Flex or similar Bus/metro season ticket Online ticket Contactless payment (telephone/debit card) Ticket from vending machine, ticket counter or driver Other
B2.3b	How often do you travel with the shared-mobility listed below? *Shared-mobility gives you access to various means of transport at special drop-off and pick-up locations or other places. You often get access to shared-mobility via an app, online account, customer card and/or vending machine.* - Shared bike/electric shared bike *(e.g. OV-fiets, Go Sharing, Bolt)* - Shared scooter *(e.g. Check, Felyx, Go Sharing)* - Shared car as driver or passenger *(e.g. neighbourhood car, Greenwheels, MyWheels)*	*Select one* 4 or more days a week 1-3 days a week 1-3 days per month 1-11 days per year Never
B2.6	***Only if B2.2 is 'car' and A1.1 is in Purmerend*** Within Purmerend, which means of transport do you often use?	*Multiple choice* Walk Cycle Scooter Shared-mobility Car (driver) Car (passenger)
B2.7	***Only if B2.6 is Car (driver)*** Why do you often use the car within Purmerend?	*Multiple choice* I find it easier It's more affordable I have difficulty with physical exertion I feel safer I prefer to use the car Other

Mobility hubs and shared-mobility

The following questions are about mobility hub and shared-mobility.

Identification	Question	Answer options
C1 Current usage		
Mobility hub A mobility hub offers multiple means of transport with different services and functions: **Shared-mobility** This can consist of a shared moped, (electric) shared bicycle, shared car or shared cargo bike. **Public transport** This can be a nearby train station or bus stop. **Digital display and signage** This will keep you informed with real-time travel information. **Attractive design** It looks nice and is pleasant to stay. **Services and facilities** A kiosk, café or other amenities may be available. **App** To book shared-mobility or for other information, you can use an app. [figure]		
C1.1	Have you ever heard of a mobility hub before?	*Select one* No Yes I'm not sure

Text resident Waterlandkwartier Purmerend

The following questions are about what and how much you think you will use a mobility hub. A mobility hub can be a small neighbourhood hub or a large hub at a train station. To make the questions more understandble, we take a location in your area as an example: Purmerend station. This location is a potential location for a hub and is also being developed by the municipality. For this study, we present you with several amenities, but these are not related to existing plans.

Text resident other Purmerend

The following questions are about what and how much you think you will use a mobility hub. A mobility hub can be a small neighbourhood hub or a large hub at a train station. To make the questions more transparent, you should imagine that the hub is located in your neighbourhood within a 10-minute walking distance. For this study, we present you with several amenities, but these are not related to existing plans.

Text working Purmerend

[]

Identification	Question	Answer options
C2 Intention to use		
Information box on shared mobility	Shared car: A shared car is reserved and must be returned to the same location. Shared bike/e-bike: Can be used immediately and can also be returned at other locations. Electric shared bike: Can be used immediately and can also be returned to other locations. Shared cargo bike: To be reserved and must be returned to the same location. Shared scooter: Can be used immediately and can also be returned to other locations.	
C2.1	How likely are you to use the following modes of transport if they are present at the mobility hub in the future? - Shared car - Shared bike - Electric shared bike - Shared cargo bike - Shared scooter	*Select one* Very unlikely Unlikely Neutral Likely Very likely

B2.8	***Only if 'Very unlikely' or 'Unlikely' are selected for all shared-mobility in B2.3b*** What are the main reasons why you will not or hardly use shared-mobility from the hub ?	*Multiple choice* I am not familiar with it It is too expensive It does not fit my travel needs I do not like using this vehicle I find it difficult to arrange this vehicle I prefer to use my own vehicle Other
B2.8b	***Only if 'Likely' or 'Very likely' are selected for any shared-mobility in B2.3b*** What are the main reasons why you will use shared-mobility from the hub ?	*Multiple choice* It is an alternative to public transport It makes me less dependent on my/a car It increases the places I can reach It offers more facilities that make it easier for me to use shared-mobility I have more certainty that there are enough vehicles Other

Services

A mobility hub can offer other services in addition to (shared)-mobility. The following questions are about whether you think you will use them in the future.

Identification	Question	Answer options
C2 Intention to use		
C2.3	How likely are you to use the following services? - Benches - Kiosk - Café - Toilet - Parcel lockers - Wi-Fi	*Select one* Very unlikely Unlikely Neutral Likely Very likely
	Here you can sit while waiting during your trip or to relax. Here you can buy food and drinks, but also ask for support at the hub. Here you can order food and drinks while you can stay seated. You can use the toilet here, possibly for a fee. Here you can have a package delivered and pick it up at a later time. It allows you to connect to the internet for free using your phone or other device.	
C2.4	How likely are you to use the following services? - Parking for the car - Electric charging station - Secure bicycle storage - Bicycle repair shop	*Select one* Very unlikely Unlikely Neutral Likely Very likely
	Here you can park your car to transfer or if you live, work or need to be in the area. Here you can charge your car, e-bike or other vehicle.	

	Here you can park your bicycle in a secure environment. Here you can have your bike repaired.	
C3.1	The mobility hub can be positive for my neighbourhood	*Select one* Strongly disagree Disagree Neutral Agree Strongly agree

Design hub

The following questions are about what should be present at the mobility hub and what it should look like.

Identification	Question	Answer options
D1 Physical integration		
D1.4	What is important to you for the information provisions at the mobility hub?	*Multiple choice* Clear directions to transport and services. A detailed explanation of the available services. Crossings and other obstacles are clearly marked and explained. Simple and clearly formulated information. Information must also be provided in languages other than Dutch. Real-time information screen with current departure times and available vehicles
D1.5	What are the design and comfort features of a mobility hub that are important to you?	*Select one* Sufficient lighting. An attractive and beautiful design. A pleasant and welcoming environment. All parts are within a short and convenient walking distance of each other. Clearly visible and recognizable from a distance. Threshold free. Security cameras SOS button Sufficient space for pedestrians Attendance of the service employee
D4.1	Rank the following hubfeatures that you find most important. Choose at least [number]. - Real-time information display - *All selected answers to question D1.5* **Number = half selected answers D1.5 + 1*	*Rank options*
C3.2	Will you make more use of the hub if your design needs are taken into account?	*Select one* Very unlikely Unlikely Neutral Likely Very likely

Arrange your trip

The following questions are about planning, booking and paying for your trip from the hub.

Identification	Question	Answer options
D2 Digital integration		
D2.1	I find booking shared-mobility with an app complicated.	*Select one* No Minor Neutral Much Very much
D2.2	***Only if D2.1 is 'None', 'Minor' or 'Neutral'*** What is important in an app to you?	*Multiple choice* Integration of all providers Integration with public transport Reserve and pay in one app Offers that encourage social and sustainable behaviour None of the above
D2.3	***Only if D2.1 is 'Much' or 'Very much'*** Why do you find booking shared-mobility complicated?	*Multiple choice* I think an app is too complicated Each provider has a separate app It is difficult to combine with public transport Reservations are difficult for me Other
D2.5	***Only if D2.1 is 'None', 'Minor' or 'Neutral'*** Do you prefer to book shared mobility (also) without an app? *Shared-mobility is often arranged via an app on a smartphone.*	*Select one* Yes No
D2.5b	***Only if D2.1 is 'Much' or 'Very much'*** What could solve your barriers?	*Multiple choice* Personal explanation of the app Personal support at the hub Alternative booking options None of the above
D2.6	***Only if D2.5 is 'Yes' or D2.5b has 'Alternative booking option' selected*** Which (alternative) booking options do you prefer? *This is about planning, booking and/or paying for shared-mobility.*	*Multiple choice* Ticket machine Kiosk/station employee Public transport card Online Telephone Other
D2.7	Which method of payment do you prefer?	*Multiple choice* Prepaid Payment per ride Subscription No preference

Gift voucher

Identification	Question	Answer options
CB		
CB1	Would you like to participate in the draw of three vouchers and/or be kept informed of the survey? *Three vouchers will be drawn, each with a value of 20 euros. When the survey is completed, a one-time information email will be sent to those who have been interested.*	*Multiple choice* I want to participate in the draw of three gift vouchers worth 20 euros

		I want to receive a one-time email with the results of the survey
CB2	***Only if CB1 has at least one selected.*** Enter your e-mail address below	*Email*
CB3	Do you have any comments or would you like to say something about mobility hubs?	*Text*

Closure

The questionnaire has been completed, thank you for participating. You can now close this window.

B. Survey (Dutch)

This appendix contains the Dutch version of the survey distributed in the case study areas discussed in sections 4.3. This version was used by respondents. Pictograms used in section C and D of the survey are omitted.

Introduction and informed consent	
Onderzoek mobiliteitshubs Versie 3A Beste deelnemer, bedankt voor het invullen van deze vragenlijst over mobiliteitshubs. Deze vragenlijst is onderdeel van een **afstudeeronderzoek** in samenwerking met de *Provincie Noord-Holland*. **Hoe moet een mobiliteitshub in uw omgeving uitzien? Hierover stellen we u wat vragen.** De vragenlijst duurt ongeveer 10 minuten. Door deel te nemen maakt u kans op een van de drie cadeaukaarten van €20.	
Gegevensbescherming Uw antwoorden op deze vragenlijst worden gebruikt voor een onderzoek en worden vertrouwelijk behandeld. U kunt vrijwillig deelnemen aan deze vragenlijst en kunt op elk moment stoppen zonder dat dit enige gevolgen heeft. Uw antwoorden worden opgeslagen volgens de privacy richtlijnen en na afronding van het onderzoek verwijderd. De enquête wordt verwerkt met LimeSurvey.	
Ik begrijp dit en ga akkoord	*Confirm*

Achtergrond

De volgende vragen gaan over uw persoonlijke achtergrond.

Identification	Question	Answer options
A1 introduction		
A1.1	Wat zijn de eerste vier cijfers van de postcode van uw woonlocatie?	*Number*
A1.2	***If A1.1 is in Purmerend*** In welke buurt woont u? [map of neighbourhoods in Purmerend]	*List of neighbourhoods within the given postal code*

Achtergrond

Identification	Question	Answer options
A2 basic socio-demographics		
De volgende vragen gaan over uw persoonlijke achtergrond		
A2.1	Geslacht	*Select one* Man Vrouw Anders Liever niet delen
A2.2	Leeftijd	*Select one* 16 t/m 17 jaar 18 t/m 19 jaar 20 t/m 24 jaar 25 t/m 29 jaar 30 t/m 34 jaar 35 t/m 39 jaar 40 t/m 44 jaar 45 t/m 49 jaar 50 t/m 54 jaar 55 t/m 59 jaar 60 t/m 64 jaar 65 t/m 69 jaar

		70 t/m 74 jaar 75 t/m 79 jaar 80 jaar of ouder
A2.3	Waar bent u geboren?	*Select one* Nederland Europa (niet Nederland) Buiten Europa Liever niet delen
A2.4	Wat is uw hoogst behaalde onderwijsniveau?	*Select one* Basisschool Middelbare school MBO of vergelijkbaar HBO/universitaire bachelor Universitaire master PhD of vergelijkbaar
A2.5	Wat is uw hoofdzakelijke werksituatie?	*Select one* Werkzaam minder dan 30 uur per week Werkzaam 30 uur of meer per week Eigen huishouding Scholier/student Werkloos Arbeidsongeschikt Gepensioneerd/VUT Onbetaald werkend
A2.5b	Wat voor dienstverband heeft u?	*Select one* Loondienst Zelfstandig werkzaam Ondernemer/eigen zaak
A1.3	***If A1.1 is in Purmerend*** Waar werkt u?	*Select one* [List of North-Holland cities]
A2.6	Wat is het netto inkomen van uw huishouden per maand?	*Select one* Minder dan €2667 €2667-€4833 Meer dan €4833 Liever niet delen
A2.8	Wat is de woonsituatie van uw huishouden?	*Select one* Huiseigenaar Huurder Anders
A3 household		
A3.1	Wat is de samenstelling van uw huishouden?	*Select one* Eén persoon Paar Gezin met kinderen Woongroep Anders

Digitale vaardigheden en participatie

Identification	Question	Answer options
A4 digital skills		
Hieronder staan paar vragen over het gebruik van een smartphone en participatie.		
A4.1	Heeft u een smartphone met een internetverbinding?	*Select one* Ja, ik gebruik apps die een internetverbinding vereisen

		Ja, maar ik gebruik deze alleen voor bellen/berichten en andere offline activiteiten Nee
A4.2	***Only if A4.1 is 'Yes' and use online connection*** Gebruikt u apps op uw smartphone voor de volgende functies?	*Multiple choice* Een reis te plannen *(bijvoorbeeld Google Maps, NS app, 9292 app)* Tickets te kopen of een plek te reserveren voor het openbaar vervoer *(bijvoorbeeld NS app, 9292 app)* Het reserveren/boeken/betalen van een deelvoertuig *(bijvoorbeeld Felyx, Check, Go Sharing, Greenwheels)* Geen van de bovenstaande
A5 democratic involvement		
A5.1	Heeft u ooit meegedaan aan plannen om het vervoersaanbod (in uw buurt) te verbeteren? *Betrokkenheid kan bijvoorbeeld deelname aan enquêtes, buurtvergaderingen of andere inspraakmomenten betekenen.*	*Select one* Ja Nee
A5.2	***Only if answer A5.1 is 'Yes'.*** Wat voor soort betrokkenheid had u hierbij?	*Multiple choice* Kreeg informatie Nam deel aan een enquête Gaf feedback of ideeën Nam deel aan een workshop Was actief in een lange-termijn groep Andere soort participatie processen

Vervoersopties en reisgedrag

De volgende vragen gaan over uw vervoers- en reisopties.

