Exploring the Feasibility of Mobility as a Service (MaaS) in Small Urban and Rural Communities: Lessons from a Case Study

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Introduction

What is MaaS (Mobility-as-a-Service)?

MaaS is an **on-demand, real-time platform** that can include **any combination of different transport modes** such as public transit, cars, taxis, and bike sharing, through **a unified gateway** that creates and manages the trip, which users can pay for with a single account.

Benefits

Government

- **Less owners, more users**
- **Less parking shortage, congestion, emissions**
- **Public health, social equity**
- **Better urban-urban, urban-suburban, urban-rural connectivity**

Transport providers

- **Improved efficiency**
- **Increased users**
- **Filling up gaps, e.g. reliability + flexibility**
- **New business opportunities**

Travelers

- **Lower prices, better service**
- **Tailored transportation service**
- **Safe & secure**
- **Instant feedback**

Research and Practice about MaaS

Literature

- **User demand** (Sochor et al., 2016; Matyas and Kamargianni, 2017; Sochor and Sarasini, 2017; Ho et al., 2018)
- **Business models** (Aapaoja et al., 2017; Konig et al., 2016; Wong et al., 2019; Kamargianni and Matyas, 2017)
- **Future bus contracts** (Hensher, 2017)
- **Service attributes and opportunities of transportation modes in MaaS** (Wells et al., 2019)

Applications

- **Commercialized MaaS projects in Europe**

Whim in Helsinki, Finland
Kyyti in major Finnish city regions
Mobility Shop in the Great Hanover Area of Germany
Moovel in Düsseldorf, Hamburg, Karlsruhe and Stuttgart, Germany
My Cicero in most important cities of Italy

- **Pilot MaaS projects in Europe**

Gothenburg, Sweden (UbiGo), Vienna, Austria (SMILE)

- **Early stages of MaaS applied in the U.S.**

Transit, Citymapper, Moovit, TriMet

Big cities/ Metropolitans ✓

Small urban and rural areas ?

Research and Practice about MaaS

Big cities/ Metropolitans ✓

Small urban and rural areas ?

Different in…

- Service span
- Public transit service
- User acceptance
- ……

Literature

- **MaaS in rural Finland** (Eckhardt et al., 2018)

Discussed the challenges and solutions from a national perspective.

Applications

- **Ylläs Tikett in Lapland, Finland** (Anttila, 2018)

Benefits from the high demand of tourism in Ylläs.

- **MinRejseplan in Northern Denmark** (Hvid et al., 2018)

Developed on the basis of the well-developed digital technology of the country and an existing nationwide accessed MaaS application.

This study aims to…

- Identify **critical issues** in small urban and rural areas
- Propose **response strategies** for each issue

