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## Rural Mobility as a Service: The Story so far

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### 1 Introduction

Mobility as a Service (MaaS) is a data-driven, inter-disciplinary approach towards the integration of services for the transport of people and goods. To date, development of this emerging model has been focussed primarily on urban areas, driven by demand. However, MaaS has the potential to bring significant improvement to rural transport services, offering the possibility to improve access to transport, increase efficiency of available assets and reduce overall vehicle emissions.

This paper focuses on two separate rural MaaS projects, Inverurie in Aberdeenshire and Cairngorms Connected in the Highlands, conducted in Scotland from January to April 2019, to understand user requirements for both personal travel and business logistics e.g. parcels and prescriptions. The collaborative, qualitative approach to this research will help provide the necessary baseline for rural MaaS, something that is currently lacking in the UK.

### 2 Background to this paper

#### 2.1 MaaS Definition

In 2019, the definition of 'MaaS' remains complex and ever-evolving with differing interpretations the world over, but all to date are fundamentally designed with urban mobility in mind. The term 'MaaS' is also being adopted in the business world (Business MaaS) so there are growing ways to apply the concept and thus it is no surprise that 'Rural MaaS' hasn't yet entered the definition debate. However, rural transport has featured heavily in research over the last twenty years during which time technology applications in transport have evolved, incorporating Real Time Passenger Information (RTPI), vehicle location, integrated and smart ticketing and vehicle priority, through to the here and now in 2019 where there is an 'app' for everything from carpooling to ordering your taxi or your UberEat. In this context, and since around 2014 when Heikkila published findings, the term Mobility as a Service (MaaS) has circulated the transport sector globally with varying definitions, interpretations and applications. The concept has been described as a 'bundling of services' or an 'app' which aggregates travel data and presents a multi-modal information service. Callegati et al (2017) agree but suggest using 'a unifying framework for mobility that supports the co-ordination of different transportation systems' whilst Gould et al (2015) believe the concept of MaaS is an opportunity to decarbonise and reduce the dependency on private car use and traditional fuels. However, is the concept new? In the UK and Europe, Demand Response Transport (DRT) had existed for several decades in different guises and is still evolving. In developing countries the practice of integrating services and maximising the utilisation of a vehicle has been tested in 2015/16 in Dhaka in the guise of 'Social Services on Wheels' and in Ithica (Up State New York, America), around 2010, the term 'consumer directed mobility management' was used to describe a bundled transport solution which today is often referred to as Mobility as a Service.

Given the complex status of a definition, this paper uses the original European MaaS Alliance and ERTICO definition to direct the initial path as it encompasses not only people but the goods and services that they consume.

"Put[ting]...users, both travellers and goods, at the core of transport services, offering them tailored mobility solutions based on their individual needs. This means that, for the first time, easy access to the most appropriate transport mode or service will be included in a bundle of flexible travel service options for end users".

That said the Rural MaaS Definition used by VTT in Finland is to

‘ensure for everyone adequate mobility services and accessibility relative to well-being, cost efficiently with an appropriate service level.’

The two projects researched in Scotland will help develop and add value to that definition.

## 2.2 Rural Definition

There are decades of research and literature into traditional rural ‘transport’ and key terminologies such as ‘mobility’, ‘intelligent transport’ and ‘smart transport’ but it’s understanding the context of where MaaS sits is the question.

The definition of rural according to the Scottish Government is “settlements less than 3000 people” but then there are the terms ‘remote rural’ which refers to populations with less than 3000 people and a drive time of between 30 to 60 minutes to a village of 10,000 people. In contrast ‘accessible rural’. Relates to a drive town of less than 30minutes to a similar sized village. Currently under the Planning (Scotland) Bill 2017 there is a capability to empower communities to help de-populated areas and the Scottish Government has recently awarded a tender to review the definition of ‘rural’ in a step to help inform and develop the next rural planning policy.

Rural communities throughout the UK and abroad have many of the same challenges as urban areas but often at a more extreme level as highlighted by the Deloitte Review published in 2017 on MaaS. This states that there are certain assumptions required to enable the concept of MaaS to be deliverable, including 3G-5G, excellent connectivity, accurate data, timetables and information and finally cashless payment systems. In rural areas, there is a mixture of connectivity success with Finland showing a high-density coverage throughout rural areas (map 2), whereas in Scotland, and specifically the Cairngorms National Park (map 1), these are assumptions that cannot be made.



