Annex 1

Transport Policy 133 (2023) 75–85

Contents lists available at ScienceDirect

Transport Policy

journal homepage: www.elsevier.com/locate/tranpol

MaaS in a regional and rural setting: Recent experience

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ARTICLE INFO

Keywords:
Mobility as a service
MaaS
Rural
Regional
Literature review

ABSTRACT

The paper has the aim of providing an evidence base for framing Mobility as a Service (MaaS) - or MaaS-like - solutions (i.e. technology-led) in rural or remote areas. This is explored particularly within the context of the policy of reducing transport disadvantage. We begin with a definition of MaaS – what it is and what it is not. This is followed by discussion of the array of existing mobility solutions typically found in rural areas which may be incorporated within MaaS. The main body of the paper focusses on the experience to date with MaaS in a regional and rural setting with consideration of recent evidence in an international context. We consider the elements of rural MaaS, and a variety of MaaS schemes, their status and levels of integration. A key discussion point is the finding that most previous and extant "Rural MaaS" schemes do not go beyond "MaaS level 2", suggesting the need for a renewed focus on understanding the barriers to the implementation and growth of MaaS in a regional and rural setting. Findings show that MaaS in a rural context is dominated by a preponderance of short-lived pilots with only a small user base, even in Finland and Sweden which can be described as the trailblazer locations. There are examples of niche schemes such as tourist focussed and there is evidence that car-based services are becoming more prevalent. Ultimately, prospects for scalability appear limited in current Rural MaaS activities since this will depend on how well MaaS segments the market.

1. Introduction

Mobility as a Service (MaaS), as an approach to holistic and technology-led integration of mobility options is typically associated with urban and sometimes suburban mobility. In contrast, this paper provides an analysis of the rural mobility context with the aim of providing an evidence base for framing a MaaS - or MaaS-like - solution in rural or remote areas where the policy aim is to reduce transport disadvantage. Transport disadvantage is a complex and multidimensional construct, but a short definition is where quality of life is restricted through lack of transport opportunities as a result of inadequate transport supply, financial or social constraints.

This paper provides an up-to-date perspective on what are the key *elements* of MaaS in the context of regional towns and rural hinterlands through a review of evidence. The barriers to design and implementation are identified from as many perspectives as possible, informed by the institutional framework of the location of the scheme under consideration although some barriers are more easily identified than others. Evidence has been sought from a desktop review together with personal experience and field observations where possible. In many cases, however, more detailed analysis is hampered by lack of evaluation. Consequently, some of the findings should be viewed as exploratory. Nevertheless, the main body of the paper aims to examine recent "on the ground experience" with MaaS and MaaS-like schemes in a rural context. Key exemplars are identified from Finland, the Netherlands, Sweden, the USA, and Japan. It is apparent that much of what is currently promoted as MaaS could be best described as a journey planner or a scheme with MaaS-like qualities rather than MaaS *per se*.

1.1. Towards a definition of MaaS

To be interested in MaaS means to have a focus on mobility. MaaS is predicated on providing mobility through the provision of service rather than mobility that is consequential on ownership of a mobility providing investment, such as a car. It must be recognised that MaaS faces an uncertain future (see for example the discussion in Hensher et al., 2021), specifically as the pandemic created such a substantial impact on public transport which by most commentators is seen as the 'backbone' of a

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https://doi.org/10.1016/j.tranpol.2023.01.014
Received 2 June 2022; Received in revised form 17 January 2023; Accepted 22 January 2023
Available online 23 January 2023

MaaS scheme. Surprisingly though, the pandemic has not led to a decline in the interest in MaaS despite the many forms of collective and shared transport suffering a considerable decline. Following the Gartner hype cycle (Dedehayir and Steinert, 2016), MaaS was probably at the 'peak of inflated expectations' a couple of years ago and now is somewhere in the 'trough of disillusionment'. Part of this uncertainty is because much commentary on MaaS suffers from the lack of agreed definition and often weak linkages to sustainability goals (Hensher et al., 2021).

Hensher et al. (2020) note that the goal of an agreed definition of MaaS remains elusive. The possible definitions of MaaS are abundant: the (then) available definitions are reviewed in Hensher et al. (2020) along with two of the more widely promoted MaaS topologies which provide a pathway of different levels of integration to a full MaaS offering. The principal confusion appears to surround what constitutes a MaaS offering and this paper begins by setting out a clarifying definition of what is (and is not) MaaS from Hensher et al. (2021):

"MaaS is a framework for delivering a portfolio of multi-modal mobility services that places the user at the centre of the offer. MaaS frameworks are ideally designed to achieve sustainable policy goals and objectives. MaaS is an integrated transport service brokered by an integrator through a digital platform. A digital platform provides information, booking, ticketing, payment (as PAYG and/or subscription plans), and feedback that improves the travel experience. The MaaS framework can operate at any spatial scale (i.e., urban or regional or global) and cover any combination of multi-modal and non-transport-related multi-service offerings, including the private car and parking, whether subsidised or not by the public sector. ***MaaS is not simply a digital version of a travel planner, nor a flexible transport service (such as Mobility on Demand), nor a single shared transport offering (such as car sharing).*** *"* (Hensher et al., 2021; emphasis added).

The pathway to a full MaaS offering is characterised by the two typologies of Sochor et al. (2018) and Lyons et al. (2019). Sochor et al. (2018) develop four levels of integration: (1) *integrated information*, such as is available via a multimodal journey planner; (2) *integrated booking and payment* using a smart card or a credit card; (3) *organisational integration* where the user is presented with different modal options in a seamless fashion, irrespective of the ownership and bundling or subscription to a suite and quantity of mobility services for a time-related fee; and (4) *integration of societal goals*. Lyons et al. (2019) describe MaaS as an 'evolutionary continuum in terms of integration' (Lyons et al., 2019, p.23) and so, similarly to Sochor, see integration as a central focus in the developmental stages of MaaS. Each of the schemes explored in this paper are categorised according to the different levels of MaaS integration proposed by Sochor et al. (2018) which we consider to be more reflective of the emerging trajectory of MaaS, as shown in Fig. 1.

Much of the discussion of MaaS and its definitions have been promoted and realigned in an urban context. One of the open questions is how much, if any, adjustments need to be made for a definition that is relevant in a regional and rural context which is addressed in this paper.