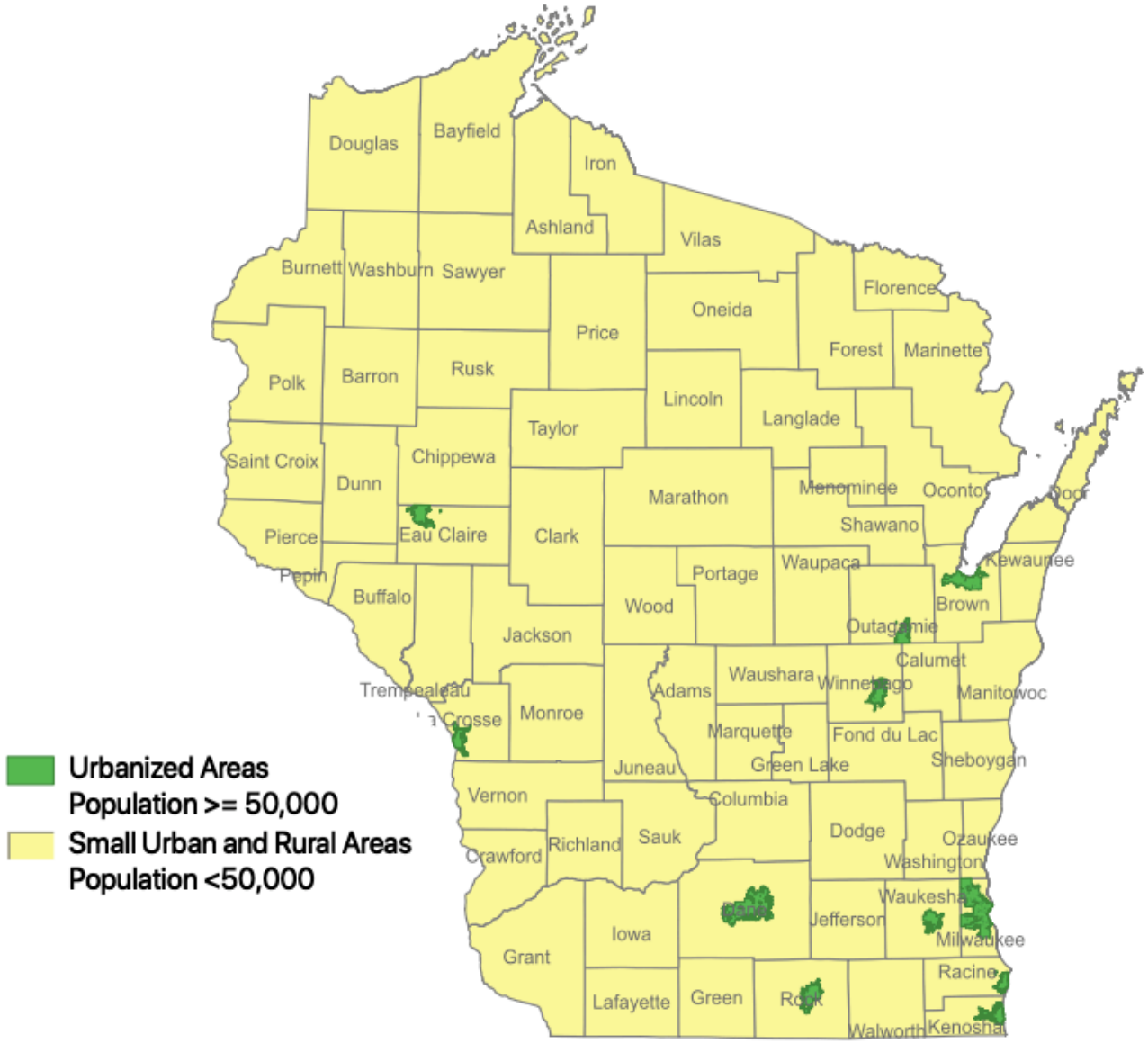
Research Overview

Study Area

The State of Wisconsin

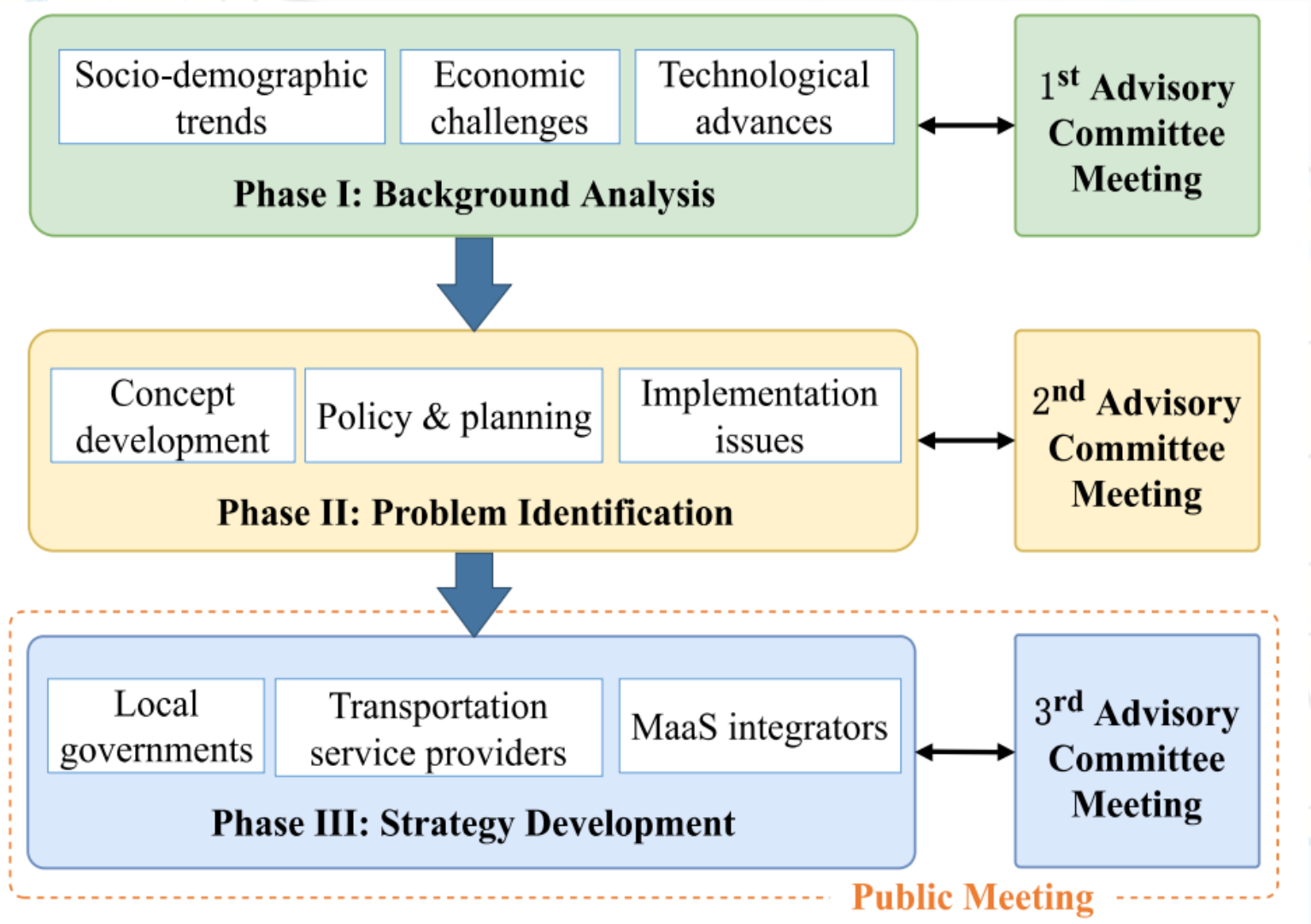
- 12 Urbanized Areas (UA)
- 1860 Small Urban and Rural Areas
  (99% of the land area)
  - 344 Urban Clusters
  - 1516 Rural Areas

Small urban and rural communities: Population < 50,000 (U.S. Census Bureau)



Source: https://www.census.gov/programs-surveys/geography/guidance/geo-areas/urban-rural/2010-urban-rural.html