Identification	Question	Answer options
B1 mobility capabilities and ownership		
B1.1	Welke van de volgende voertuigen zijn beschikbaar binnen uw huishouden?	*Multiple choice* Fiets E-bike Auto Scooter/Motor Anders Geen van de bovenstaande
B1.2	***Only if B1.1 includes 'Car'*** Hoeveel auto's bezit uw huishouden?	*Select one* 1 2 Meer dan 2
B1.3	Heeft u moeite om meer dan 10 minuten te lopen?	*Select one* Nee Ja
B1.4	***Only if B1.3 is 'Yes'.*** Gebruikt u ondersteuning tijdens het lopen? *Ondersteuning kan bijvoorbeeld bestaan uit het gebruiken van een rolstoel, rollator, scooter of loophond of begeleid worden door een verzorger.*	*Select one* Nee Ja
B2 Mobility patterns		

B2.1	Hoe vaak loopt u om een bestemming te bereiken *(uitgezonderd lopen voor ontspanning)*? - Lopen *(uitgezonderd lopen voor ontspanning)*	*Select one* 4 of meer dagen per week 1-3 dagen per week 1-3 dagen per maand 1-11 dagen per jaar Nooit
B2.2	Hoe vaak gebruikt u de eigen voertuigen van uw huishouden? - Auto als bestuurder of passagier - Fiets/e-bike - Scooter/motor	*Select one* 4 of meer dagen per week 1-3 dagen per week 1-3 dagen per maand 1-11 dagen per jaar Nooit
B2.3	Hoe vaak reist u met de onderstaande vervoersmiddelen? - Taxi/Uber - Bus/tram - Metro - Trein	*Select one* 4 of meer dagen per week 1-3 dagen per week 1-3 dagen per maand 1-11 dagen per jaar Nooit
B1.6	**Only if public transport used in B2.3** Welke abonnementen en betwaalwijzen gebruikt u voor het openbaar vervoer?	*Multiple choice* Studentreisproduct NS-Business Card NS Flex of vergelijkbaar Bus/metro abonnement Online ticket Contactloos betalen (telefoon/bankpas) Ticket van automaat, ticketbalie of chauffeur Anders
B2.3b	Hoe vaak reist u met het onderstaande deelvervoer? *Deelvervoer geeft u toegang tot verschillende vervoersmiddelen op speciale inlever- en ophaallocaties of andere plekken. Vaak krijgt u toegang tot deelvervoer via een app, online account, klantenkaart en/of automaat.* - Deelfiets/elektrische deelfiets *(bijvoorbeeld OV-fiets, Go Sharing, Bolt)* - Deelscooter *(bijvoorbeeld Check, Felyx, Go Sharing)* - Deelauto als bestuurder of passagier *(bijvoorbeeld buurtauto, Greenwheels, MyWheels)*	*Select one* 4 of meer dagen per week 1-3 dagen per week 1-3 dagen per maand 1-11 dagen per jaar Nooit
B2.6	***Only if B2.2 is 'car' and A1.1 is in Purmerend*** Binnen Purmerend, welke vervoersmiddel gebruikt u vaak?	*Multiple choice* Lopen Fietsen Scooter Deelvervoer Auto (bestuurder) Auto (pasagier)
B2.7	***Only if B2.6 is Car (driver)*** Waarom gebruikt u vaak de auto binnen Purmerend?	*Multiple choice* Ik vind het makkelijker Het is beter betaalbaar Ik heb moeite met fysieke inspanning Ik voel me veiliger

		Ik gebruik liever de auto Anders

Mobiliteitshubs en deelvervoer

De volgende vragen gaan over mobiliteitshub en deelvervoer.

Identification	Question	Answer options
C1 Current usage		
Mobiliteitshub Een mobiliteitshub biedt meerdere vervoersmidellen met verschillende diensten en functies: **Deelvervoer** Dit kan bestaan uit een deelscooter, (elektrische) deelfiets, deelauto of deelbakfiets. **Openbaar vervoer** Dit kan een nabijgelegen treinstation of bushalte zijn. **Digitale display en bewegwijzering** Hiermee wordt u op de hoogte gehouden met real-time reisinformatie. **Aantrekkelijk ontwerp** Het ziet er mooi uit en is aangenaam om te verblijven. **Diensten en voorzieningen** Er kunnen een kiosk, café of andere voorzieningen aanwezig zijn. **App** Om deelvervoer te boeken of voor andere informatie, kunt u gebruikmaken van een app. [figure]		
C1.1	Heeft u ooit eerder van een mobiliteitshub gehoord?	*Select one* Nee Ja Weet ik niet zeker

Tekst bewoner Waterlandkwartier Purmerend

De volgende vragen gaan over wat en hoeveel u denkt gebruik te maken van een mobiliteitshub. Een mobiliteitshub kan een kleine buurthub zijn of een grote hub op een treinstation. Om de vragen inzichtelijker te maken, nemen we een locatie in uw omgeving als voorbeeld: station Purmerend. Deze locatie is een potentiële locatie voor een hub en wordt daarnaast ontwikkeld door de gemeente. Voor dit onderzoek leggen we u meerdere voorzieningen voor, maar deze hebben geen verband met bestaande plannen.

Tekst bewoner overig Purmerend

De volgende vragen gaan over wat en hoeveel u denkt gebruik te maken van een mobiliteitshub. Een mobiliteitshub kan een kleine buurthub zijn of een grote hub op een treinstation. Om de vragen inzichtelijker te maken, moet u voorstellen dat de hub in uw wijk komt binnen 10 minuten loopafstand. Voor dit onderzoek leggen we u meerdere voorzieningen voor maar deze hebben geen verband met bestaande plannen.

Tekst werkenden Purmerend

Identification	Question	Answer options
C2 Intention to use		
Information box on shared mobility		Deelauto: Een deelauto wordt gereserveerd en moet teruggebracht worden naar dezelfde locatie. Deelfiets/e-bike: Direct te gebruiken en kan ook op andere locaties worden ingeleverd. Elektrische deelfiets: Direct te gebruiken en kan ook op andere locaties worden ingeleverd. Deelbakfiets: Te reserveren en moet teruggebracht worden naar dezelfde locatie. Deelscooter: Direct te gebruiken en kan ook op andere locaties worden ingeleverd.

C2.1	Hoe waarschijnlijk is het dat u de onderstaande vervoersmiddelen zult gebruiken als ze in de toekomst aanwezig zijn op de mobiliteitshub? - Deelauto - Deelfiets - Elektrische deelfiets - Deelbakfiets - Deelscooter	*Select one* Zeer onwaarschijnlijk Onwaarschijnlijk Neutraal Waarschijnlijk Zeer waarschijnlijk
B2.8	***Only if 'Very unlikely' or 'Unlikely' are selected for all shared-mobility in B2.3b*** Wat zijn de belangrijkste redenen waarom u niet of nauwelijks deelvervoer van de hub gaat gebruiken?	*Multiple choice* Ik ben er niet bekend mee Het is te duur Het sluit niet aan op mijn reisbehoefte Ik vind het niet fijn om dit voertuig te gebruiken Ik vind het moeilijk om dit voertuig te regelen Ik gebruik liever mijn eigen voertuig Anders
B2.8b	***Only if 'Likely' or 'Very likely' are selected for any shared-mobility in B2.3b*** Wat zijn de belangrijkste redenen waarom u deelvervoer van de hub gaat gebruiken?	*Multiple choice* Het is een alternatief voor het openbaar vervoer Het maakt me minder afhankelijk van mijn/een auto Het vergroot de plaatsen die ik kan bereiken Het biedt meer faciliteiten waardoor ik makkelijker deelvervoer kan gebruiken Ik heb meer zekerheid dat er voldoende voertuigen zijn Anders

Voorzieningen

Een mobiliteitshub kan naast (deel)vervoer ook andere voorzieningen aanbieden. De volgende vragen gaan over of u denkt deze in de toekomst gaat gebruiken.

Identification	Question	Answer options
C2 Intention to use		
C2.3	Hoe waarschijnlijk is het dat u de volgende voorzieningen zult gebruiken? - Zitbanken - Kiosk - Café - Toilet - Pakketkluisjes - Wi-Fi	*Select one* Zeer onwaarschijnlijk Onwaarschijnlijk Neutraal Waarschijnlijk Zeer waarschijnlijk
	Hier kunt u zitten terwijl u wacht tijdens uw reis of om te ontspannen. Hier kunt u onder andere eten en drinken kopen, maar ook om ondersteuning vragen op de hub. Hier kunt u eten en drinken bestellen terwijl u kunt blijven zitten. U kunt hier, mogelijk tegen betaling, gebruik maken van het toilet. Hier kunt u pakket laten bezorgen en op een later moment ophalen.	

	Hiermee kunt u gratis internetverbinding maken met uw telefoon of ander apparaat.	
C2.4	Hoe waarschijnlijk is het dat u de volgende voorzieningen zult gebruiken? - Parkeerplaats voor de auto - Elektrische laadpaal - Beveiligde fietsenstalling - Fietsenmaker	*Select one* Zeer onwaarschijnlijk Onwaarschijnlijk Neutraal Waarschijnlijk Zeer waarschijnlijk
	Hier kunt u uw auto parkeren om over te stappen of als u in de omgeving woont, werkt of moet zijn. Hier kunt u uw auto, e-bike of ander voertuig opladen. Hier kunt u uw fiets stallen in een beveiligde omgeving. Hier kunt u uw fiets laten repareren.	
C3.1	De mobiliteitshub kan positief zijn voor mijn buurt	*Select one* Erg oneens Oneens Neutraal Eens Erg eens

Ontwerp hub

De volgende vragen gaan over wat er op de mobiliteitshub aanwezig moet zijn en hoe die eruit moet zien.

Identification	Question	Answer options
D1 Physical integration		
D1.4	Wat is voor u belangrijk voor de informatievoorzieningen op de mobiliteitshub?	*Multiple choice* Duidelijke routebeschrijving naar het vervoer en de diensten. Een uitgebreide uitleg over de aanwezige voorzieningen. Oversteekplaatsen en andere obstakels zijn duidelijk aangegeven en toegelicht. Eenvoudige en duidelijke geformuleerde informatie. Informatie dient ook in andere talen dan het Nederlands te worden verstrekt. Real-time informatiescherm met actuele vertrektijden en beschikbare voertuigen
D1.5	Wat zijn voor u belangrijke ontwerp- en comfortkenmerken van een mobiliteitshub?	*Select one* Voldoende verlichting. Een aantrekkelijk en mooi ontwerp. Een prettige en gastvrije omgeving. Alle onderdelen liggen op korte en handige loopafstand van elkaar. Vanaf een afstand goed zichtbaar en herkenbaar. Drempel vrij. Beveiligingscamera's SOS-knop Voldoende ruimte voor voetgangers Aanwezigheid service-medewerker

D4.1	Rankschik de volgende hub-onderdelen die u het meest belangrijk vindt. Kies er minimaal [aantal]. - Real-time informatiescherm - *Alle geselecteerde antwoorden bij vraag D1.5*	*Rank options*
C3.2	Gaat u meer gebruik maken van de hub als er rekening wordt gehouden met uw ontwerpwensen?	*Select one* Zeer onwaarschijnlijk Onwaarschijnlijk Neutraal Waarschijnlijk Zeer waarschijnlijk

Reis regelen

De volgende vragen gaan over het plannen, boeken en betalen van uw reis vanaf de hub.