Map 1- 4G coverage map Cairngorms National Park Map 2 – 4G coverage map of Finland

## 2.3 Literature Review

The literature available and live projects on Rural MaaS are growing, but it is in an urban context where the developments occur, for example in May 2018 there were only six journal articles available on Rural MaaS. The rural literature focus is usually upon developed countries and the pilot projects mainly in Finland such as Artic MaaS and Rural MaaS. The lack of specific rural MaaS literature provides not only a challenge but also an opportunity over the forthcoming years to contribute to the conversation. In principle the documentation, be that conference papers, thesis papers or industry news, describes

MaaS as a ‘concept’ with many early definitions making references to an App similar to that of Airbnb in the accommodation industry. In addition, the debate widens to include questions like ‘Is MaaS a tailored hyper-convenient mobility solution (Jittrapirom, 2017)’ or ‘A hybrid multiservice transport solution (Kamau, 2014) or ‘A soft mobility management tool?’ (Matyas 2018).

The most relevant Rural MaaS work currently being undertaken is in Finland under the two aforementioned projects where, based on interviews, a business model has emerged: PPPP (public-private-people partnership). The evidence shows ‘efficiency as a key enabler’ and that combining school, health and logistic transport services is the desired model. This is the vision that both Inverurie and Cairngorms Connected are working towards, given the ability to share resources and create new business opportunities for local people.

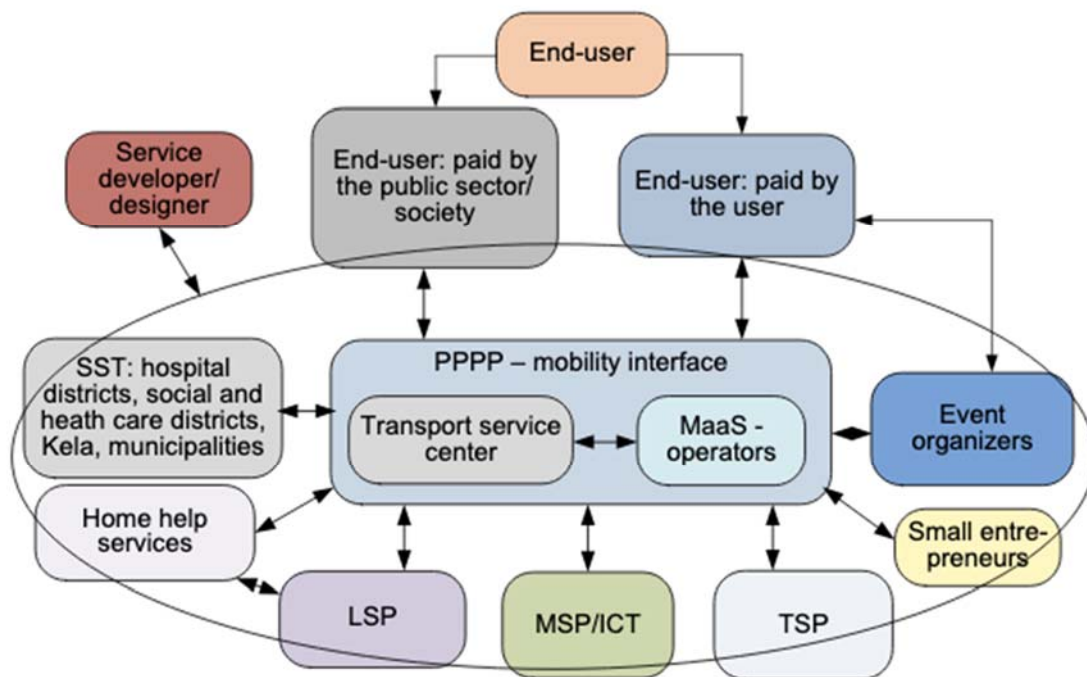


Diagram 1 PPPP model for rural Areas ( Eckhardt et al 2017)

Finally, it was ascertained through the literature review that although user-centred research is not a new technique, it hasn’t readily been applied to the transport industry. In Scotland, the ESP Group undertook a pilot project called Navigogo which involved some co-design workshops, but Inverurie and Cairngorms Connected are the first two projects to actively combine multiple stakeholders from end users, businesses, citizens to visitors.