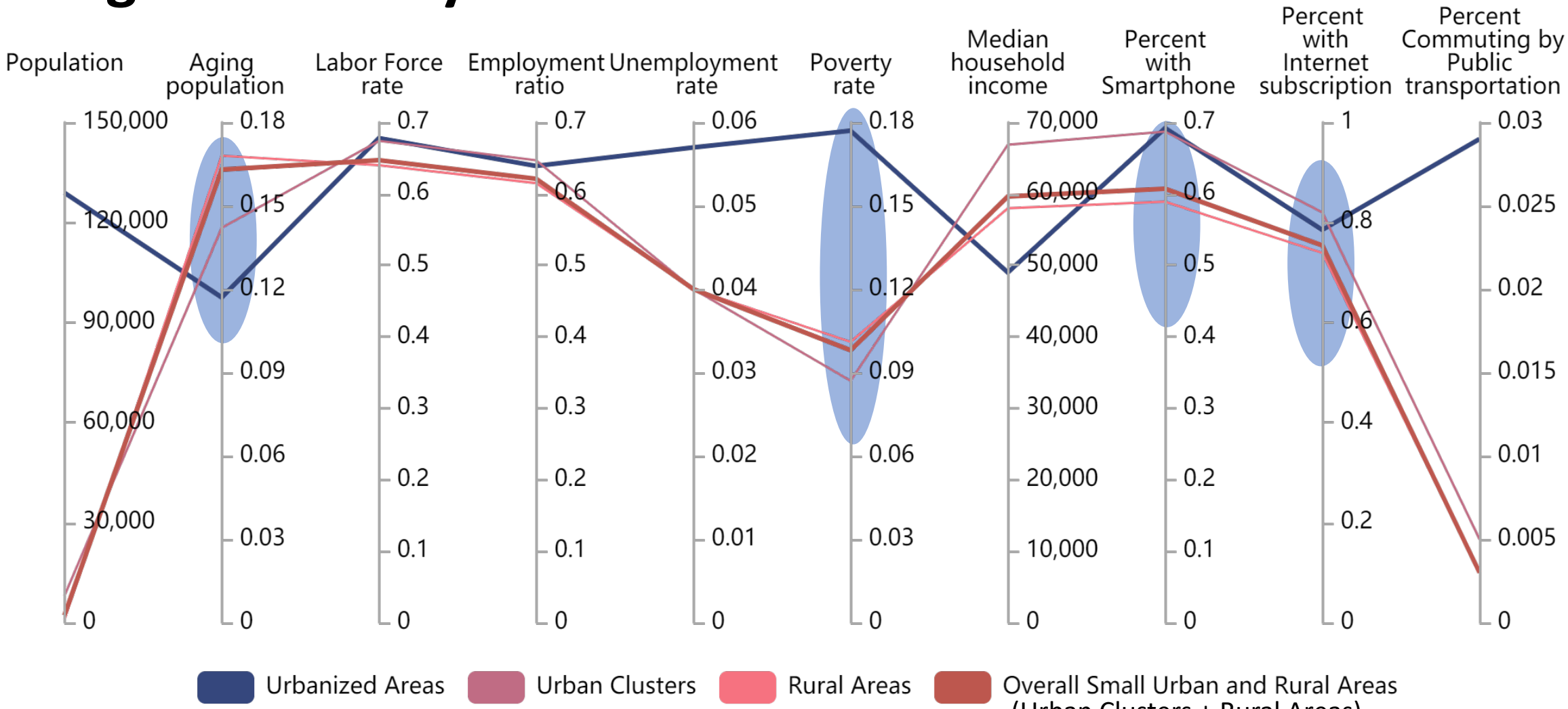
Research Procedure



Advisory Committee

State/Local government	1
Transit agency	2
Transportation planner	1
State/Local public transportation association	1
Shared-ride taxi provider	2
Bikeshare provider	1

Background Analysis



Statistics of Demographics, Economics, Technology, and the Usage of Public Transportation in Urbanized, Small Urban and Rural Areas of Wisconsin

Source: U.S. Census 2010; ACS 2013-2017

Key Findings

Identification of Critical Issues

Concept Development

- Aging population
- Lack of public transport travel experience
- Limited smartphone service availability