Identification	Question	Answer options
D2 Digital integration		
D2.1	Het boeken van deelvervoer met een app vind ik ingewikkeld.	*Select one* Geen Weinig Neutraal Veel Erg veel
D2.2	***Only if D2.1 is 'None', 'Minor' or 'Neutral'*** Wat is belangrijk in een app voor u?	*Multiple choice* Integratie van alle aanbieders Integratie met openbaar vervoer Reserveren én betalen in één app Aanbiedingen die sociaal en duurzaam gedrag aanmoedigen Geen van de bovenstaande
D2.3	***Only if D2.1 is 'Much' or 'Very much'*** Waarom vindt u het boeken van deelvervoer ingewikkeld?	*Multiple choice* Een app vind ik te ingewikkeld Elke aanbieder heeft een aparte app Het is moeilijk te combineren met het openbaar vervoer Reserveren is moeilijk voor mij Anders
D2.5	***Only if D2.1 is 'None', 'Minor' or 'Neutral'*** Boekt u liever deelmobiliteit (ook) zonder een app? *Deelvervoer wordt vaak via een app op een smartphone geregeld.*	*Select one* Ja Nee
D2.5b	***Only if D2.1 is 'Much' or 'Very much'*** Wat zou uw barrières kunnen verhelpen?	*Multiple choice* Persoonlijke uitleg van de app Persoonlijke ondersteuning op de hub Alternatieve boekingsopties Geen van de bovenstaande
D2.6	***Only if D2.5 is 'Yes' or D2.5b has 'Alternative booking option' selected*** Welke (alternatieve) boekingsopties hebben u voorkeur? *Het gaat hierom over het plannen, boeken en/of betalen van deelvervoer.*	*Multiple choice* Kaartautomaat Kiosk/stationsmedewerker OV-kaart Online Telefonisch

		Anders
D2.7	Welk manier van betalen heeft uw voorkeur?	*Multiple choice* Vooruitbetaald/prepaid Betaling per rit Abonnement Geen voorkeur

Cadeaubon

Identification	Question	Answer options
D3 democratic integration		
CB1	Wilt u meedoen aan de loting van drie vouchers en/of op de hoogte worden gehouden van het onderzoek? *Er worden drie vouchers geloot met elk een waarde van 20 euro. Wanneer het onderzoek is voltooid, wordt er een eenmalige infomail gestuurd naar zij die geïnterseerd zijn.*	*Multiple choice* Ik wil meedoen aan de loting van drie cadeaubonnen ter waarde van 20 euro Ik wil een eenmalige e-mail krijgen met de uitkomsten van het onderzoek
CB2	***Only if CB1 has at least one selected.*** Vul hieronder uw e-mail adres in	*E-mail*
CB3	Heeft u nog opmerkingen of wilt u iets kwijt over mobiliteitshubs?	*Text*

Afsluiting

De vragenlijst is voltooid, bedankt voor uw deelname. U kunt dit venster nu sluiten.

C. Flyer

This appendix contains the final version which only had small improvements and corrections over earlier versions.

Figure 16: Front and back of the flyer for the survey.

D. Kendell's Tau (dependent variables)

Table 33 contains the results from the Kendell's Tau correlation analysis.

Table 33: Results from the Kendell's Tau correlation analysis.

		Bench	Kiosk	Café	Toilet	Parcel locker	Wi-Fi	Car parking	Electric vehicle charging	Bike/moped secured parking	Bike repair shop
Bench	Coefficient	1,000	,449**	,336**	,419**	0,050	,273**	,162**	-0,071	,162**	,240**
	Sig.		0,000	0,000	0,000	0,372	0,000	0,004	0,210	0,004	0,000
	N	220	220	220	220	220	220	220	220	220	220
Kiosk	Coefficient	,449**	1,000	,653**	,459**	0,098	,231**	,180**	0,101	,178**	,269**
	Sig.	0,000		0,000	0,000	0,077	0,000	0,001	0,073	0,001	0,000
	N	220	220	220	220	220	220	220	220	220	220
Café	Coefficient	,336**	,653**	1,000	,399**	,148**	,155**	,204**	,128*	,162**	,192**
	Sig.	0,000	0,000		0,000	0,007	0,005	0,000	0,022	0,003	0,001
	N	220	220	220	220	220	220	220	220	220	220
Toilet	Coefficient	,419**	,459**	,399**	1,000	0,068	,226**	,215**	0,017	,157**	,216**
	Sig.	0,000	0,000	0,000		0,222	0,000	0,000	0,764	0,005	0,000
	N	220	220	220	220	220	220	220	220	220	220
Parcel locker	Coefficient	0,050	0,098	,148**	0,068	1,000	,140*	0,018	0,096	0,052	,165**
	Sig.	0,372	0,077	0,007	0,222		0,010	0,740	0,084	0,347	0,003
	N	220	220	220	220	220	220	220	220	220	220
Wi-Fi	Coefficient	,273**	,231**	,155**	,226**	,140*	1,000	,157**	0,001	,181**	,139*
	Sig.	0,000	0,000	0,005	0,000	0,010		0,004	0,988	0,001	0,012
	N	220	220	220	220	220	220	220	220	220	220
Car parking	Coefficient	,162**	,180**	,204**	,215**	0,018	,157**	1,000	,206**	,220**	0,047
	Sig.	0,004	0,001	0,000	0,000	0,740	0,004		0,000	0,000	0,394
	N	220	220	220	220	220	220	220	220	220	220
Electric vehicle charging (car, e-bike or other vehicle)	Coefficient	-0,071	0,101	,128*	0,017	0,096	0,001	,206**	1,000	,214**	,192**
	Sig.	0,210	0,073	0,022	0,764	0,084	0,988	0,000		0,000	0,001
	N	220	220	220	220	220	220	220	220	220	220
Bike/moped secured parking	Coefficient	,162**	,178**	,162**	,157**	0,052	,181**	,220**	,214**	1,000	,393**
	Sig.	0,004	0,001	0,003	0,005	0,347	0,001	0,000	0,000		0,000
	N	220	220	220	220	220	220	220	220	220	220
Bike repair shop	Coefficient	,240**	,269**	,192**	,216**	,165**	,139*	0,047	,192**	,393**	1,000
	Sig.	0,000	0,000	0,001	0,000	0,003	0,012	0,394	0,001	0,000	
		220	220	220	220	220	220	220	220	220	220

E. VIF

Table 34 contains the results of the multicollinearity analysis. It shows the variance inflation factor (VIF) that indicates the level of correlation between predictor variables. A VIF value of 1 indicates no correlation between the predictor variables. A value between 1-5 indicates a moderate correlation while a value above 5 indicates a high correlation which means that there is multicollinearity (Statology, 2020; Field, 2024; Statistics Solutions, n.d.). The maximum VIF value is 2,353, therefore there is no concern for multicollinearity.

Table 34: Multicollinearity analysis.

Model 1 / 4			Model 2 / 5			Model 3 / 6	
	Tolerance	VIF		Tolerance	VIF	Tolerance	VIF
Urbanisation	0,558	1,794	Urbanisation	0,556	1,799	0,555	1,802
Building year	0,724	1,381	Building year	0,726	1,377	0,727	1,376
Gender	0,89	1,123	Gender	0,871	1,148	0,878	1,139
Age	0,443	2,257	Age	0,43	2,328	0,43	2,326
Birth country	0,728	1,374	Birth country	0,932	1,073	0,937	1,067
Education	0,742	1,348	Education	0,773	1,294	0,775	1,29
Employment	0,555	1,801	Employment	0,45	2,224	0,44	2,275
Homeownership Status	0,625	1,599	Homeownership Status	0,633	1,58	0,636	1,573
Household composition	0,694	1,441	Household composition	0,677	1,476	0,676	1,48
Digital skills	0,767	1,304	Digital skills	0,839	1,192	0,845	1,183
Participation	0,887	1,127	Participation	0,943	1,061	0,949	1,053
Car ownership	0,436	2,296	Car ownership	0,426	2,349	0,552	1,812
Difficulty walking	0,46	2,174	Difficulty walking	0,706	1,417	0,755	1,325
Assistance walking	0,466	2,145	Frequency walking	0,769	1,3	0,827	1,209
Frequency walking	0,735	1,360	Frequency car	0,443	2,256	0,566	1,768
Frequency car	0,425	2,353	Frequency bike, e-bike, moped, motorcycle	0,862	1,16	0,816	1,226
Frequency bike/e-bike	0,79	1,266	Frequency public transport	0,607	1,647	0,636	1,572
Frequency moped/motorcycle	0,922	1,085	Current use shared mobility	0,727	1,376	0,753	1,328
Frequency taxi/Uber	0,771	1,297					
Frequency bus/tram	0,531	1,883					
Frequency metro	0,542	1,845					
Frequency train	0,512	1,954					
Frequency shared bike/e-bike	0,706	1,417					
Frequency shared moped/motorcycle	0,866	1,155					
Frequency shared car	0,665	1,503					

F. OLR shared-mobility primary

This Appendix contains the Ordinal Logistic Regression for the intention to use any form of shared-mobility.

Table 35: Parameter estimates for the ordinal logistic regression for the intention to use shared mobility.

	B	Std. Error	Wald	Sig.	exp(B)	CI lower bound	CI upper bound
Constant	2,099	1,594	1,734	0,188	8,155		
Urbanisation = 1	-0,582	0,535	1,185	0,276	0,559	0,196	1,594
Urbanisation = 2	-0,447	0,51	0,766	0,381	0,64	0,235	1,74
Urbanisation = 3	0a						
Gender = unknown	-1,164	1,297	0,805	0,37	0,312	0,025	3,97
Gender = male	-0,137	0,373	0,134	0,714	0,872	0,42	1,81
Gender = female	0a						
Age = 16-24	2,364	1,104	4,584	0,032	10,631	1,221	92,537
Age = 25-34	1,427	0,846	2,847	0,092	4,167	0,794	21,871
Age = 35-44	1,176	0,845	1,939	0,164	3,243	0,619	16,985
Age = 45-54	1,116	0,815	1,877	0,171	3,053	0,618	15,077
Age = 55-64	0,872	0,692	1,59	0,207	2,392	0,617	9,282
Age = 65+	0a						
Birth country = unknown	-20,167	27618,078	0	0,999	0	0	.
Birth country = Netherlands	-0,719	0,742	0,94	0,332	0,487	0,114	2,085
Birth country = abroad	0a						
Education = low	0,563	0,842	0,447	0,504	1,756	0,337	9,147
Education = neutral	-0,492	0,447	1,21	0,271	0,612	0,255	1,469
Education = high	0a						
Occupation = active	-0,24	0,699	0,118	0,732	0,787	0,2	3,095
Occupation = not-active	0a						
Homeownership = unknown	-0,292	1,141	0,065	0,798	0,747	0,08	6,989
Homeownership = homeowner	-0,461	0,463	0,993	0,319	0,631	0,255	1,562
Homeownership = renting	0a						
Household = unknown	-0,527	1,039	0,258	0,612	0,59	0,077	4,524
Household = alone	0,605	0,552	1,199	0,273	1,831	0,62	5,404
Household = pair	0,26	0,53	0,242	0,623	1,297	0,459	3,664
Household = multiple	0a						
Digital skill = 0/1	-0,981	1,183	0,687	0,407	0,375	0,037	3,813
Digital skill = 2	0,175	0,377	0,215	0,643	1,191	0,569	2,492
Digital skill = 3	0a						
Participation = no	-1,458	0,477	9,356	0,002	0,233	0,091	0,592
Participation = yes	0a						
Car ownership = 0	2,005	0,953	4,424	0,035	7,428	1,146	48,123
Car ownership = 1	0,141	0,517	0,075	0,785	1,152	0,418	3,174
Car ownership = 2+	0a						
Difficulty walking = no	0,38	0,687	0,306	0,58	1,462	0,381	5,616
Difficulty walking = yes	0a						
Frequency walking = low	-0,243	0,52	0,219	0,64	0,784	0,283	2,171
Frequency walking = medium	0,625	0,411	2,311	0,128	1,868	0,835	4,18
Frequency walking = high	0a						
Car usage = low	-1,274	0,736	2,993	0,084	0,28	0,066	1,184
Car usage = medium	0,639	0,434	2,17	0,141	1,894	0,81	4,43
Car usage = high	0a						
Frequency bike/moped = low	-0,357	0,459	0,605	0,437	0,7	0,284	1,721
Frequency bike/moped = medium	-0,472	0,444	1,131	0,287	0,624	0,261	1,489
Frequency bike/moped = high	0a						
Frequency public transport = low	-0,066	0,573	0,013	0,908	0,936	0,304	2,879
Frequency public transport = medium	0,386	0,541	0,508	0,476	1,471	0,509	4,249
Frequency public transport = high	0a						
Shared-mobility use = no	-1,709	0,572	8,917	0,003	0,181	0,059	0,556
Shared-mobility use = yes	0a						

G. Services OLR model comparison

Table 36 shows the quality of different models for the ordinal logistic regression analysis of the intention to use mobility hub services. For each service and model the model significance, goodness-of-fit significance (Pearson and Deviance), Pseudo R-square (Cox and Snell, Nagelkerke, McFadden), test of parallel lines and AIC. Model 6 is the model used for this research and the results.

Table 36: Model quality results for the intention to use services.