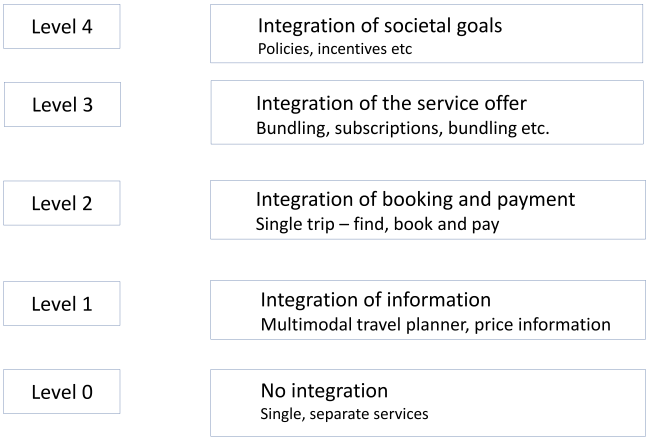

Fig. 1. The different levels of integration as identified in Sochor et al. (2018).

The paper is organised as follows. We begin with a discussion of the rural transport context and the wide array of rural shared mobility services that have been proposed and tested in a variety of contexts. The main body of the paper focusses on the experience to date with MaaS in a regional and rural setting with consideration of recent evidence in an international context. The final section considers the implications from this review for the prospects for realising MaaS in a regional and rural setting.

2. The rural transport context and implications for smart mobility

2.1. What do we mean by "rural"?

Mounce et al. (2020) discussing the classification of rurality note that classifying rurality must recognize an urban to rural continuum. Fadic et al. (2019), on behalf of the OECD, define "remote regions" as those regions where more than 50% of the population are located beyond a 60-min drive from urban areas of at least 50,000 people. They define "non-metropolitan regions" as regions where more than 50% of the population are located within a 60-min drive of urban areas of between 50,000 and 250,000 people.

Nelson and Caulfield (2022) observe that the Australian Rural, Remote and Metropolitan Area's (RRMA's) 'Index of remoteness' AIHW (2004) is considered comprehensive since it is based on distance to service centres as well as a measure of 'distance from other people'. Mounce et al. (2020) suggest that the definition of rurality should depend on both the level of transport accessibility and measures of population size and distribution. Further considerations to take into account include the cost of travel options, access to publicly available modes of travel, rates of car ownership, or the safety of travel options.

2.2. The rural transport challenge

The challenges of providing rural transport services have been well documented. One way to understand these challenges is to maintain a good understanding of the stakeholders involved, their roles and their perceptions. These have been variously categorised but should include transport operators and those involved in the co-ordination of transport services (such as residential care centres/facilities), policy makers, organisations involved in providing finance and support for capacity building (such as industry associations) and the users of transport services.

Eckhardt et al. (2018) formulated what they termed "measures of rural mobility" which they considered necessary to maintain the vitality of rural areas. As an example, collaboration and combination are essential if effective use is to be made of the available transport resource, particularly publicly subsidised services, especially in a health and social care context. It has been demonstrated that scope exists for releasing otherwise unused capacity where it may be possible to relax eligibility criteria for certain transport services (Mounce et al., 2018). The idea of offering transport services for all on a one-stop-shop principle has been widely discussed (e.g., Nelson et al., 2010).

2.3. The array of rural mobility solutions

Fig. 2 summarises the array of rural shared mobility services that have been proposed and tested in a variety of contexts. All have been variously documented. Over the last two decades, for example, there have been many implementations of Demand Responsive Transport (DRT) services in rural areas (see for example Nelson and Wright, 2021). SMARTA (2020) suggest that DRT could be a compelling model for rural shared mobility where it is designed in response to local needs and effectively co-ordinated with local and inter-urban fixed route public transport. Other forms of rural shared mobility either allow users to

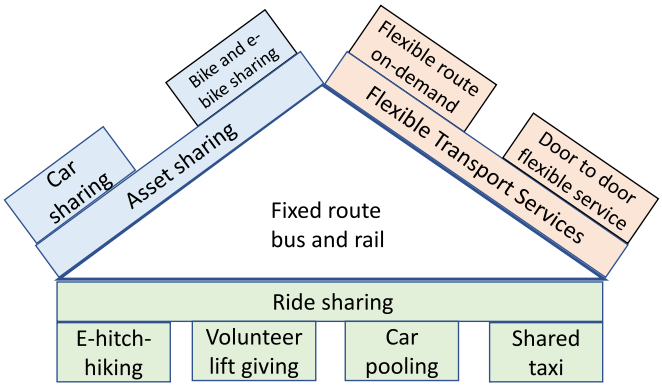

Fig. 2. The array of rural shared mobility services (adapted from SMARTA, 2020)[11].

share rides (e.g., shared taxis or car-pooling); or to share assets (e.g., cars, bicycles, scooters, etc.).

The European Commission-funded INCLUSION[2] project investigated 51 case studies of innovative mobility services that were identified as having potential to reduce the risk of exclusion from transport for a broad range of vulnerable user groups (INCLUSION, 2019). These range from providing loans for rental mopeds, small motorcycles, bicycles, subsidised bus travel to job seekers with an offer of employment but no means of transport (*Wheels2Work*, UK); schemes using volunteer drivers of minibuses operating on a fixed route in rural and semi-rural areas of North Rhine Westphalia in Germany (*Bürgerbuses*); a scheme in the USA which builds community-based transportation solutions for older persons to connect them with vehicles and drivers so that they can access essential services such as healthcare (*Independent Transportation Network)*; and very simple schemes such as *Die Mitfahrerbank* (The Passenger Bench) in Speicher, Germany where turquoise benches are placed on roadsides in rural areas with signs that waiting travellers can use them to indicate which direction they want to travel to one of the eight surrounding local communities or to the central town.

However, to date, many of the rural areas do not use technology in their provision, or where it is employed, it is relatively low-tech. On the other hand, Mounce et al. (2020) argue that some digital infrastructure is required to achieve the necessary integration between rural shared mobility services, e.g., to achieve timed connections, and this may not be available.

Hensher et al. (2021), discuss factors which may influence the future uptake of MaaS (and other applications of smart mobility) and highlight the question of digital literacy. Older persons, who tend to dominate rural areas, are often less comfortable with digital technologies. If technology-led rural mobility solutions (including MaaS) are to become a major theme of government strategic planning, then equity issues must be considered. Similarly, Velaga et al. (2012) discuss the digital divide in rural contexts, explaining that notions of 'digital divide' are characterised by varying levels of access to digital infrastructure, technologies, knowledge as well as the skills required to use digital systems. They observed that gender, age, income, race and location are important factors in identifying 'haves' and 'have nots' in the digital sphere.

3. MaaS in a regional and rural setting: recent evidence

The focus of this paper now turns to the experience to date with MaaS in a regional and rural setting with an analysis of recent evidence in an international context. We consider the elements of rural MaaS, and the status and levels of integration achieved by a variety of MaaS schemes. Country-specific examples are discussed from Finland, The Netherlands, Sweden, The USA, and Japan.