## 2.4 Inverurie and Aviemore

Inverurie in Aberdeenshire is 17miles north of Aberdeen and has a town population of 13,640 but over 55,000 people in the geographically surrounding area. Inverurie has a rail station located on the Aberdeen to Inverness line which connects with Aberdeen airport, is on the A96 trunk road and has one main bus operator running services into Aberdeen and also Inverness but also to the local villages. The challenge for this project is for those outlying areas to connect into a ‘transport hub’ to travel on elsewhere. As one survey response stated: ‘once in Inverurie the world is your Oyster’.

This was a three-month project, January to March 2019 led by Transport Systems Catapult with the involvement of JLM and Mobility Lab. The list of stakeholders is extensive ranging from Community Planning Partnership, Health and Social Care Partnerships, Stagecoach, Aberdeenshire Council,

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Network Rail, Scotrail, Stagecoach, BIDS Inverurie, Royal Voluntary Service, Nestrans, CTA Scotland, local councillors, local business owners and local development trusts not forgetting the public. This first phase sought to:

- Understand user need (passengers and freight) for mobility services in Inverurie;
- Identify mobility gaps and opportunities;
- Scope a small trial in Inverurie to meet the identified needs;
- Identify a wider market opportunity in rural areas across the UK for deployment of such solutions, both through trials and through potential commercial application.

In contrast, Cairngorms Connected (a consortium of transport service providers led by JLM) applied to Innovate UK for a Design and Foundation call and received funding for the same three months. The Cairngorm National Park has a land area of 4500km<sup>2</sup>, 5 local authorities, 3 Regional Transport Partnerships, 18,000 residents and 2million visitors annually, with 1.2 million visitors to Aviemore alone each year. The rural challenge involves the high dependency on visitors and thus seasonal employment opportunities but also an aging demographic. In the most recent Visitor Survey for the Cairngorm National Park (2014/15), the survey discovered that 96% of visitors travel about by car and only 3% by public transport.

The delivery partners involved a local organisation called Voluntary Action Badenoch and Strathspey (VABS) and Cairngorm Business Partnership - a not for profit private sector organisation. Other stakeholders involved were HITRANS, local community transport providers, Highland Council, bus operators, local businesses, taxis, NHS, Cairngorm National Park Authority (CNPA), Scotrail, Network Rail, Citylink, car clubs, visitors and the public. The project aims for Cairngorms Connected were to identify the transport needs and challenges faced by local people, businesses and the 1.2 million annual visitors to the Aviemore area.

## **2.5 Methodology**

For the research to carry value, a collaborative approach was taken from the outset and this included how to design the research, with the conclusion being a mix of qualitative and quantitative methods. This approach adds value and confidence to a subject which is embryonic and ever-evolving in nature. The use of focus groups, street interviews, one-two-one interviews, and stakeholder sessions were all tools used to liaise with operators, communities and businesses to ascertain user requirements and mobility gaps. The table overleaf summaries the methods adopted for each project. It was critical to ensure that visitor information was captured and that included on-street interviews during the February half term. There was also a need for quantitative data in the form of sampling through online and paper surveys to engage with those hard to reach. This data and approach involved a participatory or co-design practice for both study areas in Inverurie and Cairngorms Connected. As both projects were only three months long, in reality this only provided a short window to undertake the research, but it has provided a baseline for further research by all and has helped determine how the next phase of data gathering for the PhD will be undertaken.

**Table 1: Comparative Methodologies**

	<b>Cairngorms Connected</b>	<b>Inverurie</b>
1 to 1 Transport Stakeholder meetings	X	X
1 to 1 Street Interviews (visitors)	X	
1 to 1 Street Interviews (locals)	X	
1 to 1 Interviews with Businesses, local experts and communities	X	
Online survey (locals)	X	X
Online Survey (visitors)	X	
Transport Stakeholder Focus Group	X	X
On Bus interviewing	X	
Drop In session with local community		X
Community Café engagement	X	
Business community workshop	X	X
Insights and Co-design workshop with key stakeholders	X	X

The findings were used to co-design service concepts and explore opportunities for commercialisation in the later workshops. For Cairngorms Connected this involved end-users and transport service providers whilst in Inverurie the concepts were developed by transport service providers, to be tested at a later date with end-users. This generation of new ideas and business models will ensure solutions are based on user needs and guide decision making.