Bench	1	2	3	4	5	6
Model fit significance	<,001	0,008	0,004	<,001	<,001	<,001
Pearson significance	0,908	0,94	0,056	0,958	0,797	0,162
Deviance significance	1	1	1	1	1	1
Cox and Snell	0,418	0,263	0,24	0,456	0,322	0,289
Nagelkerke	0,444	0,279	0,255	0,559	0,394	0,355
McFadden	0,191	0,108	0,097	0,36	0,23	0,202
Test of Parallel Lines significance	0,102	0,171	<,001	0,989	0,299	0,058
AIC	650,499	640,506	631,336	384,002	370,611	364,911
Kiosk	1	2	3	4	5	6
Model fit significance	<,001	0,002	0,062	<,001	<,001	0,028
Pearson significance	<,001	<,001	0,526	0,133	0,027	0,158
Deviance significance	1	1	1	0,887	0,805	0,493
Cox and Snell	0,423	0,283	0,194	0,427	0,316	0,209
Nagelkerke	0,447	0,299	0,205	0,489	0,362	0,239
McFadden	0,187	0,113	0,073	0,269	0,184	0,113
Test of Parallel Lines significance	0,794	<,001	0,011	0,009	0,017	0,048
AIC	671,563	657,328	667,039	478,677	455,616	471,858
Café	1	2	3	4	5	6
Model fit significance	0,001	0,001	0,012	<,001	<,001	0,015
Pearson significance	0,04	0,002	0,082	0,366	0,03	0,094
Deviance significance	1	1	1	0,691	0,52	0,286
Cox and Snell	0,41	0,289	0,222	0,428	0,305	0,218
Nagelkerke	0,43	0,303	0,233	0,484	0,345	0,247
McFadden	0,173	0,112	0,082	0,259	0,169	0,114
Test of Parallel Lines significance	0,922	<,001	<,001	0,155	0,051	0,128
AIC	699,876	678,97	682,736	497,068	477,941	487,621
Toilet	1	2	3	4	5	6
Model fit significance	<,001	<,001	<,001	<,001	<,001	<,001
Pearson significance	<,001	0,493	0,033	<,001	0,13	<,001
Deviance significance	1	1	1	1	0,988	0,981
Cox and Snell	0,471	0,297	0,26	0,506	0,345	0,309
Nagelkerke	0,497	0,312	0,274	0,59	0,403	0,36
McFadden	0,214	0,118	0,101	0,362	0,217	0,19
Test of Parallel Lines significance	0,735	<,001	0,002	0,005	0,054	0,554
AIC	661,404	662,278	657,315	419,295	419,403	415,224
Parcel locker	1	2	3	4	5	6
Model fit significance	0,001	0,033	0,063	<,001	0,037	0,028
Pearson significance	<,001	0,133	0,154	0,08	0,169	0,192
Deviance significance	1	1	1	0,943	0,697	0,692
Cox and Snell	0,409	0,24	0,194	0,413	0,238	0,209
Nagelkerke	0,428	0,251	0,203	0,478	0,275	0,241
McFadden	0,169	0,089	0,069	0,266	0,136	0,117
Test of Parallel Lines significance	0,968	0,791	0,006	0,975	0,618	0,14
AIC	712,632	705,79	702,767	469,391	465,027	457,259
Wi-Fi	1	2	3	4	5	6
Model fit significance	<,001	0,006	0,005	<,001	<,001	<,001
Pearson significance	0,012	0,455	0,526	0,146	0,303	0,381
Deviance significance	1	1	1	0,994	0,923	0,895
Cox and Snell	0,42	0,268	0,235	0,474	0,323	0,284
Nagelkerke	0,439	0,28	0,245	0,548	0,373	0,328
McFadden	0,173	0,099	0,085	0,32	0,194	0,166
Test of Parallel Lines significance	0,961	<,001	<,001	0,199	0,601	0,925
AIC	717,629	706,838	700,624	446,968	440,524	436,822
Carparking	1	2	3	4	5	6
Model fit significance	<,001	<,001	<,001	<,001	<,001	<,001

Pearson significance	<,001	<,001	<,001	<,001	0,022	0,037
Deviance significance	1	1	1	0,991	0,891	0,881
Cox and Snell	0,527	0,351	0,326	0,491	0,338	0,31
Nagelkerke	0,551	0,367	0,341	0,563	0,387	0,355
McFadden	0,238	0,137	0,126	0,328	0,2	0,18
Test of Parallel Lines significance	0,792	0,001	<,001	.	1	0,998
AIC	673,691	681,367	673,642	449,914	445,694	438,772
Electric vehicle charging	1	2	3	4	5	6
Model fit significance	0,005	0,734	0,442	0,045	0,864	0,621
Pearson significance	<,001	0,334	0,435	<,001	0,031	0,035
Deviance significance	1	1	1	0,998	0,929	0,956
Cox and Snell	0,387	0,151	0,145	0,35	0,136	0,131
Nagelkerke	0,412	0,16	0,155	0,422	0,164	0,158
McFadden	0,174	0,058	0,056	0,244	0,083	0,08
Test of Parallel Lines significance	0,996	0,055	0,044	1	0,864	0,985
AIC	656,85	666,759	652,144	439,048	439,496	424,779
Secure bike parking	1	2	3	4	5	6
Model fit significance	<,001	<,001	<,001	<,001	<,001	<,001
Pearson significance	<,001	0,287	0,308	0,687	0,139	0,04
Deviance significance	1	1	1	1	0,982	0,978
Cox and Snell	0,457	0,342	0,309	0,487	0,33	0,301
Nagelkerke	0,48	0,359	0,324	0,569	0,385	0,351
McFadden	0,2	0,137	0,121	0,344	0,206	0,184
Test of Parallel Lines significance	0,067	0,658	0,548	1	1	0,768
AIC	682,996	663,427	658,131	426,373	423,227	416,738
Bike repair shop	1	2	3	4	5	6
Model fit significance	0,065	0,299	0,335	0,025	0,21	0,256
Pearson significance	0,198	0,093	0,208	0,002	0,065	0,116
Deviance significance	1	1	1	0,381	0,178	0,162
Cox and Snell	0,342	0,19	0,155	0,361	0,2	0,162
Nagelkerke	0,36	0,2	0,162	0,409	0,227	0,184
McFadden	0,139	0,07	0,056	0,209	0,104	0,083
Test of Parallel Lines significance	<,001	0,588	0,249	0,076	0,91	0,752
AIC	717,453	701,268	694,655	518,538	505,856	499,999

H. Services OLR results

The tables below contain all variables of the Ordinal Logistic Regression analysis for the mobility hub services.

Table 37: Parameter estimates of the ordinal logistic regression for the intention to use a bench at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Bench = unimportant	-3,458	1,413	5,988	0,014	0,031	0,002	0,503
Bench = neutral	-2,143	1,398	2,351	0,125	0,117	0,008	1,817
Location							
Urbanisation = 1	-0,501	0,523	0,917	0,338	0,606	0,217	1,690
Urbanisation = 2	0,392	0,509	0,593	0,441	1,480	0,546	4,011
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-1,573	1,044	2,268	0,132	0,207	0,027	1,606
Gender = male	-0,825	0,379	4,732	0,03	0,438	0,208	0,921
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	1,627	1,342	1,47	0,225	5,089	0,367	70,669
Age = 25-34	-0,495	0,77	0,413	0,52	0,610	0,135	2,759
Age = 35-44	0,377	0,8	0,221	0,638	1,458	0,304	6,994
Age = 45-54	-0,658	0,747	0,776	0,378	0,518	0,120	2,239
Age = 55-64	0,335	0,678	0,245	0,621	1,398	0,370	5,280
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	21,28	0	.	.	1744964415,274	1744964415,274	1744964415,274
Birth country = abroad	1,44	0,863	2,783	0,095	4,221	0,777	22,897
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	1,629	1,056	2,381	0,123	5,099	0,644	40,407
Education = neutral	-0,007	0,428	0	0,987	0,993	0,430	2,298
Education = high	0a	.	.	.	.	.	.
Occupation = active	-2,03	0,684	8,821	0,003	0,131	0,034	0,502
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	1,725	1,484	1,351	0,245	5,613	0,306	102,925
Homeownership = homeowner	-0,769	0,497	2,4	0,121	0,463	0,175	1,226
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-0,463	1,147	0,163	0,687	0,629	0,067	5,960
Household = alone	0,388	0,545	0,508	0,476	1,474	0,507	4,293
Household = pair	-0,095	0,506	0,035	0,851	0,909	0,338	2,450
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,391	1,394	0,079	0,779	0,676	0,044	10,392
Digital skill = 2	-0,005	0,369	0	0,989	0,995	0,483	2,050
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-1,378	0,504	7,46	0,006	0,252	0,094	0,678
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	0,105	0,856	0,015	0,903	1,111	0,208	5,936
Car ownership = 1	0,55	0,483	1,298	0,255	1,733	0,673	4,464
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	2,75	0,679	16,419	<,001	15,643	4,137	59,205
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	0,017	0,486	0,001	0,973	1,017	0,393	2,635
Frequency walking = medium	0,744	0,419	3,142	0,076	2,104	0,924	4,787
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	-0,992	0,707	1,972	0,16	0,371	0,093	1,481
Frequency car = medium	-0,743	0,447	2,754	0,097	0,476	0,198	1,143
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	-0,476	0,463	1,055	0,304	0,621	0,251	1,540
Frequency bike/moped = medium	-0,392	0,418	0,881	0,348	0,676	0,298	1,533
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-1,188	0,555	4,576	0,032	0,305	0,103	0,906
Frequency public transport = medium	-0,707	0,531	1,773	0,183	0,493	0,174	1,397
Frequency public transport = high	0a	.	.	.	.	.	.