It is important to recognize that when referring to 'regional' and 'rural' this could point to quite different densities and other local conditions. In particular, mainland Europe 'rural' schemes are likely to be operating in higher densities with a more extensive public transport network than would be the case in say, North America or Australia. Moreover, the institutional framework varies between countries (as identified above), as do their underlying motivations for providing public transport. In particular, MaaS schemes tend to require significant funding which in the US would come from federal funding with schemes needing to demonstrate social equity objectives. This aspiration may not be clear from schemes operating in mainland Europe, especially in the Nordic countries, where the statutory guarantee of social transport makes it unnecessary to reiterate social equity and social provision in their MaaS scheme objectives.

3.1. The elements of "rural MaaS"

Several commentators have proposed definitions of "rural MaaS" (e.g., Eckhardt et al., 2020; Schweiger, 2020). Perhaps the most prescient comment is made by Schweiger who notes that "rural MaaS will look different than it does in urban or even suburban areas" (p6). Schweiger suggests that the objective of rural MaaS should be to increase efficiency and utilization rates of shared transportation options. However, this also requires that sufficient service levels are maintained. Eckhardt et al. (2020), who have worked extensively in the rural MaaS context, particularly in Finland, suggest that "… urban MaaS is multimodal and based on public transport complemented with additional services, while rural MaaS is based on integrating different services and user groups and using mainly on demand and sharing services." Hensher et al. (2022) point out that in a regional and rural setting having public transport as the centre of a MaaS offering is less likely and thus more attention needs to be given to the role of the car as a potential shared collective vehicle. Reducing transport disadvantage (for example by tackling social exclusion and improving well-being) will come to the forefront as an important objective that can be enhanced through a MaaS framework.

Aapaoja et al. (2017a) reporting on work completed as part of the MAASiFiE project[3] propose several MaaS service combinations for different geographical areas (such as cities, suburbs and rural). They identify objectives and value propositions for each type of area and suggest the transport services most likely to be suitable for each. In subsequent work, Aapaoja et al. (2017b) extend their discussion to potential business models drawing on the findings of MaaSiFiE[4] and the Finnish Rural MaaS project (2016–2017). In the Finnish context, the PPPP (public-private-people partnership) approach with shared transport resources (e.g. public transport, health and social transport) is seen as essential for organizing future mobility and transport (both passenger and logistics) in primarily rural and sparsely populated areas and regions. The MAASiFiE approach has recently been adapted by Leung et al. (2021) to explicitly include a regional transport dimension with objectives focussed on increasing the efficiency and utilization rates of vehicle fleets, improving accessibility to key services and supporting tourist travel. However, whilst there is no explicit mention of wellbeing and social exclusion in these objectives, there were considerations of both in the underlying objectives: the explicit omission may simply be the understanding of the requirements of many mainland European states to provide a statutory guarantee of social transport.

[2] http://h2020-inclusion.eu/(project website).

[3] The MAASiFiE project (Mobility as a Service for Linking Europe) was funded by the Conference of European Directors of Roads (CEDR) Transnational Road Research Programme project, 2015–2017 and was led by VTT Technical Research Centre of Finland Ltd.

[4] For further details of the business and operator models for MaaS proposed by MAASiFiE see König et al. (2016).

3.2. MaaS schemes, their status and levels of integration

To analyse the existing evidence base for MaaS in a regional and rural context, we have assembled a table to capture MaaS schemes, their status and levels of integration as at January 2022 (Table A1 in the Appendix) although the Table is being continually updated as part of current research. Selected schemes are presented below in the context of the relevant country. For each scheme, the table distinguishes between pilot and operational status, dates of operation, and number of modes involved. We also capture "number of bundles" (if any) and whether the scheme is only a journey planner. Each scheme is also classified according to its level of MaaS following Sochor et al. (2018), and shown in Fig. 1, to characterise the level of integration.

3.3. Finland

Finland is characterised by its very sparsely populated areas with long distances to municipality centres, especially in areas such as Lapland, which has a population density of 180,000 inhabitants per 100,000 km^2. The digitally led National MaaS Framework, a country level approach to the development of MaaS, is of particular interest. The 'Transport Code' introduced under The Act on Transport Services (2018)[5] is at the heart of the Framework. Crucially, the 'Transport Code' requires transport operators to provide their operational data via open interfaces and to make single tickets available for resale third parties (see SMARTA, 2019).

Eckhardt et al. (2018) in their rural mobility SWOT analysis for Finland suggest that an identified strength is the existing rural mobility services which include taxi services, extensive and regular postal services, and publicly subsidised bus and taxi services. Together these create a solid core of transport resource that could potentially be integrated into new transport solutions. It is relevant to note that Finland has extensive previous experience with DRT, building on pioneering work in the EC-funded SAMPO and SAMPLUS projects and recommendations for a national policy as early as 2003 (Nelson et al., 2010).

The Finnish Rural MaaS project (2016–17) was led by The Ministry of Agriculture and Forestry of Finland to create a national vision for MaaS in rural and sparsely populated areas. An important outcome was to improve awareness of the MaaS concept in rural areas by sharing knowledge, and by providing recommendations for developing mobility regulations as well as the technical aspects of MaaS. Importantly, the project defined a vision for rural mobility: "Ensure for everyone adequate mobility services and accessibility relative to well-being, [and] cost-efficiently with an appropriate service level" (quoted in Eckhardt et al., 2018, p81).

Also noteworthy is the rural transport and mobility national communication project (known as 'Digiboksi'[6]) which ran between February 2018 and January 2021. The aim of the project was to collect, process and spread accurate information about the changes occurring in the transport sector; and to explain how the 'Transport Code' and digitalization can be used to deliver transport services more flexibly.

The deployment of MaaS in Finland has been strongly government led. In early 2015, the Ministry of Transport and Communications (MTC) and the Finnish Funding Agency for Innovation (Tekes) launched a programme which funded eight feasibility studies and several pilots (see Table 1).

3.3.1. Kätevä Seinäjoki

This was a MaaS pilot in the municipality of Seinäjoki between November 2016 and April 2017. Kätevä integrated taxi, shared taxi, demand responsive and traditional fixed route fixed schedule public transport, shared bikes and walking, via a mobile application available for IOS and Android. It was one of the first MaaS schemes in Finland to introduce mobility bundles. The service offered three different priced monthly packages. Eckhardt et al. (2017) note that a test group of twenty travellers were followed for evaluation purposes.

Although the pilot ended in 2017, the "handy" App continues but only as a regional journey planner and a mobile ticketing application; as such the current offering cannot be described as a MaaS scheme. Mobile tickets can be purchased with a debit card or Google Pay.