### **3 Main Findings**

#### **3.1 Findings from Cairngorms Connected**

As this paper was to be submitted by the first week in April and the research for Inverurie concluded at the end of March and for Cairngorms Connected is still underway, the findings are only indicative and high level.

For Cairngorms Connected, the barriers and opportunities to transportation in the region varied significantly from active travel modes and unsafe, unsuitable timetables through to information and vehicle design. For those with hidden as well as physical disabilities the lack of reliability to the type of bus undertaking a service was a barrier and for many cases it was the replacement of a coach or a non-



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low floor vehicle that caused the barrier. In some cases, it was the inability to have help to access the coach as one lady with arthritis pointed out. Therefore, the lack of available information and the type and design of vehicle would be seen as a deterrent. Although there is legislation coming into force in 2020 relating to low floor buses, accessible buses for all remains a strong theme along with the need for information to make an informed choice.

The insights gathered through interviews and workshops were shared with the relevant transport provider and in several cases, connections made. For example, a young person who lives in Cromdale but attends college in Inverness some 37 miles away, explained in detail the challenges involved in the nearly 2hr each way public transport journey. It started with a 4-mile drive by a family member to Grantown on Spey as there is no existing bus servicing the village despite being located on a trunk road on which there is no safe way to cycle/walk to the bus stop. The bus from Grantown then travelled to Carrbridge where the person changed to an Inverness-bound bus. This person has learning difficulties and is consequently in receipt of a free bus pass. The insights provided by this person on the service available to young people in the area were hugely beneficial and as such the person and the bus operator are now working together.

The barriers and opportunities were discussed by all in the Cairngorms project with one workshop having end users in one room and transport service providers in another. The latter were asked to detail the 'perceived' barriers and then the end-users fed back the real barriers. Surprisingly, there wasn't a large variance in the feedback from either room showing that the understanding of barriers by all has greatly narrowed.

The use of resources was a key theme from all participants and that was evident in the concept posters which, in the main, focused on the theme of utilising vehicles' efficiency to maximise the financial input. Much of rural transport is heavily subsidised and it is acknowledged, like the Finish PPPP model, that this has to change not only due to the ever-increasing local authority budgetary costs but also due to the running of empty buses. Local rural bus networks are tied into school bus contracts, so for the future, those buses will need to be fit for serving communities or else the procurement of local bus networks in rural areas will have to be rethought.

For those businesses in the area that participated in the project, the key challenges focused on the inability to access staff due to the lack of flexible public transport. One local forestry business runs two minibuses to help provide transport to work given the working hours, whilst other organisations in the drinks and the hospitality industry struggle with unsociable working hours and bus services that don't meet those demands. The hospitality industry also struggles to accommodate those wishing to come for dinner and provide a cost-effective means for the return journey. It was also highlighted that hotels are currently an 'informal transport hub' as guests have access to a personalised journey planner (the receptionist) as those individuals know the local bus times, taxi operators etc and local infrastructure. For the increasing market share of visitors staying in self-catering be that cottages, camping, glamping or using a motorhome, that 'informal transport hub' is not as easily available. On speaking to a local taxi operator who serves many local hotels in Grantown on Spey, the role of the taxi in the area is to fill the gap in public transport and offer tailored journeys be that to the airport, train station or to a local facility e.g. café, visitor attraction or hotel.

Visitors were interviewed during the February half term break with the majority travelling by car to the area, which supports the Visitor Survey of 2014/15 at 96%. Of those travelling by car, many had travelled to the area with equipment be that bicycles, ice axes or skis as it was perceived to be too difficult and expensive to travel by public transport. The purpose of the journeys was active travel be that walking or cycling and for a few that was an organised coach holiday. For those without a car the observations centred on the buses not fitting with visitor attractions be that Loch an Eilien or indeed the Highland Wildlife Park and that a day ticket was very expensive. Those visitors would like to see smaller

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buses and more frequency servicing visitor destinations. Further research into visitor experiences is currently on-going and will not be completed before this paper's submission.

### **3.2 Findings from Inverurie**

The three main themes which emerged from the workshops related to congestion, active travel and the availability or suitability of alternative transport options and all these had impacts upon employment, businesses and access to health care. Importantly, the existing issues affected greatly the ability of people to engage with social occasions/events and often this gave a feeling of isolation. Unsurprisingly, these themes are intertwined with financial worries and that in several cases, people are taking expensive taxi trips home from the health centre due to the lack of public transport alternative. These themes were then addressed in the final workshop when solutions were discussed with the transport service providers.