Shared-mobility usage = never	0,993	0,513	3,757	0,053	2,699	0,989	7,374
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 38: Parameter estimates of the ordinal logistic regression for the intention to use a café at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Café = unimportant	-2,111	1,116	3,578	0,059	0,121	0,014	1,079
Café = neutral	-0,493	1,107	0,198	0,656	0,611	0,070	5,344
Location							
Urbanisation = 1	-0,157	0,432	0,131	0,717	0,855	0,366	1,996
Urbanisation = 2	0,731	0,423	2,992	0,084	2,077	0,908	4,759
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-0,090	0,963	0,009	0,926	0,914	0,138	6,038
Gender = male	-0,591	0,297	3,955	0,047	0,554	0,309	0,991
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-1,257	0,826	2,316	0,128	0,285	0,056	1,436
Age = 25-34	-0,663	0,656	1,019	0,313	0,515	0,142	1,866
Age = 35-44	0,213	0,662	0,104	0,748	1,237	0,338	4,531
Age = 45-54	0,199	0,630	0,100	0,752	1,220	0,355	4,195
Age = 55-64	0,231	0,533	0,189	0,664	1,260	0,444	3,582
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	20,148	0,000	.	.	562555300,944	562555300,944	562555300,944
Birth country = abroad	1,146	0,658	3,034	0,082	3,146	0,866	11,416
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	1,405	0,717	3,839	0,050	4,076	1,000	16,627
Education = neutral	0,885	0,360	6,049	0,014	2,423	1,197	4,904
Education = high	0a	.	.	.	.	.	.
Occupation = active	-0,778	0,527	2,178	0,140	0,459	0,163	1,290
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	0,729	0,892	0,668	0,414	2,073	0,361	11,905
Homeownership = homeowner	-1,107	0,396	7,814	0,005	0,331	0,152	0,718
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-1,936	0,790	6,000	0,014	0,144	0,031	0,679
Household = alone	-0,289	0,447	0,417	0,519	0,749	0,312	1,800
Household = pair	0,442	0,428	1,066	0,302	1,556	0,672	3,604
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,759	0,994	0,583	0,445	0,468	0,067	3,287
Digital skill = 2	-0,128	0,299	0,183	0,669	0,880	0,490	1,581
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,284	0,369	0,595	0,440	0,753	0,365	1,550
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-0,464	0,709	0,429	0,512	0,629	0,157	2,522
Car ownership = 1	-0,101	0,404	0,063	0,802	0,904	0,409	1,996
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	1,150	0,526	4,782	0,029	3,158	1,126	8,855
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,193	0,404	0,228	0,633	0,824	0,373	1,820
Frequency walking = medium	0,076	0,327	0,055	0,815	1,079	0,569	2,048
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,137	0,532	0,066	0,797	1,147	0,404	3,254
Frequency car = medium	0,043	0,351	0,015	0,902	1,044	0,525	2,077
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	0,707	0,379	3,476	0,062	2,028	0,965	4,263
Frequency bike/moped = medium	-0,033	0,343	0,009	0,924	0,968	0,495	1,895
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,960	0,461	4,343	0,037	0,383	0,155	0,945
Frequency public transport = medium	-0,482	0,438	1,213	0,271	0,618	0,262	1,456
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,147	0,418	0,123	0,725	1,158	0,511	2,625
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 39: Parameter estimates of the ordinal logistic regression for the intention to use a toilet at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Toilet = unimportant	-2,637	1,244	4,492	0,034	0,072	0,006	0,820
Toilet = neutral	-1,006	1,230	0,668	0,414	0,366	0,033	4,080
Location							
Urbanisation = 1	-0,289	0,465	0,387	0,534	0,749	0,301	1,863
Urbanisation = 2	-0,032	0,445	0,005	0,943	0,969	0,405	2,316
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-1,042	0,995	1,097	0,295	0,353	0,050	2,479
Gender = male	-0,150	0,331	0,206	0,650	0,861	0,450	1,647
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	0,903	0,951	0,900	0,343	2,467	0,382	15,927
Age = 25-34	0,686	0,755	0,827	0,363	1,986	0,452	8,715
Age = 35-44	0,612	0,752	0,661	0,416	1,844	0,422	8,053
Age = 45-54	0,712	0,742	0,920	0,337	2,038	0,476	8,723
Age = 55-64	1,814	0,699	6,735	0,009	6,135	1,559	24,143
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	20,913	0,000	.	.	1208928 177,161	1208928 177,161	1208928 177,161
Birth country = abroad	0,704	0,710	0,982	0,322	2,022	0,503	8,125
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	-0,205	0,815	0,063	0,801	0,815	0,165	4,023
Education = neutral	0,460	0,411	1,250	0,264	1,584	0,708	3,547
Education = high	0a	.	.	.	.	.	.
Occupation = active	-2,709	0,679	15,931	<,001	0,067	0,018	0,252
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	0,832	1,133	0,539	0,463	2,298	0,250	21,158
Homeownership = homeowner	-1,222	0,444	7,574	0,006	0,295	0,123	0,703
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-0,417	1,090	0,147	0,702	0,659	0,078	5,573
Household = alone	-1,001	0,505	3,939	0,047	0,368	0,137	0,988
Household = pair	-0,542	0,465	1,356	0,244	0,582	0,234	1,448
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,398	1,162	0,117	0,732	0,672	0,069	6,554
Digital skill = 2	0,914	0,344	7,065	0,008	2,494	1,271	4,894
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	0,240	0,408	0,347	0,556	1,271	0,572	2,829
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	0,107	0,776	0,019	0,890	1,113	0,243	5,089
Car ownership = 1	0,847	0,427	3,927	0,048	2,333	1,009	5,392
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	0,547	0,591	0,855	0,355	1,728	0,542	5,501
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-1,347	0,443	9,249	0,002	0,260	0,109	0,619
Frequency walking = medium	-0,297	0,371	0,639	0,424	0,743	0,359	1,539
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,734	0,606	1,465	0,226	2,083	0,634	6,835
Frequency car = medium	0,091	0,391	0,054	0,816	1,095	0,509	2,358
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	1,608	0,446	12,994	<,001	4,993	2,083	11,965
Frequency bike/moped = medium	1,103	0,401	7,568	0,006	3,013	1,373	6,613
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,456	0,505	0,816	0,366	0,634	0,236	1,704
Frequency public transport = medium	-0,560	0,474	1,396	0,237	0,571	0,226	1,446
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,158	0,470	0,113	0,736	1,171	0,467	2,939
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 40: Parameter estimates of the ordinal logistic regression for the intention to use a parcel locker at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Parcel locker = unimportant	-1,895	1,192	2,527	0,112	0,150	0,015	1,554
Parcel locker = neutral							
Location	-0,968	1,187	0,666	0,414	0,380	0,037	3,885
Urbanisation = 1	-0,022	0,452	0,002	0,962	0,978	0,403	2,375
Urbanisation = 2	0,299	0,444	0,454	0,500	1,349	0,565	3,219
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	0,110	0,975	0,013	0,910	1,116	0,165	7,538
Gender = male	-0,471	0,310	2,303	0,129	0,624	0,340	1,147
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	0,410	0,906	0,205	0,651	1,507	0,255	8,891
Age = 25-34	0,705	0,695	1,029	0,311	2,024	0,518	7,901
Age = 35-44	0,995	0,706	1,983	0,159	2,705	0,677	10,794
Age = 45-54	0,104	0,655	0,025	0,874	1,110	0,307	4,007
Age = 55-64	0,078	0,558	0,020	0,889	1,081	0,362	3,232
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	20,382	0,000	.	.	710869907,600	710869907,600	710869907,600
Birth country = abroad	-0,321	0,642	0,251	0,617	0,725	0,206	2,550
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	1,817	0,786	5,346	0,021	6,153	1,319	28,732
Education = neutral	0,656	0,360	3,312	0,069	1,927	0,951	3,904
Education = high	0a	.	.	.	.	.	.
Occupation = active	0,111	0,538	0,043	0,836	1,117	0,389	3,209
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	0,184	0,988	0,035	0,852	1,202	0,173	8,331
Homeownership = homeowner	-0,964	0,421	5,252	0,022	0,381	0,167	0,869
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-0,923	0,838	1,212	0,271	0,397	0,077	2,054
Household = alone	0,175	0,478	0,135	0,714	1,191	0,467	3,037
Household = pair	0,522	0,454	1,323	0,250	1,685	0,692	4,100
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-1,591	1,092	2,121	0,145	0,204	0,024	1,733
Digital skill = 2	-0,007	0,313	0,000	0,982	0,993	0,537	1,835
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	0,302	0,381	0,630	0,427	1,353	0,641	2,855
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-1,036	0,775	1,788	0,181	0,355	0,078	1,621
Car ownership = 1	-0,071	0,429	0,028	0,868	0,931	0,402	2,158
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	0,667	0,544	1,503	0,220	1,948	0,671	5,652
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,833	0,431	3,740	0,053	0,435	0,187	1,011
Frequency walking = medium	-0,596	0,348	2,935	0,087	0,551	0,278	1,090
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,069	0,585	0,014	0,906	1,071	0,340	3,374
Frequency car = medium	-0,164	0,364	0,203	0,653	0,849	0,416	1,733
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	-0,190	0,391	0,237	0,627	0,827	0,384	1,781
Frequency bike/moped = medium	0,256	0,366	0,490	0,484	1,292	0,631	2,649
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,485	0,473	1,053	0,305	0,616	0,244	1,556
Frequency public transport = medium	0,200	0,457	0,192	0,662	1,221	0,499	2,992
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	-0,923	0,476	3,767	0,052	0,397	0,156	1,009
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 41: Parameter estimates of the ordinal logistic regression for the intention to use a Wi-Fi at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Wi-Fi = unimportant	-2,850	1,224	5,422	0,020	0,058	0,005	0,637
Wi-Fi = neutral	-1,943	1,215	2,559	0,110	0,143	0,013	1,550
Location							
Urbanisation = 1	-0,942	0,479	3,865	0,049	0,390	0,152	0,997
Urbanisation = 2	-0,444	0,457	0,945	0,331	0,641	0,262	1,570
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-2,744	1,155	5,642	0,018	0,064	0,007	0,619
Gender = male	-0,570	0,322	3,129	0,077	0,566	0,301	1,064
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-1,655	0,865	3,664	0,056	0,191	0,035	1,041
Age = 25-34	-2,362	0,723	10,682	0,001	0,094	0,023	0,388
Age = 35-44	-0,910	0,713	1,631	0,202	0,403	0,100	1,627
Age = 45-54	-1,532	0,673	5,187	0,023	0,216	0,058	0,807
Age = 55-64	-0,985	0,580	2,889	0,089	0,373	0,120	1,163
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	0,752	1,638	0,211	0,646	2,121	0,086	52,562
Birth country = abroad	0,893	0,645	1,918	0,166	2,442	0,690	8,637
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	0,878	0,850	1,067	0,302	2,406	0,455	12,718
Education = neutral	0,585	0,384	2,322	0,128	1,795	0,845	3,815
Education = high	0a	.	.	.	.	.	.
Occupation = active	-1,049	0,568	3,405	0,065	0,350	0,115	1,067
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	2,928	1,262	5,383	0,020	18,690	1,576	221,628
Homeownership = homeowner	-0,452	0,414	1,192	0,275	0,636	0,283	1,432
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-3,244	1,074	9,118	0,003	0,039	0,005	0,320
Household = alone	-0,694	0,475	2,134	0,144	0,500	0,197	1,267
Household = pair	-0,199	0,453	0,192	0,661	0,820	0,338	1,990
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	1,023	1,366	0,561	0,454	2,782	0,191	40,407
Digital skill = 2	0,432	0,325	1,765	0,184	1,540	0,815	2,912
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,241	0,395	0,372	0,542	0,786	0,363	1,704
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	0,337	0,769	0,192	0,661	1,401	0,310	6,322
Car ownership = 1	0,382	0,431	0,786	0,375	1,465	0,630	3,411
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	0,816	0,586	1,938	0,164	2,261	0,717	7,135
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	0,097	0,453	0,046	0,831	1,102	0,453	2,675
Frequency walking = medium	-0,181	0,356	0,258	0,611	0,834	0,415	1,677
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	-0,119	0,590	0,041	0,840	0,888	0,279	2,818
Frequency car = medium	-0,181	0,388	0,217	0,641	0,834	0,390	1,786
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	0,040	0,401	0,010	0,921	1,041	0,474	2,282
Frequency bike/moped = medium	0,362	0,378	0,918	0,338	1,436	0,685	3,013
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,836	0,487	2,942	0,086	0,433	0,167	1,126
Frequency public transport = medium	-0,424	0,453	0,877	0,349	0,654	0,269	1,590
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,861	0,452	3,638	0,056	2,366	0,976	5,737
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 42: Parameter estimates of the ordinal logistic regression for the intention to use a car parking at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confiden	

						ce Interval	
Threshold						Lower Bound	Upper Bound
Car parking = unimportant	-2,902	1,242	5,463	0,019	0,055	0,005	0,626
Car parking = neutral	-1,971	1,233	2,555	0,110	0,139	0,012	1,562
Location							
Urbanisation = 1	-0,725	0,472	2,360	0,124	0,484	0,192	1,221
Urbanisation = 2	-0,072	0,463	0,024	0,876	0,931	0,376	2,305
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-0,017	0,981	0,000	0,986	0,983	0,144	6,719
Gender = male	-0,135	0,320	0,177	0,674	0,874	0,466	1,637
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-2,096	0,925	5,138	0,023	0,123	0,020	0,753
Age = 25-34	-0,190	0,732	0,068	0,795	0,827	0,197	3,473
Age = 35-44	-0,471	0,733	0,413	0,520	0,624	0,148	2,627
Age = 45-54	-0,025	0,717	0,001	0,972	0,975	0,239	3,975
Age = 55-64	-1,025	0,592	2,999	0,083	0,359	0,112	1,145
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	-0,347	1,937	0,032	0,858	0,707	0,016	31,469
Birth country = abroad	-0,030	0,682	0,002	0,965	0,970	0,255	3,699
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	-1,561	0,744	4,400	0,036	0,210	0,049	0,903
Education = neutral	-0,042	0,370	0,013	0,910	0,959	0,464	1,982
Education = high	0a	.	.	.	.	.	.
Occupation = active	0,326	0,595	0,300	0,584	1,385	0,432	4,442
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	2,610	1,046	6,230	0,013	13,599	1,751	105,530
Homeownership = homeowner	-0,452	0,430	1,102	0,294	0,636	0,274	1,480
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-1,383	0,962	2,067	0,151	0,251	0,038	1,652
Household = alone	-0,131	0,499	0,069	0,793	0,877	0,330	2,333
Household = pair	1,184	0,475	6,209	0,013	3,267	1,288	8,290
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-1,484	1,048	2,005	0,157	0,227	0,029	1,768
Digital skill = 2	0,312	0,322	0,937	0,333	1,366	0,726	2,570
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,698	0,403	3,001	0,083	0,498	0,226	1,096
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-2,638	0,836	9,956	0,002	0,072	0,014	0,368
Car ownership = 1	-0,118	0,436	0,073	0,787	0,889	0,378	2,090
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	-1,065	0,592	3,241	0,072	0,345	0,108	1,099
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,339	0,442	0,588	0,443	0,712	0,299	1,696
Frequency walking = medium	0,035	0,345	0,011	0,918	1,036	0,527	2,038
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	-0,027	0,546	0,002	0,961	0,973	0,334	2,838
Frequency car = medium	0,068	0,372	0,034	0,854	1,070	0,517	2,219
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	1,440	0,427	11,354	<,001	4,221	1,826	9,757
Frequency bike/moped = medium	-0,429	0,369	1,352	0,245	0,651	0,316	1,342
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,431	0,505	0,728	0,394	0,650	0,242	1,749
Frequency public transport = medium	-0,483	0,486	0,986	0,321	0,617	0,238	1,600
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,332	0,462	0,516	0,472	1,394	0,564	3,442
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 43: Parameter estimates of the ordinal logistic regression for the intention to use an electrical vehicle charging at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	