3.3.2. Ylläs Around

The tourist focussed pilot in sparsely populated Northern Finland commenced in the spring of 2016 and concluded in 2017. Fees and prices were based on bilateral agreements between the MaaS operator and transport service providers. The pilot served the area between the Ylläs ski resort, the airport and the railway station. Buses and taxis (both single and shared occupancy) were accessed via a mobile app which included payment and ticketing features to offer one-stop-shop transport services. Eckhardt et al. (2020) note that twenty customers responded to the Ylläs Around survey.

3.3.3. Sonnera Reissu Hämeenlinna

The 2016 pilot operated in the Hämeenlinna region (Hämeenlinna - Janakkala - Hattula) and is described on the legacy website as a Transport as a Service App (in one of the earliest uses of the term). The pilot included taxi services (both single and shared occupancy) operating on a first and last mile basis from railway stations with a payment means included.

3.3.4. ALPIO

Eckhardt et al. (2020) describe three MaaS regional pilots introduced as part of the ALPIO project which ran between May 2018 and November 2019 with funding by the Finnish Innovation Fund (Sitra).

The *ALPIO Eastern Uusimaa* pilot operated in the towns of Porvoo (January to May 2019) and Loviisa (January to June 2019), targeting young people travelling for leisure in Porvoo and long-haul commuting in Loviisa. The pilot included a DRT service (Kyläkyyti) which operated in rural areas at times when no other public transport was offered. The DRT service ran solely on a mobile App which included long-haul public transport, biking and walking routes.

ALPIO South Savo was a DRT service which operated from March to June 2019 in the town of Mikkeli. A call centre and a mobile App were available. As part of the pilot municipal minibuses offering group transport for elderly people were also integrated in the system and spare capacity was used for social and health service transport (SHST) rides which would otherwise be provided by taxi. These changes increased occupancy and utilization rates of vehicles and reduced the need for taxi rides while the DRT also improved the service level (Eckhardt et al., 2020).

The *ALPIO Tampere region* pilot was in Kuru and Vammala (March to October 2019). Kuru consists mainly of sparsely populated rural areas (approximately 2600 inhabitants and 50 SHST customers), and Vammala includes a rural heartland (16,000 inhabitants and 300 SHST customers). The transport services integrated in the pilot included the SHST service; a special needs DRT service (PALI), and an open DRT service (Kyläkyyti) with a mobile app using taxis and minibuses.

During the pilot there were nearly 6900 orders placed which resulted in nearly 9500 passenger trips and over 5700 driven routes. The pilot promoted regional mobility development and data sharing. Eckhardt et al. (2020) identify that the most significant benefits of the new service were at the societal level as accessibility was enhanced with the improved occupancy rates of vehicles, reduced vehicle-kilometres and

[1] SMARTA (2020) provide examples of where such schemes have been introduced in rural environments. More information can be found at: https://ruralsharedmobility.eu/.

[5] For further information on the Act on Transport Services see the press releases from the Ministry of Transport and Communications. https://www.lvm.fi/-/act-on-transport-services-955864.

[6] https://projectsites.vtt.fi/sites/maasdigiboksi/.

Table 1
Regional and rural MaaS Schemes, their status and levels of integration as at January 2022 – Finland.

Name	Place	Status: Pilot (P)/ Operational (O)	Dates	Regional (Reg)/Rural (R)	Number of modes	Level of integration: Sochor et al. (2018)	Number of bundles	Journey planner only
Sonnera Reissu Hämeenlinna	Hämeenlinna & Ylläs, Finland	P	2016	Reg	3	2	?	✓
Ylläs Around (Artic MaaS)	Ylläs, Finland	P	Spring 2016–2017	R	3	2		
Kätevä Seinäjoki,	Finland	P	Nov 2016–April 2017	R	3	2	3	
ALPIO	South Savo, Finland	P	March to June 2019	R	1	1	0	
Kyläkyyti (ALPIO)	Kuru and Vammala, Finland	P	March to October 2019	R/Reg	2	2	0	
Kyläkyyti (ALPIO)	Eastern Uusimaa, Finland	P	January to June 2019	R/Reg	3	1	0	
Foli	Turku, Finland	O	Start date unclear - present	Reg	4	2	0	✓

cost savings for the public sector.

3.3.5. Foli

Foli is a regional journey planner for the Turku area (local and long-distance bus, rail, ferry). Single, daily and season tickets are available, all via the mobile App, service points and ticket machines.

3.4. The Netherlands

The Netherlands in north-west Europe has a land area of 41,543 km^2 of largely flat landscape, a population of 17.23m (2019, World Bank), and one of the highest population densities in the EU at 413 per km^2 ([7]).

The Netherlands is included because of the way the Dutch government promoted MaaS (in May 2019) as a regional concept to overcome congestion in cities, crowding in public transport and the lack of accessible and affordable transport outside the conurbations (Ministry of Infrastructure and Water Management, 2019). The proposal was for seven pilot schemes throughout the country, based on the use of an app with a minimum of 50,000 users, with each pilot focussing on a different policy objective. This was building on a framework agreement with providers made in 2018, with the pilots intended to run from 2019 until the end of 2021. The government proposed to fund this development with the proviso that each pilot should become financially self-sufficient within two to three years. Two of the pilots have a regional and rural focus (Groningen – Drenthe Pilot and Limburg Pilot, discussed below) but appear still to be in the planning stage. The Netherlands also has three further schemes (discussed briefly below) which are multimodal and have regional reach. These are longstanding schemes, conceived before MaaS became a well-known label for such multimodal offerings.

In the rural *Groningen – Drenthe pilot,* there was only sparse public transport offerings but a growing need for transport solutions. Activity centres were concentrated in central locations and the pilot was to build on the HUB network (the creation of localities where different modes come together) to integrate all transport options including 'HUB taxi' and the spare capacity of special transport as well as including collective transport operated by volunteers. The pilot area extends previous attempts to co-ordinate and promote sustainable transport for citizens. Recent commentary identifies the population density as being crucial to a workable MaaS scheme although the combined area of Groningen and Drenthe has a considerably lower population density than other MaaS schemes (Cawthorne-Nugent, 2020). Arriva won the tender to operate the MaaS scheme in Groningen and Drenthe (from December 2020 till 2022), and the app 'VIA GO', its own app, was to be modified for the area to meet the specifications of the government (Arriva, 2020). As of Autumn (2022) the pilot was not yet operational (Philipsen, 2021).