The online survey ran for a few weeks and had a good spread with 39% of respondents aged between 26-45yrs, 49% between 46-65 and 10% over the age of 66. However, the lack of younger people (2%) responding questions whether the advertising carried out in Inverurie was correctly targeted for this group. Facebook and local and regional newspapers were the primary sources although it might not be the media platform which was the problem, but maybe that transport isn't a big enough issue for the younger person. Of those respondents 30% lived in Inverurie, 39% within 1-5miles and 31% 5.1miles and more which may explain the lack of taxi use when asked about their journeys. When asked how many journeys were made in a week for shopping, 37% said between 3-5 whilst commuting accounted for 30%, other leisure 27%. When making these journeys none had used the dial-a-bus and walking scored higher overall than cycling; taxis were the least used with car sharing most likely when visiting friends or relatives, shopping or other leisure. The survey asked respondents about trips that they would like to make less frequently and overwhelmingly, no matter how far away you lived from Inverurie it was commuting with second place being shopping which is in contrast to journeys they would like to make more often which had 'other leisure' and visiting friends or relatives at the top of the table.

All this data can help provide an informed, user-designed transport network and ensure targeted investment, thus it was important to ask questions about new transport services and various factors such as frequency, door to door provision and information. The top three factors, no matter the person's location, were reliability of the service to get to the destination on time, up to date information on the service and finally it was important that the service operates on a set timetable. These desires were mirrored in the free answering of the 'other comments' where lack of active travel options, long bus trips which are expensive and inadequately scheduled to meet needs like employment and lots of congestion.

These issues were also discussed at the Insights and Design Workshop where three concepts were worked up; how to maximise vehicle utilisation; how to reduce the stress of interchange and how to reduce delivery miles. In three groups, concept posters were developed with all three presented and then voted upon. The ideas included a single online ticket, a local distribution hub with a 'green' local delivery and finally a transport 'mocktail' which integrated the NHS, 3<sup>rd</sup> sector and the council for fleet, pool cars, patient and client transport which maximised flexibility. All three were voted upon and it was close, the peoples' choice between the delivery hub and transport 'mocktail'. These concepts are now being explored more heavily for phase 2.

### **3.3 Conclusions from Inverurie and Cairngorms Connected**

The two projects have clearly gathered data about how and why people move around whilst also highlighting existing mobility gaps in what are two different, but similarly classed 'accessible rural' areas. This insight will benefit stakeholders locally and nationally, who can use the information to inform routing and infrastructure investments whilst also develop new businesses cases, models and ideas. It is

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anticipated that the outputs will direct modal integration in rural areas along with improving the understanding of user needs and demands.

Both projects have highlighted the barriers to vehicle suitability, information and mobility gaps so it is unexpected in the final workshops both projects produced concept posters with similar themes. These ranged from the 'Us Bus' and maximising the use of a community bus, through to delivery hubs, developing an e-ticket platform and a visitor card. This emphasises that there are similar solutions desired to the barriers in each 'accessible area' but that elements require customising due to different population densities, visitor influence and available services/infrastructure.

So, what does the future hold? Both projects are working towards concepts for new rural mobility services which will benefit the rural economy, develop new partnerships and potentially, in the longer-term, create sustainable economic growth. By involving and empowering communities and businesses in the approach there is an increased likelihood of local buy-in to solutions and delivering such a sustainable model. Secondly, with the recently announced MaaS Investment Fund (MIF) which is part of the Scottish Government's Programme for Government, there is the potential to develop these projects/research with some of all the stakeholders involved.

The collaborative/co-design approach to developing new mobility services and business models has the potential to change the nature of research and development for all partners involved and within the wider transport industry. These projects present a novel approach which will open up new mobility market segments for all partners and change the way stakeholders conduct research and make decisions.

For the author, this work has confirmed the importance of information for informed decision making be that users providing information on barriers to service providers or vice versa when there is disruption or a change of plan. Information is key when the choice of mode is limited and the success of rural Mobility as a Service depends upon it.

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#### End Notes



For information on Artic MaaS visit <https://www.arcticmaas.fi> and for Rural MaaS <https://www.vtt.fi/sites/maaseutumaas/>

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