Threshold						Lower Bound	Upper Bound
Electrical vehicle charging = unimportant	1,716	1,238	1,921	0,166	5,562	0,491	62,992
Electrical vehicle charging = neutral	2,946	1,250	5,550	0,018	19,030	1,640	220,523
Location							
Urbanisation = 1	0,290	0,474	0,375	0,540	1,336	0,528	3,380
Urbanisation = 2	0,243	0,461	0,277	0,598	1,275	0,516	3,146
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-0,735	1,214	0,367	0,545	0,480	0,044	5,181
Gender = male	0,326	0,329	0,981	0,322	1,385	0,727	2,638
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-1,060	0,990	1,145	0,285	0,346	0,050	2,413
Age = 25-34	-0,389	0,742	0,274	0,600	0,678	0,159	2,901
Age = 35-44	-0,108	0,744	0,021	0,885	0,898	0,209	3,861
Age = 45-54	0,157	0,713	0,049	0,826	1,170	0,289	4,735
Age = 55-64	0,632	0,603	1,100	0,294	1,881	0,578	6,135
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	1,485	1,683	0,779	0,377	4,415	0,163	119,462
Birth country = abroad	1,641	0,634	6,705	0,010	5,160	1,490	17,886
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	0,311	0,833	0,139	0,709	1,365	0,267	6,987
Education = neutral	0,234	0,379	0,382	0,537	1,264	0,602	2,654
Education = high	0a	.	.	.	.	.	.
Occupation = active	0,546	0,593	0,848	0,357	1,726	0,540	5,518
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	1,047	1,061	0,974	0,324	2,849	0,356	22,828
Homeownership = homeowner	-0,171	0,428	0,161	0,689	0,843	0,364	1,948
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-1,171	1,004	1,360	0,244	0,310	0,043	2,219
Household = alone	-0,270	0,494	0,299	0,584	0,763	0,290	2,010
Household = pair	0,082	0,457	0,032	0,858	1,085	0,443	2,659
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-1,839	1,378	1,781	0,182	0,159	0,011	2,368
Digital skill = 2	0,060	0,327	0,034	0,854	1,062	0,559	2,018
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,198	0,406	0,238	0,626	0,820	0,370	1,817
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-0,800	0,793	1,019	0,313	0,449	0,095	2,123
Car ownership = 1	-0,419	0,429	0,957	0,328	0,658	0,284	1,523
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	1,132	0,652	3,016	0,082	3,102	0,864	11,134
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	0,530	0,449	1,394	0,238	1,699	0,705	4,096
Frequency walking = medium	0,477	0,362	1,742	0,187	1,611	0,793	3,274
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	-0,233	0,594	0,154	0,695	0,792	0,247	2,537
Frequency car = medium	-0,183	0,381	0,231	0,630	0,833	0,395	1,758
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	-0,233	0,414	0,317	0,573	0,792	0,352	1,782
Frequency bike/moped = medium	-0,448	0,386	1,350	0,245	0,639	0,300	1,361
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	0,112	0,486	0,053	0,818	1,119	0,431	2,901
Frequency public transport = medium	0,136	0,463	0,087	0,768	1,146	0,463	2,841
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	-0,372	0,464	0,642	0,423	0,689	0,278	1,711
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 44: Parameter estimates of the ordinal logistic regression for the intention to use a secure bike parking at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Secure bike parking = unimportant	-2,913	1,273	5,240	0,022	0,054	0,004	0,658

Secure bike parking = neutral	-2,052	1,264	2,633	0,105	0,128	0,011	1,533
Location							
Urbanisation = 1	-1,270	0,531	5,729	0,017	0,281	0,099	0,795
Urbanisation = 2	-0,728	0,502	2,102	0,147	0,483	0,181	1,292
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-1,357	1,031	1,734	0,188	0,257	0,034	1,941
Gender = male	-0,205	0,330	0,387	0,534	0,815	0,427	1,554
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	0,085	0,922	0,008	0,927	1,089	0,179	6,633
Age = 25-34	0,054	0,749	0,005	0,942	1,055	0,243	4,586
Age = 35-44	0,301	0,726	0,172	0,679	1,351	0,325	5,613
Age = 45-54	1,450	0,707	4,205	0,040	4,263	1,066	17,030
Age = 55-64	0,605	0,589	1,054	0,305	1,831	0,577	5,812
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	-0,609	1,530	0,158	0,691	0,544	0,027	10,924
Birth country = abroad	0,055	0,693	0,006	0,937	1,057	0,272	4,104
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	-0,250	0,770	0,106	0,745	0,779	0,172	3,522
Education = neutral	0,008	0,382	0,000	0,983	1,008	0,477	2,132
Education = high	0a	.	.	.	.	.	.
Occupation = active	-1,089	0,582	3,500	0,061	0,337	0,108	1,053
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	1,136	1,109	1,050	0,306	3,114	0,354	27,385
Homeownership = homeowner	-1,086	0,442	6,035	0,014	0,338	0,142	0,803
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-0,049	0,927	0,003	0,958	0,952	0,155	5,859
Household = alone	-0,476	0,488	0,952	0,329	0,621	0,239	1,616
Household = pair	1,171	0,481	5,932	0,015	3,225	1,257	8,273
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,709	1,172	0,366	0,545	0,492	0,050	4,889
Digital skill = 2	0,797	0,348	5,237	0,022	2,219	1,121	4,389
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,424	0,438	0,935	0,334	0,654	0,277	1,545
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-0,481	0,829	0,337	0,561	0,618	0,122	3,136
Car ownership = 1	0,114	0,454	0,063	0,802	1,121	0,461	2,726
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	1,473	0,575	6,560	0,010	4,362	1,413	13,477
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,079	0,455	0,030	0,862	0,924	0,379	2,255
Frequency walking = medium	0,854	0,373	5,231	0,022	2,349	1,130	4,884
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,446	0,628	0,505	0,477	1,562	0,457	5,349
Frequency car = medium	0,128	0,390	0,108	0,743	1,137	0,529	2,438
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	-1,552	0,419	13,747	<,001	0,212	0,093	0,481
Frequency bike/moped = medium	-1,009	0,398	6,421	0,011	0,365	0,167	0,796
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-0,659	0,514	1,649	0,199	0,517	0,189	1,415
Frequency public transport = medium	-0,948	0,489	3,758	0,053	0,388	0,149	1,010
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	-0,520	0,504	1,064	0,302	0,595	0,222	1,595
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 45: Parameter estimates of the ordinal logistic regression for the intention to use a bike repair shop at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Bike repair shop = unimportant	-0,876	1,098	0,636	0,425	0,416	0,048	3,586
Bike repair shop = neutral	0,383	1,097	0,122	0,727	1,467	0,171	12,604
Location							
Urbanisation = 1	-0,542	0,439	1,528	0,216	0,582	0,246	1,374
Urbanisation = 2	-0,274	0,420	0,426	0,514	0,760	0,334	1,732

Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-0,375	0,882	0,181	0,670	0,687	0,122	3,869
Gender = male	-0,144	0,292	0,242	0,623	0,866	0,488	1,536
Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-0,261	0,831	0,098	0,754	0,770	0,151	3,927
Age = 25-34	0,141	0,657	0,046	0,830	1,151	0,318	4,175
Age = 35-44	0,552	0,662	0,696	0,404	1,737	0,475	6,353
Age = 45-54	-0,263	0,632	0,173	0,678	0,769	0,223	2,656
Age = 55-64	0,221	0,537	0,170	0,680	1,247	0,436	3,572
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	0,447	1,517	0,087	0,768	1,564	0,080	30,569
Birth country = abroad	-0,112	0,610	0,033	0,855	0,894	0,271	2,956
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	-0,766	0,672	1,299	0,254	0,465	0,125	1,735
Education = neutral	-0,070	0,341	0,042	0,838	0,932	0,478	1,818
Education = high	0a	.	.	.	.	.	.
Occupation = active	-0,212	0,525	0,163	0,687	0,809	0,289	2,264
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	1,106	0,965	1,312	0,252	3,022	0,456	20,025
Homeownership = homeowner	-0,677	0,382	3,148	0,076	0,508	0,241	1,074
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-0,544	0,806	0,456	0,500	0,580	0,120	2,818
Household = alone	-0,265	0,446	0,352	0,553	0,767	0,320	1,840
Household = pair	-0,069	0,425	0,026	0,871	0,933	0,406	2,147
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,597	0,964	0,383	0,536	0,550	0,083	3,640
Digital skill = 2	-0,130	0,296	0,192	0,661	0,878	0,492	1,570
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,597	0,372	2,583	0,108	0,550	0,266	1,140
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	1,198	0,708	2,865	0,091	3,313	0,828	13,263
Car ownership = 1	0,647	0,394	2,690	0,101	1,910	0,882	4,133
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	0,707	0,513	1,899	0,168	2,028	0,742	5,540
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,079	0,401	0,039	0,843	0,924	0,421	2,026
Frequency walking = medium	-0,005	0,323	0,000	0,988	0,995	0,528	1,876
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,499	0,526	0,902	0,342	1,647	0,588	4,614
Frequency car = medium	0,180	0,342	0,276	0,600	1,197	0,612	2,342
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	-0,351	0,361	0,942	0,332	0,704	0,347	1,429
Frequency bike/moped = medium	0,388	0,348	1,247	0,264	1,474	0,746	2,915
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	0,483	0,453	1,135	0,287	1,621	0,667	3,935
Frequency public transport = medium	-0,075	0,430	0,030	0,862	0,928	0,399	2,158
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,213	0,426	0,249	0,618	1,237	0,537	2,852
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 46: Parameter estimates of the ordinal logistic regression for the intention to use a component 1 (bench, kiosk, café, toilet) at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Component 1 = unimportant	-4,747	1,483	10,249	0,001	0,009	0,000	0,159
Component 1 = neutral	-2,894	1,456	3,949	0,047	0,055	0,003	0,961
Location							
Urbanisation = 1	-0,280	0,481	0,339	0,560	0,756	0,295	1,939
Urbanisation = 2	0,319	0,465	0,471	0,492	1,376	0,553	3,425
Urbanisation = 3	0a	.	.	.	.	.	.
Gender = unknown	-2,220	0,969	5,245	0,022	0,109	0,016	0,726
Gender = male	-0,991	0,348	8,106	0,004	0,371	0,188	0,734

Gender = female	0a	.	.	.	.	.	.
Age = 16-24	-0,062	0,947	0,004	0,947	0,940	0,147	6,013
Age = 25-34	-0,016	0,738	0,000	0,983	0,984	0,232	4,179
Age = 35-44	0,408	0,746	0,299	0,584	1,504	0,349	6,482
Age = 45-54	0,179	0,713	0,063	0,802	1,196	0,296	4,836
Age = 55-64	1,459	0,679	4,621	0,032	4,302	1,138	16,265
Age = 65+	0a	.	.	.	.	.	.
Birth country = unknown	19,685	0,000	.	.	3540681 61,793	3540681 61,793	3540681 61,793
Birth country = abroad	-1,193	0,779	2,346	0,126	0,303	0,066	1,395
Birth country = Netherlands	0a	.	.	.	.	.	.
Education = low	1,547	0,969	2,550	0,110	4,697	0,703	31,375
Education = neutral	0,196	0,400	0,241	0,623	1,217	0,556	2,664
Education = high	0a	.	.	.	.	.	.
Occupation = active	-2,234	0,649	11,858	<,001	0,107	0,030	0,382
Occupation = not-active	0a	.	.	.	.	.	.
Homeownership = unknown	1,461	1,107	1,739	0,187	4,310	0,492	37,751
Homeownership = homeowner	-1,055	0,453	5,422	0,020	0,348	0,143	0,846
Homeownership = tenant	0a	.	.	.	.	.	.
Household = unknown	-1,124	0,994	1,279	0,258	0,325	0,046	2,280
Household = alone	-0,470	0,501	0,883	0,347	0,625	0,234	1,667
Household = pair	-0,346	0,473	0,536	0,464	0,708	0,280	1,786
Household = multiple	0a	.	.	.	.	.	.
Digital skill = 0/1	-0,713	1,271	0,315	0,575	0,490	0,041	5,918
Digital skill = 2	0,183	0,340	0,291	0,590	1,201	0,617	2,337
Digital skill = 3	0a	.	.	.	.	.	.
Participation = no	-0,814	0,427	3,637	0,057	0,443	0,192	1,023
Participation = yes	0a	.	.	.	.	.	.
Car ownership = 0	-0,121	0,794	0,023	0,879	0,886	0,187	4,200
Car ownership = 1	0,616	0,438	1,977	0,160	1,852	0,784	4,371
Car ownership = 2+	0a	.	.	.	.	.	.
Difficulty walking = no	1,972	0,598	10,887	<,001	7,185	2,228	23,196
Difficulty walking = yes	0a	.	.	.	.	.	.
Frequency walking = low	-0,608	0,438	1,920	0,166	0,544	0,231	1,287
Frequency walking = medium	0,409	0,378	1,174	0,279	1,505	0,718	3,158
Frequency walking = high	0a	.	.	.	.	.	.
Frequency car = low	0,017	0,630	0,001	0,978	1,017	0,296	3,494
Frequency car = medium	-0,162	0,399	0,164	0,686	0,850	0,389	1,861
Frequency car = high	0a	.	.	.	.	.	.
Frequency bike/moped = low	0,759	0,436	3,028	0,082	2,136	0,908	5,028
Frequency bike/moped = medium	0,212	0,383	0,306	0,580	1,236	0,583	2,620
Frequency bike/moped = high	0a	.	.	.	.	.	.
Frequency public transport = low	-1,327	0,521	6,495	0,011	0,265	0,096	0,736
Frequency public transport = medium	-0,627	0,496	1,599	0,206	0,534	0,202	1,412
Frequency public transport = high	0a	.	.	.	.	.	.
Shared-mobility usage = never	0,632	0,467	1,825	0,177	1,881	0,752	4,702
Shared-mobility usage = yes	0a	.	.	.	.	.	.