The Limburg province borders two other countries (Germany and Belgium) and the presence of borders provides a constraint to multimodal, cross-border transport, especially public transport, as a result of ticketing in particular lacking interoperability. The aim of the *Limburg pilot* is to stimulate sustainable transport across the borders and reduce private car use. The target groups are commuters and tourists, mainly from Germany and Belgium that come to the Designer Outlet in the area. The pilot is unusual in that it is intended that MaaS will be developed in conjunction with foreign partners from Germany and Belgium. In terms of progress, Arriva announced when winning the tender for the pilot, that the 'VIA GO' app would be tailored for this pilot, as for the Gronignen-Drenthe pilot. There is also evidence of significant mobility collaboration between employers and mobility operators in the Limburg province, with a 'Mobility Arena' being held to bring people together in late 2021. But there is no evidence of the pilot having started.[8]

The three schemes that preceded the development of MaaS pilots include *Mobility Mixx*, an employer-based scheme. Originally a card, but more recently with the addition of an app, Mobility Mixx allows employers to provide transport for employees – both work and personal travel with all available modes. Employers can use Mobility Mixx to improve sustainability by identifying which modes they are willing to support. We classify this scheme as a Level 2 MaaS offering. The *NS Business Card* is the Dutch Railways business card that is a free card which can be used nationwide on train, bus, metro, to store bicycles at stations, hire cars and other modes when available. Whilst the card is available for zero subscription costs, options exist for payment for unlimited travel by train for one employee, with discounts for a further three employees travelling together. The NS Business Card does not advertise itself as a MaaS scheme; it nevertheless shares many characteristics that would be present in a MaaS ecosystem. We classify this scheme as a Level 2 MaaS offering. Finally, *t*he *Utrecht Region pass* is a contactless travel card that can be used nationwide on all public transport. It is a pay as you go card, linked to a credit card for seamless topping up. Unusually the card use can extend to activities within the Utrecht region, in addition to public transport, thus targeting local citizens to the region and tourists or visitors. We classify this scheme as a Level 2 MaaS offering.

[7] https://www.macrotrends.net/countries/NLD/netherlands/population-density'. Netherlands Population Density 1950–2022. Retrieved 1 Jan 2022.

[8] Moreover, it appears that 'VIA GO' may be superseded by a new app promoted by Arriva in September 2021 called 'Glimble' which is designed to be pan-European (Intelligent Transport, 2021). Glimble has been developed in partnership with the journey planning technology provider Moovit.

3.5. Sweden

Sweden in Northern Europe has a population of 10 million; it is the third largest country in the European Union (EU) by area at 447,400 km^2. Sweden has the second lowest population density in the EU (24.4 people per km^2) and 67% of its land area is covered by woodland. Sweden has a history of involvement in innovative rural mobility schemes and was at the forefront of developments in telematics-based DRT from the late 1990s (Ambrosino et al., 2004).

Drive Sweden[9] is a Strategic Innovation Programme launched in 2015 by VINNOVA, the Swedish Innovation Agency. The programme addressed opportunities and challenges with the next generation mobility system for people and goods and promotes new mobility models, including MaaS. Although initially urban-focussed, the vision is for nationwide MaaS operations to begin by 2026. The Smart Rural Transport Services project, for example, addresses future transport systems for sparsely populated areas in the context of transport services operated by autonomous, electric and on demand-controlled vehicles and drones. Sweden has been a leader in MaaS developments with the pioneering Ubigo scheme in Gothenburg being one of the best documented anywhere in the world (Hensher et al., 2020), prior to ceasing operation in 2021, having failed to find a profitable business model.

Hult et al. (2021) report on recent experience from five pilots in rural areas of Sweden (see Table 2) with an emphasis on developing organisational insights. Hult et al. (2021) provide a detailed assessment of the motivation and objectives of the actors (organisations) involved in these pilots and describe them as struggling with finding their roles, mitigating uncertainties, distributing responsibilities, and negotiating business models: all of these challenges are common in urban MaaS too.

Collectively, this set of pilots are notable for their use of technology, although all have a small number of users (around 100 users in each case). These four pilots (DalMaaS, FjällMaaS, Hämta and KomILand) integrate planning, booking, and payment functionalities across modes. The Mobilsamåkning pilot is ridesharing and cannot be described as MaaS. None of the pilots offer mobility bundles. Although paused by the pandemic these schemes are restarting.

DalMaaS is based in Skattungbyn which is a small rural community in Dalarna County in central Sweden. Starting in November 2018 with booking via an App, a car sharing service has grown to incorporate special transport service rides (in June 2019). The scheme was paused due to COVID-19.

FjällMaaS was established in February 2020 in Södra Årefjällen in central Sweden; this scheme benefited from a successful grant application by the local business association. It was designed with tourists in mind and to facilitate low carbon person mobility and goods deliveries, using a commercially operated on-demand bus service. It was extended to include ridesharing through an app in February 2020 but paused due to COVID-19. All services are bookable via a smartphone app, which includes a link to the regional PTA's website.

Hämta is based in Torhamn, southern Sweden, an area with 600 residents. The pilot began in March 2018 as a 2-month ridesharing pilot by the regional PTA. This was a bookable App-based service with a link only to the public transport app.

KomILand is a regional platform for booking public transport, car sharing services, bicycle sharing and taxi services (although the car-sharing and taxis are deep linked rather than integrated within the App). There is also a tool sharing service (e.g., for trailers). The pilot operates in three rural communities in Västra Götaland on the western coast of Sweden (Broddetorp, Timmersdala, and Lundsbrunn). The service commenced in October 2020 and has been adversely affected by the pandemic.

Finally, *Mobilsamåkning* was an earlier ridesharing service introduced by a local community-based organisation with public funding in Broddetorp (200 inhabitants) in September 2013 using an App which enabled search, book and pay as well as including the public transport timetable. The service ceased after 5 years.

3.6. The USA

There are only two prominent examples of schemes in the USA which can genuinely be described as rural MaaS (see Table 3). Two others which could be described as emerging MaaS schemes are also discussed in this section.

3.6.1. Mobility Co-ordination center (MaaS in Tompkins County)

Tompkins County, Ithaca, New York, has been developing MaaS initiatives since 2010 (Tompkins County, undated). The county is home to several small urban and rural communities as well as Cornell University. Tompkins County participated in the Federal Transit Administration's (FTA) Mobility-on-Demand On-Ramp Program to rework its MaaS concept into a multi-phase project (June 2018 to Nov 2019).

The Tompkins County Transit Authority has developed a MaaS strategy in phases, with Phase 1 dedicated to the development and implementation of early multi-modal mobility services, with multi-modal trip planning (bus, local and intercity; shared services for car, bike, paratransit, taxi and Transportation Network Companies), promotion of carpooling volunteer transportation services and a first/last mile pilot project and the establishment of a multi-modal customer service centre available via App and phone. Ultimately, the project is working towards the delivery of an integrated family of mobility services. A key learning was to select a lead agency (in this case the County Transportation Planning team) for the early roll out of new services.

Phase 2 involves the development of secure financial management policies and operations to enable the roll out of MaaS. External funding for Phase 2 has come from the FTA and the New York State Energy Research & Development Authority.

3.6.2. Vamos (MaaS in San Joaquin Valley)

The San Joaquin Valley in California is a mostly rural region with large distances between households and destinations. It is also a region that is classified as economically and environmentally disadvantaged. The low public transport use results in escalating service costs and subsequent reductions in service level. Lack of public transport options, compounded with the high cost of private car ownership, restricts access to opportunities for citizens.

The Vamos App is an initiative of the San Joaquin County and the Stanislaus County transit agencies and regional rail. The enhanced journey planner (which is being marketed as a MaaS platform, Schweiger, 2020) is designed to include awareness of shared transport services and includes VOGO, a volunteer driver transport service (Volunteers on the Go) which offers free rides to residents whose trips begin and end in disadvantaged rural areas which are not served by public transport, and an electric vehicle carsharing service (known as miocar[10], as well as existing fixed route bus services and DRT. Reservations can be made for VOGO and DRT. Bicycle trip planning is included. Payment options are included. Reservations can be made up to 2 days in advance. Both VOGO and miocar are positioned as building blocks of a wider initiative to plan and implement a regional and rural MaaS system.

3.6.3. Shared-use mobility practices in rural areas

Godavarthy and Hough (2019) report on the outcome of a study which investigated opportunities for shared-use mobility in rural areas (defined as population <50,000) and small-urban areas (50,000–200,000). The following measures are included: Ridesourcing, Carsharing, Bikesharing and Microtransit. Eight case studies are identified although these are all small schemes.

[9] https://www.drivesweden.net/en.

[10] https://miocar.org/(miocar website).

Table 2
Regional and rural MaaS Schemes, their status and levels of integration as at January 2022 – Sweden.

Name	Place	Status: Pilot (P)/ Operational (O)	Dates	Regional (Reg)/Rural (R)	Number of modes	Level of integration: Sochor et al. (2018)	Number of bundles	Journey planner only
DalMaaS	Skattungbyn, Sweden	P	Nov 2018 - present	R	2	2	0	
FjällMaaS	Södra Årefjällen, Sweden	P	Feb 2020 - present	R/Reg	3	2	0	
Hämta	Torhamn, Sweden	~~P~~	March–April 2018	R/Reg	2	2	0	
KomILand	Lundsbrunn, Timmersdala and Broddetorp, Sweden	P	October 2020 - present	R/Reg	4	2	0	
Mobilsamåkning	Broddetorp, Sweden	P	Sept 2013–Sept 2018	R	1	1	0	

Table 3
Regional and rural MaaS Schemes, their status and levels of integration as at January 2022 – USA.

Name	Place	Status: Pilot (P)/ Operational (O)	Dates	Regional (Reg)/Rural (R)	Number of modes	Level of integration: Sochor et al. (2018)	Number of bundles	Journey planner only
Mobility Co-ordination Center	Tompkins County, NY, US	Concept	2020 - present	R	6	2?	(Y)	
Vamos	San Joaquin, CA, US	O	2020 (exact date not clear) - present	R/Reg	5	2	0	

3.6.4. 'MaaS' in rural Michigan

Using a grant (approx. US$1m), awarded in October 2018 through the Michigan Mobility Challenge Grants, a project subsequently badged as "MaaS in rural Michigan" has been developed to include a ride sharing platform provider (Bosch and SPLT) to improve the co-ordination of DRT and healthcare transport services in Grand Traverse, Benzie and Allegan Counties. The project has successfully reduced trip cancellations by 20% with missed health appointments reduced by 10%, and increased rides by 10% (Godavarthy and Hough, 2019).

3.7. Japan

The Japanese government has been promoting a nationwide approach to MaaS (Tran and Hashimoto, 2022). In June 2019, the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) launched the Smart Mobility Challenge Scheme and subsequently selected 19 areas for a MaaS pilot in 2019 and another 38 projects in 2020 (MLIT, 2021).[11] The goals were to increase the convenience of transport and mobility, utilising the current transport network in regions with shrinking and aging population, providing opportunities and promoting traffic safety in an aging society and integrating MaaS into the Smart City concept (MLIT, 2021). Recognising that many elderly persons do not use smart phones several of the pilots include telephone-based reservation (Fujisaki et al., 2022). The number of projects has grown to more than 80 of which approximately 80% operate in rural areas (World Economic Forum, 2021). Tran and Hashimoto (2022) offer an evaluation of the initial results from 16 of the trials launched under the Smart Mobility Challenge. In addition to the widespread introduction of on-demand taxis and buses there is evidence of non-mobility services such as medical delivery services (sometimes delivered by passenger vehicles) and mobile stores being included in the MaaS offering – although it is difficult to discern the extent to which services are bundled together. Tran and Hashimoto (2022) note that the services were particularly appreciated by older people without access to cars.

As of January 2022, 83 "MaaS services" are being implemented across Japan, with the Sochor et al. (2018) level of integration varying from 2 to 4. There are 65 MaaS projects in suburban areas, regional cities, and depopulated areas in Japan where the "MaaS innovations not only include services that integrate existing transport options, but also new approaches to bringing in income" (World Economic Forum, 2021, p6). For example, the Shobara scheme, operates in a town of approximately 30,000 residents, and not only serves the elderly but has also expanded to target tourists by offering a smart app and increasing the number of bus stops to reduce the walking distance for the residents (typically within 100–200 m, which is important for the elderly) and to improve connectivity with bus services to/from the city (important for tourists, but also access to medical services located in the city). An app, *my route*, operated by Toyota Financial Services, offers transport services and also information about local businesses, events and attractions; the latter were found to be one of the main reasons for users to choose *my route*. The operator also promotes business collaboration by addressing the specific needs of local governments and partner companies in each area they operate. The development of MaaS for rural and regional areas in Japan highlights the importance of understanding the target customer and the mobility objective of the corresponding regions in selecting an appropriate model for MaaS, which the World Economic Forum (2021) terms the "regional archetypes of MaaS". They classify MaaS for regional and rural areas into two broad types of regional archetypes: tourism-focused and community-based. These regional archetypes of MaaS represent a useful finding from a collection of MaaS developments in rural Japan as they inform not only the model that MaaS could follow depending on the characteristics of the region where MaaS is to be introduced, but also the challenges.

4. Discussion of implications for the prospects for realising MaaS in a regional and rural setting

This paper has considered the evidence and provided commentary on

[11] Recognising the difficulty of accessing detailed information in English we have treated the schemes as a block rather than attempting to itemise individual schemes in Table A1.

MaaS in a regional and rural setting. As noted at the outset, evidence has been sought from a desktop review together with personal experience and access to field observations where possible. Given that in many cases, however, more detailed analysis is hampered by lack of a thorough evaluation as well as by language these limitations mean that aspects of this study should be seen as exploratory. This concluding discussion draws together the main findings that arise from this investigation and offers some key recommendations for further work.