Table 47: Parameter estimates of the ordinal logistic regression for the intention to use a component 2 (secure bike parking, bike repair shop) at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	95% Confidence Interval	
Threshold						Lower Bound	Upper Bound
Component 2 = unimportant	-3,360	1,370	6,017	0,014	0,035	0,002	0,509
Component 2 = neutral	-1,770	1,357	1,701	0,192	0,170	0,012	2,435
Location	-1,119	0,491	5,200	0,023	0,327	0,125	0,855
Urbanisation = 1	-0,752	0,466	2,599	0,107	0,471	0,189	1,176
Urbanisation = 2	0a	.	.	.	.	.	.
Urbanisation = 3	-0,905	0,911	0,986	0,321	0,405	0,068	2,413
Gender = unknown	-0,249	0,312	0,638	0,424	0,780	0,423	1,436
Gender = male	0a	.	.	.	.	.	.
Gender = female	-0,470	0,864	0,295	0,587	0,625	0,115	3,401
Age = 16-24	0,144	0,701	0,042	0,837	1,155	0,293	4,559

Age = 25-34	0,502	0,682	0,540	0,462	1,652	0,433	6,290
Age = 35-44	1,092	0,669	2,663	0,103	2,980	0,803	11,056
Age = 45-54	0,775	0,563	1,892	0,169	2,171	0,720	6,547
Age = 55-64	0a	.	.	.	.	.	.
Age = 65+	0,481	1,631	0,087	0,768	1,618	0,066	39,528
Birth country = unknown	0,150	0,649	0,053	0,818	1,162	0,326	4,141
Birth country = abroad	0a	.	.	.	.	.	.
Birth country = Netherlands	-0,443	0,722	0,376	0,540	0,642	0,156	2,646
Education = low	-0,093	0,362	0,066	0,797	0,911	0,448	1,853
Education = neutral	0a	.	.	.	.	.	.
Education = high	-1,147	0,557	4,231	0,040	0,318	0,107	0,947
Occupation = active	0a	.	.	.	.	.	.
Occupation = not-active	2,379	1,176	4,091	0,043	10,794	1,077	108,202
Homeownership = unknown	-1,161	0,421	7,600	0,006	0,313	0,137	0,715
Homeownership = homeowner	0a	.	.	.	.	.	.
Homeownership = tenant	-0,703	0,892	0,620	0,431	0,495	0,086	2,846
Household = unknown	-0,514	0,468	1,205	0,272	0,598	0,239	1,498
Household = alone	0,677	0,450	2,257	0,133	1,968	0,814	4,754
Household = pair	0a	.	.	.	.	.	.
Household = multiple	-1,625	1,139	2,036	0,154	0,197	0,021	1,835
Digital skill = 0/1	0,458	0,322	2,021	0,155	1,581	0,841	2,974
Digital skill = 2	0a	.	.	.	.	.	.
Digital skill = 3	-0,835	0,422	3,919	0,048	0,434	0,190	0,992
Participation = no	0a	.	.	.	.	.	.
Participation = yes	0,029	0,780	0,001	0,970	1,029	0,223	4,754
Car ownership = 0	0,293	0,420	0,486	0,486	1,340	0,588	3,056
Car ownership = 1	0a	.	.	.	.	.	.
Car ownership = 2+	1,505	0,543	7,691	0,006	4,504	1,554	13,040
Difficulty walking = no	0a	.	.	.	.	.	.
Difficulty walking = yes	-0,370	0,427	0,750	0,386	0,691	0,299	1,595
Frequency walking = low	0,413	0,349	1,406	0,236	1,511	0,763	2,995
Frequency walking = medium	0a	.	.	.	.	.	.
Frequency walking = high	0,469	0,583	0,647	0,421	1,598	0,510	5,008
Frequency car = low	0,128	0,363	0,124	0,725	1,137	0,558	2,314
Frequency car = medium	0a	.	.	.	.	.	.
Frequency car = high	-0,890	0,384	5,372	0,020	0,411	0,193	0,872
Frequency bike/moped = low	-0,335	0,371	0,816	0,366	0,715	0,345	1,481
Frequency bike/moped = medium	0a	.	.	.	.	.	.
Frequency bike/moped = high	-0,453	0,483	0,880	0,348	0,636	0,247	1,639
Frequency public transport = low	-0,700	0,463	2,289	0,130	0,497	0,201	1,230
Frequency public transport = medium	0a	.	.	.	.	.	.
Frequency public transport = high	-0,276	0,472	0,341	0,559	0,759	0,301	1,916
Shared-mobility usage = never	0a	.	.	.	.	.	.
Shared-mobility usage = yes	-3,360	1,370	6,017	0,014	0,035	0,002	0,509

I. BLR combination

This appendix contains all the results for the Binary Logistic regression analysis of the combined dataset.

Table 48: Model summary of the binary logistic regression for the importance of services at the mobility hub.

Model Summary		Hosmer and Lemeshow Test	
-2 Log likelihood	1225,175a	Chi-square	4,061
Cox & Snell R Square	0,114	df	8
Nagelkerke R Square	0,154	Sig.	0,852

Table 49: Parameter estimates of the binary logistic regression for the importance of services at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	Lower Bound	Upper Bound
Constant	-1,124	0,875	1,65	0,199	0,325		
Urbanisation = 1	-0,039	0,271	0,021	0,886	0,962	0,566	1,636
Urbanisation = 2	0,261	0,294	0,786	0,375	1,298	0,729	2,31
Urbanisation = 3	0a						
Gender = male	0a						
Gender = female	0,216	0,142	2,334	0,127	1,242	0,941	1,639
Age = 16-24	0,727	0,37	3,867	0,049	2,07	1,002	4,274
Age = 25-34	0,865	0,307	7,963	0,005	2,376	1,302	4,333
Age = 35-44	0,38	0,306	1,543	0,214	1,462	0,803	2,664
Age = 45-54	0,149	0,301	0,246	0,62	1,161	0,644	2,092
Age = 55-64	0,238	0,293	0,659	0,417	1,269	0,714	2,256
Age = 65+	0a						
Birth country = Netherlands	0a						
Birth country = abroad	0,391	0,216	3,283	0,07	1,478	0,969	2,256
Education = low	-0,271	0,206	1,722	0,189	0,763	0,509	1,143
Education = neutral	0,162	0,178	0,834	0,361	1,176	0,83	1,667
Education = high	0a						
Occupation = active	0,128	0,247	0,268	0,605	1,137	0,7	1,846
Occupation = not-active	0a						
Household = alone	0,044	0,2	0,049	0,825	1,045	0,707	1,546
Household = pair	-0,009	0,19	0,002	0,964	0,992	0,683	1,439
Household = multiple	0a						
Digital skill = 0/1	-1,36	0,273	24,796	<,001	0,257	0,15	0,438
Digital skill = 2	-0,298	0,169	3,118	0,077	0,742	0,534	1,033
Digital skill = 3	0a						
Car ownership = 0	-0,341	0,329	1,077	0,299	0,711	0,373	1,354
Car ownership = 1	-0,182	0,216	0,712	0,399	0,834	0,546	1,272
Car ownership = 2+	0a						
Difficulty walking = no	-0,3	0,231	1,688	0,194	0,741	0,471	1,165
Difficulty walking = yes	0a						
Frequency walking = low	-0,208	0,198	1,11	0,292	0,812	0,551	1,196
Frequency walking = medium	0,003	0,16	0	0,986	1,003	0,732	1,373
Frequency walking = high	0a						
Car usage = low	0,293	0,256	1,31	0,252	1,341	0,811	2,215
Car usage = medium	-0,105	0,186	0,321	0,571	0,9	0,625	1,295
Car usage = high	0a						
Frequency bike = low	0,064	0,18	0,127	0,722	1,066	0,75	1,516
Frequency bike = medium	0,129	0,185	0,488	0,485	1,138	0,792	1,636
Frequency bike = high	0a						
Frequency moped = low	0,908	0,643	1,994	0,158	2,48	0,703	8,752
Frequency moped = medium	0,499	0,742	0,453	0,501	1,648	0,385	7,059
Frequency moped = high	0a						
Frequency bus/tram/metro = low	-0,118	0,228	0,27	0,603	0,888	0,569	1,388
Frequency bus/tram/metro = medium	0,105	0,251	0,173	0,677	1,11	0,679	1,816
Frequency bus/tram/metro = high	0a						
Frequency train = low	0,323	0,299	1,164	0,281	1,381	0,768	2,483
Frequency train = medium	0,09	0,323	0,078	0,78	1,095	0,581	2,062
Frequency train = high	0a						

Frequency shared bike/e-bike = low	-0,374	0,343	1,188	0,276	0,688	0,351	1,348
Frequency shared bike/e-bike = medium	-0,337	0,381	0,785	0,376	0,714	0,338	1,505
Frequency shared bike/e-bike = high	0a						
Frequency shared moped/motorcycle = low	0,024	0,245	0,01	0,92	1,025	0,635	1,655
Frequency shared moped/motorcycle = medium	0,228	0,329	0,48	0,488	1,256	0,659	2,393
Frequency shared moped/motorcycle = high	0a						
Frequency shared car = low	-0,012	0,318	0,001	0,97	0,988	0,53	1,842
Frequency shared car = medium	0,419	0,388	1,171	0,279	1,521	0,712	3,251
Frequency shared car = high	0a						

Table 50: Model summary of the binary logistic regression for the importance of design at the mobility hub.

Model Summary		Hosmer and Lemeshow Test	
-2 Log likelihood	1089,106a	Chi-square	17,032
Cox & Snell R Square	0,107	df	8
Nagelkerke R Square	0,153	Sig.	0,03

Table 51: Parameter estimates of the binary logistic regression for the importance of design at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	Lower Bound	Upper Bound
Constant	-0,155	0,897	0,03	0,863	0,856		
Urbanisation = 1	-0,138	0,294	0,22	0,639	0,871	0,489	1,551
Urbanisation = 2	-0,141	0,322	0,19	0,663	0,869	0,462	1,634
Urbanisation = 3	0a						
Gender = male	0a						
Gender = female	0,357	0,154	5,389	0,02	1,429	1,057	1,932
Age = 16-24	0,026	0,403	0,004	0,948	1,027	0,466	2,263
Age = 25-34	0,187	0,338	0,306	0,58	1,205	0,622	2,336
Age = 35-44	0,504	0,333	2,284	0,131	1,655	0,861	3,18
Age = 45-54	0,156	0,334	0,217	0,641	1,168	0,607	2,248
Age = 55-64	0,326	0,321	1,032	0,31	1,386	0,738	2,599
Age = 65+	0a						
Birth country = Netherlands	0a						
Birth country = abroad	0,262	0,227	1,335	0,248	1,3	0,833	2,029
Education = low	-0,322	0,231	1,941	0,164	0,725	0,461	1,14
Education = neutral	0,012	0,193	0,004	0,95	1,012	0,693	1,478
Education = high	0a						
Occupation = active	-0,029	0,273	0,011	0,917	0,972	0,569	1,661
Occupation = not-active	0a						
Household = alone	0,209	0,219	0,907	0,341	1,232	0,802	1,893
Household = pair	0,466	0,208	5,041	0,025	1,594	1,061	2,395
Household = multiple	0a						
Digital skill = 0/1	-1,113	0,297	14,066	<,001	0,329	0,184	0,588
Digital skill = 2	-0,622	0,184	11,486	<,001	0,537	0,375	0,769
Digital skill = 3	0a						
Car ownership = 0	0,177	0,352	0,252	0,615	1,194	0,598	2,381
Car ownership = 1	0,113	0,239	0,223	0,637	1,12	0,701	1,789
Car ownership = 2+	0a						
Difficulty walking = no	-0,257	0,253	1,031	0,31	0,773	0,47	1,271
Difficulty walking = yes	0a						
Frequency walking = low	-0,132	0,219	0,366	0,545	0,876	0,571	1,345
Frequency walking = medium	-0,11	0,172	0,407	0,524	0,896	0,639	1,256
Frequency walking = high	0a						
Car usage = low	0,02	0,272	0,006	0,941	1,02	0,598	1,74
Car usage = medium	-0,29	0,205	1,998	0,158	0,748	0,501	1,119
Car usage = high	0a						
Frequency bike = low	-0,17	0,195	0,756	0,385	0,844	0,575	1,238
Frequency bike = medium	0,282	0,196	2,082	0,149	1,326	0,904	1,946
Frequency bike = high	0a						
Frequency moped = low	0,175	0,631	0,077	0,781	1,191	0,346	4,101
Frequency moped = medium	-0,539	0,774	0,485	0,486	0,583	0,128	2,659
Frequency moped = high	0a						
Frequency bus/tram/metro = low	-0,269	0,241	1,248	0,264	0,764	0,477	1,225
Frequency bus/tram/metro = medium	-0,024	0,262	0,009	0,926	0,976	0,583	1,632
Frequency bus/tram/metro = high	0a						