Whilst noting the challenges of providing collective transport solutions in a rural environment, it is encouraging that a wide array of rural shared mobility services have been proposed and tested in a variety of contexts. Many of these could become elements of a MaaS or MaaS-like solution for the rural context.

The paper has the aim of providing an evidence base for framing a MaaS - or MaaS-like - solution (i.e. technology-led) in rural or remote areas. The role of technology (where it is available) should be seen in context; technology can be used to support innovative mobility solutions but should not be seen as the determinant of innovation. Digital technologies can function both as a *service enabler*, i.e., enabling a transport service which otherwise would not be possible; and as a *service enhancer*, i.e., allowing a service to operate better and more efficiently by using the supporting ICT (Mounce et al., 2020). Furthermore, the question of whether sufficient digital literacy exists should be acknowledged since it cannot be assumed the whole population is digitally competent or comfortable.

Much of what is currently promoted as MaaS could be best described as an enhanced journey planner or a scheme with MaaS-like (or MaaS-lite) qualities rather than MaaS as a whole; most schemes identified fall within the Level 1 or 2 classification of Sochor et al. (2018). This means that although marketed as MaaS, they do not go beyond offering integrated information, booking or payment. This is perhaps a reflection of the relative infancy of MaaS in a rural context, but they cannot be described as MaaS. App integration is more common, even with the smallest schemes (for example the recent experience in Sweden) – meaning that the technology issues are largely resolved and that (as noted below) the future focus should be on the development of organisational and business models where very little work has been done, apart from in Finland (see Aapaoja et al., 2017b). For example, while the *Kätevä Seinäjoki* MaaS pilot (2016–17) was one of the first MaaS schemes in Finland to introduce mobility bundles, the App continues but only as a regional journey planner and a mobile ticketing application.

There is a distinctiveness to rural MaaS and we should not, given the characteristics of rural areas, compare with MaaS in urban areas. MaaS in a rural context has an important role to play where the policy aim is to reduce transport disadvantage as the most critical issue. While MaaS as a whole faces an uncertain future (Hensher et al., 2021) much of the current concern is directed towards experience in the urban context.

Findings show that MaaS in a rural context is dominated by a preponderance of short-lived pilots, even in Finland and Sweden which can be described as the trailblazer locations. There is also an important contrast between locations which have attempted to create a "MaaS experience" from the outset (e.g., The Netherlands) and those schemes which are attempting to put in place the elements of a MaaS scheme and then build from there (e.g., the USA). It is surprising and not surprising that so many pilots end. It is often the case that implementation has not taken on board the hidden costs of ending (such as leasing costs on premises and equipment or the continuation of existing labour contracts).

Some schemes are very small in terms of actual users (e.g., Finland and Sweden). A small potential user base will always be a threat as noted by Philipsen (2021) in his SWOT analysis of rural MaaS in the Netherlands. Whilst not yet implemented, a key part of the aims of the Netherlands pilots is to ensure a minimum of 50,000 users of the app as 'without this kind of scale, there will be only a limited effect and little opportunity to make a positive business case.' (Ministry of Infrastructure and Water Management, 2019). It is surprising that the Netherlands pilots have not made further progress. The anticipated roll out has not happened yet and this is likely to be partly COVID-19 dependent. The pandemic has created such a substantial impact on public transport which by most commentators is seen as the 'backbone' of a MaaS scheme. COVID-19 has also posed a major challenge to the longevity and prospects of some pilots and we observe that schemes are gradually coming back (as in Sweden).

While population density is widely accepted as being crucial to a workable MaaS scheme, this appears to be less important in a rural context as shown by experience from Finland and the Netherlands. Nevertheless, degrees of rurality provide barriers to the achievement of sustainable mobility outcomes. The notion of mobility does not correlate necessarily with population size. Not every trial or scheme is the same in terms of their targeted users/trial participants. Lessons learnt and transferable policy is therefore more limited than the number of schemes in existence might suggest. As is the case with urban-focussed MaaS, there is limited technical evaluation. Proper evaluation of pilots is key to identify which aspects, if any, are transferable to new locations.

There are examples of niche schemes such as the tourist focussed *Ylläs Around* in northern Finland and *FjällMaaS* in Sweden and the cross-border pilot (not yet implemented) in Limburg, Netherlands. The Japanese national level approach to MaaS distinguishes between tourism-driven and tourism-promoting MaaS and incorporates a variety of revenue raising activities such as encouraging the participation of sponsors such as local businesses.

The intention of the Tomkins County initiative is to engage and engender trusting and effective partnership working as the key to making the initiative work which if successful would be a good example of moving from a concept with a vision to the on the ground implementation. At the time of writing this paper, the outcome of the MaaS initiative is yet to be seen and so the degree of partnership working cannot be evaluated. The Limburg pilot in the Netherlands, while yet to be implemented is unusual in that it is intended to be developed in conjunction with foreign partners from Germany and Belgium. However, working with key stakeholders, whether they be businesses or activity-based centres, is an important part of partnership working. The ALPIO Tampere pilot is a good example of how mainstream transport services and social and health service transport can be integrated as part of a MaaS offering. The role of policy-related stakeholders in developing an appropriate policy context for regional and rural MaaS should not be understated since there is often considerable lack of capacity. Hult et al. (2021) note that both actors involved in rural MaaS pilots and urban MaaS developments face similar organizational challenges.

Prospects for scalability appear limited in current rural MaaS activities since this will depend on how well MaaS segments the market through the number of mobility bundles offered (if bundles are offered) although it should be noted that the Netherlands' pilots are intended to have a high number of app users to achieve scalability.

The Finland country level approach to the development of MaaS has not yet led to rural implementation at scale (in contrast to Japan), perhaps partly due to the emphasis on urban, although we acknowledge that there are different levels of rurality, relative to density of urban areas and that Japan has a clear population advantage. There remains a pressing need to identify potential business models to support MaaS in rural environments. The regional archetypes of MaaS in Japan (tourism-driven; tourism-promoting; community-sustaining; community-harnessing) represents a useful finding as they inform not only the model that MaaS could follow depending on the characteristics of the regions where MaaS is to be introduced, but also the challenges and key success factors that should be considered.

A key discussion point and one that relates to recommendations for further work is the finding that most previous and extant "Rural MaaS" schemes do not go beyond "MaaS level 2", suggesting the need for a renewed focus on understanding the barriers to the implementation and growth of MaaS in a regional and rural setting. Also, a lack of evaluation means that it is difficult to see any policy transfer and in particular to

work out what is good and what is not so good practice. This is a point which needs to be addressed.