Frequency train = low	0,085	0,31	0,076	0,783	1,089	0,593	1,999
Frequency train = medium	0,466	0,333	1,954	0,162	1,593	0,829	3,062
Frequency train = high	0a						
Frequency shared bike/e-bike = low	-0,123	0,344	0,128	0,72	0,884	0,451	1,734
Frequency shared bike/e-bike = medium	0,28	0,38	0,544	0,461	1,323	0,628	2,787
Frequency shared bike/e-bike = high	0a						
Frequency shared moped/motorcycle = low	-0,293	0,251	1,362	0,243	0,746	0,456	1,22
Frequency shared moped/motorcycle = medium	-0,2	0,341	0,343	0,558	0,819	0,42	1,598
Frequency shared moped/motorcycle = high	0a						
Frequency shared car = low	-0,394	0,323	1,488	0,223	0,675	0,358	1,27
Frequency shared car = medium	-0,3	0,39	0,594	0,441	0,741	0,345	1,589
Frequency shared car = high	0a						
Constant	-0,155	0,897	0,03	0,863	0,856		
Urbanisation = 1	-0,138	0,294	0,22	0,639	0,871	0,489	1,551
Urbanisation = 2	-0,141	0,322	0,19	0,663	0,869	0,462	1,634
Urbanisation = 3	0a						
Gender = male	0a						

Table 52: Model summary of the binary logistic regression for the importance of information at the mobility hub.

Model Summary		Hosmer and Lemeshow Test	
-2 Log likelihood	1272,097a	Chi-square	6,479
Cox & Snell R Square	0,096	df	8
Nagelkerke R Square	0,129	Sig.	0,594

Table 53: Parameter estimates of the binary logistic regression for the importance of information at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	Lower Bound	Upper Bound
Constant	-0,799	0,816	0,959	0,327	0,45		
Urbanisation = 1	-0,018	0,263	0,005	0,944	0,982	0,586	1,645
Urbanisation = 2	-0,203	0,288	0,497	0,481	0,816	0,464	1,436
Urbanisation = 3	0a						
Gender = male	0a						
Gender = female	0,062	0,138	0,201	0,654	1,064	0,812	1,395
Age = 16-24	0,402	0,364	1,218	0,27	1,495	0,732	3,052
Age = 25-34	0,334	0,299	1,25	0,263	1,397	0,777	2,511
Age = 35-44	0,514	0,298	2,97	0,085	1,672	0,932	3,001
Age = 45-54	0,472	0,29	2,657	0,103	1,604	0,909	2,83
Age = 55-64	0,412	0,282	2,131	0,144	1,509	0,868	2,623
Age = 65+	0a						
Birth country = Netherlands	0a						
Birth country = abroad	0,263	0,214	1,519	0,218	1,301	0,856	1,979
Education = low	-0,261	0,198	1,733	0,188	0,77	0,522	1,136
Education = neutral	0,098	0,174	0,318	0,573	1,103	0,784	1,551
Education = high	0a						
Occupation = active	0,149	0,24	0,386	0,535	1,161	0,725	1,86
Occupation = not-active	0a						
Household = alone	0,217	0,197	1,208	0,272	1,242	0,844	1,828
Household = pair	0,073	0,186	0,153	0,696	1,075	0,747	1,549
Household = multiple	0a						
Digital skill = 0/1	-1,133	0,25	20,598	<,001	0,322	0,197	0,525
Digital skill = 2	-0,264	0,167	2,485	0,115	0,768	0,554	1,066
Digital skill = 3	0a						
Car ownership = 0	-0,517	0,327	2,502	0,114	0,596	0,314	1,132
Car ownership = 1	-0,113	0,211	0,286	0,593	0,893	0,591	1,35
Car ownership = 2+	0a						
Difficulty walking = no	-0,256	0,221	1,336	0,248	0,774	0,502	1,195
Difficulty walking = yes	0a						
Frequency walking = low	0,053	0,191	0,078	0,78	1,055	0,725	1,535
Frequency walking = medium	-0,199	0,157	1,59	0,207	0,82	0,602	1,116
Frequency walking = high	0a						
Car usage = low	0,717	0,255	7,925	0,005	2,049	1,243	3,376
Car usage = medium	0,034	0,181	0,035	0,852	1,034	0,725	1,475

Car usage = high	0a						
Frequency bike = low	-0,108	0,175	0,383	0,536	0,897	0,637	1,265
Frequency bike = medium	0,31	0,182	2,91	0,088	1,364	0,955	1,949
Frequency bike = high	0a						
Frequency moped = low	0,334	0,559	0,358	0,55	1,397	0,467	4,176
Frequency moped = medium	0,508	0,664	0,585	0,444	1,661	0,452	6,103
Frequency moped = high	0a						
Frequency bus/tram/metro = low	-0,197	0,224	0,77	0,38	0,821	0,529	1,275
Frequency bus/tram/metro = medium	0,206	0,248	0,687	0,407	1,229	0,755	1,999
Frequency bus/tram/metro = high	0a						
Frequency train = low	0,403	0,295	1,866	0,172	1,496	0,839	2,666
Frequency train = medium	0,43	0,322	1,786	0,181	1,538	0,818	2,89
Frequency train = high	0a						
Frequency shared bike/e-bike = low	0,125	0,341	0,135	0,713	1,134	0,581	2,213
Frequency shared bike/e-bike = medium	0,15	0,379	0,156	0,693	1,161	0,552	2,442
Frequency shared bike/e-bike = high	0a						
Frequency shared moped/motorcycle = low	0,027	0,244	0,012	0,911	1,028	0,636	1,659
Frequency shared moped/motorcycle = medium	0,373	0,331	1,273	0,259	1,452	0,76	2,777
Frequency shared moped/motorcycle = high	0a						
Frequency shared car = low	-0,191	0,312	0,373	0,541	0,826	0,448	1,524
Frequency shared car = medium	0,353	0,39	0,822	0,364	1,424	0,663	3,057
Frequency shared car = high	0a						
Constant	-0,799	0,816	0,959	0,327	0,45		
Urbanisation = 1	-0,018	0,263	0,005	0,944	0,982	0,586	1,645
Urbanisation = 2	-0,203	0,288	0,497	0,481	0,816	0,464	1,436
Urbanisation = 3	0a						
Gender = male	0a						

Table 54: Model summary of the binary logistic regression for the likeliness to use shared mobility at the mobility hub.

Model Summary		Hosmer and Lemeshow Test	
-2 Log likelihood	812,042a	Chi-square	11,219
Cox & Snell R Square	0,405	df	8
Nagelkerke R Square	0,549	Sig.	0,19

Table 55: Parameter estimates of the binary logistic regression for the likeliness to use shared mobility at the mobility hub.

	Estimate	Std. Error	Wald	Sig.	exp(B)	Lower Bound	Upper Bound
Constant	5,849	1,229	22,634	<,001	346,8		
Urbanisation = 1	-0,716	0,319	5,023	0,025	0,489	0,261	0,914
Urbanisation = 2	-0,626	0,351	3,179	0,075	0,535	0,269	1,064
Urbanisation = 3	0a						
Gender = male	0a						
Gender = female	-0,11	0,183	0,361	0,548	0,896	0,625	1,283
Age = 16-24	1,085	0,471	5,311	0,021	2,959	1,176	7,444
Age = 25-34	1,103	0,393	7,857	0,005	3,012	1,393	6,511
Age = 35-44	0,65	0,384	2,861	0,091	1,915	0,902	4,067
Age = 45-54	0,288	0,384	0,564	0,453	1,334	0,629	2,833
Age = 55-64	0,521	0,367	2,018	0,155	1,683	0,821	3,452
Age = 65+	0a						
Birth country = Netherlands	0a						
Birth country = abroad	0,353	0,274	1,662	0,197	1,423	0,832	2,433
Education = low	-0,776	0,273	8,059	0,005	0,46	0,269	0,786
Education = neutral	-0,393	0,227	3,005	0,083	0,675	0,433	1,053
Education = high	0a						
Occupation = active	0,006	0,314	0	0,985	1,006	0,543	1,863
Occupation = not-active	0a						
Household = alone	0,07	0,252	0,077	0,781	1,072	0,655	1,757
Household = pair	-0,039	0,25	0,024	0,876	0,962	0,589	1,569
Household = multiple	0a						
Digital skill = 0/1	-1,109	0,33	11,307	<,001	0,33	0,173	0,63
Digital skill = 2	-0,621	0,199	9,762	0,002	0,537	0,364	0,793
Digital skill = 3	0a						
Car ownership = 0	0,904	0,432	4,385	0,036	2,471	1,06	5,761
Car ownership = 1	0,613	0,291	4,443	0,035	1,846	1,044	3,266

Car ownership = 2+	0a						
Difficulty walking = no	-0,895	0,287	9,693	0,002	0,409	0,233	0,718
Difficulty walking = yes	0a						
Frequency walking = low	-0,125	0,259	0,234	0,629	0,882	0,531	1,467
Frequency walking = medium	0,259	0,208	1,551	0,213	1,295	0,862	1,946
Frequency walking = high	0a						
Car usage = low	-0,183	0,334	0,299	0,584	0,833	0,433	1,602
Car usage = medium	0,039	0,243	0,026	0,872	1,04	0,646	1,674
Car usage = high	0a						
Frequency bike = low	-0,558	0,232	5,771	0,016	0,573	0,363	0,902
Frequency bike = medium	-0,142	0,237	0,36	0,548	0,868	0,546	1,379
Frequency bike = high	0a						
Frequency moped = low	-1,176	0,739	2,53	0,112	0,309	0,072	1,314
Frequency moped = medium	-1,567	0,896	3,057	0,08	0,209	0,036	1,209
Frequency moped = high	0a						
Frequency bus/tram/metro = low	-0,038	0,295	0,016	0,898	0,963	0,54	1,718
Frequency bus/tram/metro = medium	0,233	0,329	0,503	0,478	1,263	0,663	2,405
Frequency bus/tram/metro = high	0a						
Frequency train = low	-0,615	0,385	2,557	0,11	0,54	0,254	1,149
Frequency train = medium	0,175	0,42	0,174	0,676	1,192	0,523	2,715
Frequency train = high	0a						
Frequency shared bike/e-bike = low	-0,865	0,538	2,581	0,108	0,421	0,147	1,209
Frequency shared bike/e-bike = medium	-0,16	0,598	0,071	0,79	0,853	0,264	2,752
Frequency shared bike/e-bike = high	0a						
Frequency shared moped/motorcycle = low	-3,346	0,473	49,97	<,001	0,035	0,014	0,089
Frequency shared moped/motorcycle = medium	-2,263	0,543	17,393	<,001	0,104	0,036	0,301
Frequency shared moped/motorcycle = high	0a						
Frequency shared car = low	0,004	0,487	0	0,994	1,004	0,386	2,608
Frequency shared car = medium	1,721	0,617	7,785	0,005	5,59	1,669	18,725
Frequency shared car = high	0a						
Constant	5,849	1,229	22,634	<,001	346,8		
Urbanisation = 1	-0,716	0,319	5,023	0,025	0,489	0,261	0,914
Urbanisation = 2	-0,626	0,351	3,179	0,075	0,535	0,269	1,064
Urbanisation = 3	0a						
Gender = male	0a						