In contrast to the urban context, local access public transport is unlikely to be the backbone of regional and rural MaaS, although the need for public transport remains to service for example, aged users, captive users and school travel. However, long distance public transport will continue to form the backbone in regional and remote areas and is likely to be an important component of the MaaS offer. Car-based services are also becoming more prevalent (e.g., inclusion of carsharing in the *KomILand* pilot in Sweden and ridesharing as part of the 4 other current or recent Swedish pilots, and the proposal to incorporate e-car sharing in the Sao Joaquin scheme in California). Finding better ways of utilising the car by sharing in one form or another, while moving forward to achievable sustainable outcomes is a key challenge (Hensher et al., 2022).

Finally, possibly the greatest challenge once the potential markets are identified for MaaS take up is whether there is a business model that aligns with the broader societal objectives that should drive the value of MaaS. The hype associated with the 'latest App' is no basis for ascribing a future for MaaS. In a rural and broad regional setting, it is unlikely that there will be a commercial model that delivers profits; rather the commercial model should be best seen as a framework within which to identify an optimal allocation of subsidy (Hensher et al., 2020, Ch 8).

Author statement

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Declaration of competing interest

None.

Data availability

No data was used for the research described in the article.

Acknowledgment

This research is part of iMOVE Cooperative Research Centre (CRC) Project 3–020 with Transport for News South Wales (TfNSW) on Design of a Regional Town and Rural Hinterland (RTRH) MaaS Blueprint. The findings reported are those of the authors and are not the position of TfNSW; but approval to present these findings is appreciated.

Appendix

Table A1
Regional and rural MaaS Schemes, their status and levels of integration as at January 2022

Name	Place	Status: Pilot (P)/ Operational (O)	Dates	Regional (Reg)/ Rural (R)	Number of modes	Level of integration: Sochor et al. (2018)	Number of bundles	Journey planner only	Weblink
Hannovermobil 2.0	Hannover, Germany	O	2016- present	Reg	5	3	variable		https://www.gvh.de/home/?L=1#/
DalMaaS	Skattungbyn, Sweden	P	Nov 2018 - present	R	2	2	0		
Kätevä Seinäjoki,	Finland	P	Nov 2016–April 2017	R	3	2	3		http://www.komialiikenne.fi/w/kateva–sovellus
Mobility Co-ordination Center	Tompkins County, NY, US	Concept	2020- present	R	6	2?	(Y)		https://n-catt.org/wp-content/uploads/2020/07/MaaS-Webinar-All.pdf [from slide 32]/https://www.tccoordinatedplan.org/mobility-as-a-service.html
Ylläs Around (Artic MaaS)	Ylläs, Finland	P	Spring 2016–2017	R	3	2			
FjällMaaS	Södra Årefjällen, Sweden	P	Feb 2020 - present	R/Reg	3	2	0		
Go-Hi	Scottish Highlands, UK	O	2021- present	R/Reg	8	2	0	✓	https://www.youtube.com/watch?v=-4zYG_vz1uY
Hämta	Torhamn, Sweden	~~P~~	March–April 2018	R/Reg	2	2	0		
Kyläkyyti (ALPIO)	Kuru and Vammala, Finland	P	March to October 2019	R/Reg	2	2	0		https://cris.vtt.fi/ws/portalfiles/portal/26817397/ALPIO_project.pdf
Vamos	San Joaquin, CA, US	O	2020 (exact date not clear) - present	R/Reg	5	2	0		https://vamosmobileapp.com//https://n-catt.org/wp-content/uploads/2020/07/MaaS-Webinar-All.pdf [from slide 45]
KomILand	Lundsbrunn, Timmersdala and Broddetorp, Sweden	P	October 2020 - present	R/Reg	4	2	0		https://www.vgregion.se/kollektivtrafik/sa-styrs-kollektivtrafiken/informationssida-text-testmall2/komiland/
Foli	Turku, Finland	O	Start date unclear- present	Reg	4	2	0	✓	https://www.foli.fi/en/mobile-ticket

(*continued on next page*)

Table A1 (*continued*)

Name	Place	Status: Pilot (P)/ Operational (O)	Dates	Regional (Reg)/ Rural (R)	Number of modes	Level of integration: Sochor et al. (2018)	Number of bundles	Journey planner only	Weblink
									https://www.foli.fi/en/tickets/
MinRejseplan	Denmark	P	2018–Sep 2020 date not clear	Reg	2	2	0	✓	See: https://help.rejseplanen.dk/hc/da/articles/1500002704562-MinRejseplan-er-lukket
Mobility Mixx	Netherlands	O	2014 (exact start date not clear)-present	Reg	7	2			https://mobilitymixx.nl/en/home.html
myCicero	Italy	O	2014 to present	Reg	4	2	0	✓	http://www.mycicero.eu/
NaviGoGo	Dundee, Scotland, UK	P	2017–2018	Reg	4	2			https://www.the-espgroup.com/project/navigogo/https://static1.squarespace.com/static/5ceee5bd0687a1500015b5a9f/t/5d5c0a6c3e4b3a0001242602/1566313071168/NaviGoGo-Pilot-report.pdf.
NS-Business Card	Netherlands	O	2012 (start date not clear)-present	Reg	6	2	0	✓	https://www.ns.nl/en/business/ns-business-card
Sonnera Reissu Hämeenlinna	Hämeenlinna & Ylläs, Finland	P	2016	Reg	3	2	?	✓	https://yhteiso.telia.fi/t5/Blogi/Sonera-Reissu-Alyliikennepalvelut-ovat-jo-taalla/ba-p/126052
Utrect Region Pass	Utrect, Netherlands	O	2016-present	Reg	4	2	0	✓	https://utrechtregionpass.com/
UESTRA	Hannover, Germany	O	Start and end dates not clear	U/R	4	2		✓	website no longer present
ALPIO	South Savo, Finland	P	March to June 2019	R	1	1	0		https://cris.vtt.fi/ws/portalfiles/portal/26817397/ALPIO_project.pdf
Door to gate	Munich, Germany, Brussels, Belgium and Luxembourg	P	2017 -present	Airport only	5	1			https://www.globalairrail.com/images/events/2017/Airport_Access_Ideas_Forum_2017/Case_Studies/AAIF2017%20-%20Case%20Studies-MaaS.pdf
Kyläkyyti (ALPIO)	Eastern Uusimaa, Finland	P	January to June 2019	R/Reg	3	1	0		https://cris.vtt.fi/ws/portalfiles/portal/26817397/ALPIO_project.pdf
Mobilsamåkning	Broddetorp, Sweden	P	Sept 2013–Sept 2018	R	1	1	0		
Via-Go/Glimble	Limburg, Netherlands			Reg	6				
Via-Go/Glimble	Groningen-Drenthe, Netherlands			Reg					

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