Policy & Planning

- Municipal boundaries
- Funding

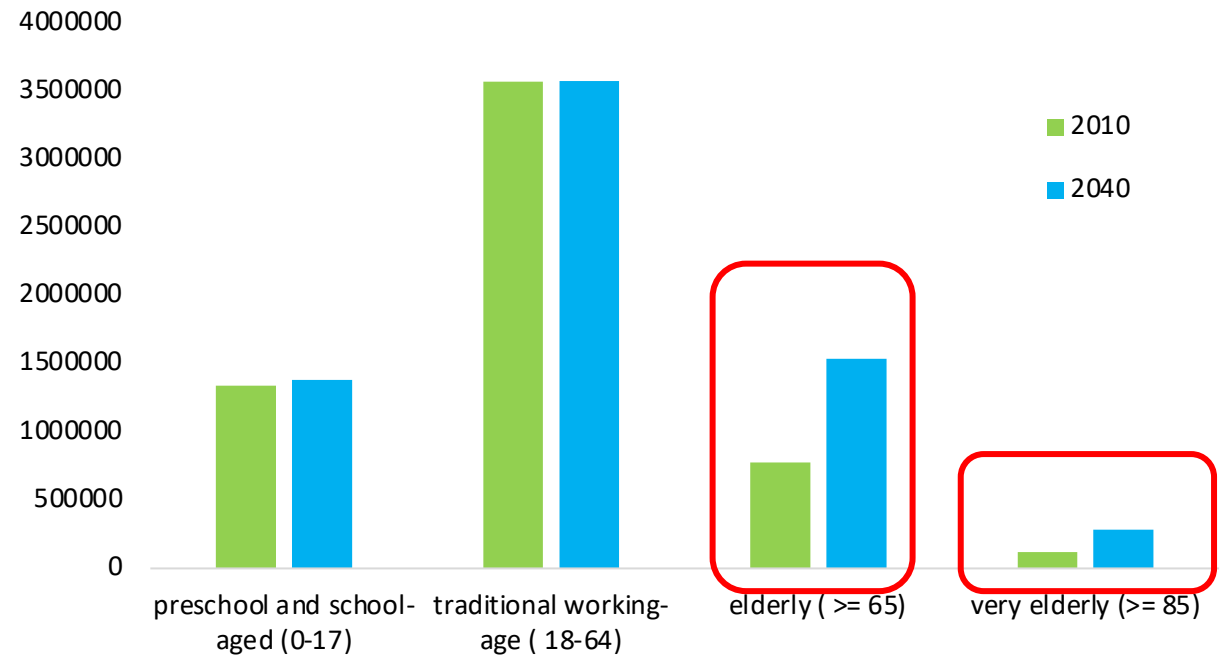
Implementation

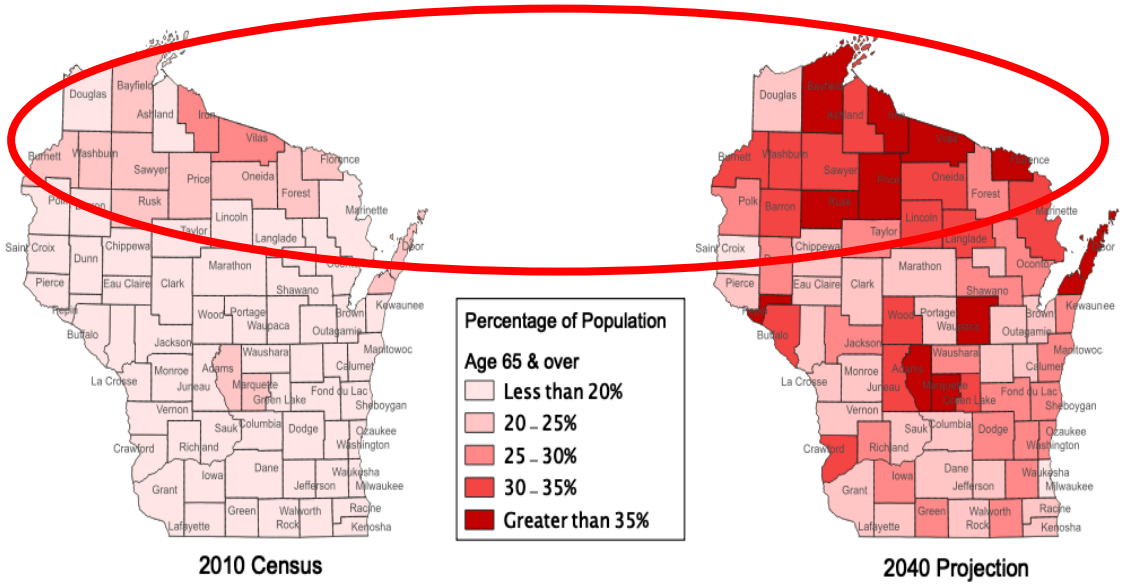
- Staff availability
- Limited capacity
- Technical capabilities

Identification of Critical Issues

1. Aging population

- Young elderly (ages 65-84) ***almost double,*** "Old elderly" (ages 85 and over) nearly increase ***one and one-half.***
- Northern counties are projected to have ***more than 3 out of every 10 residents over 65 in 2040***.



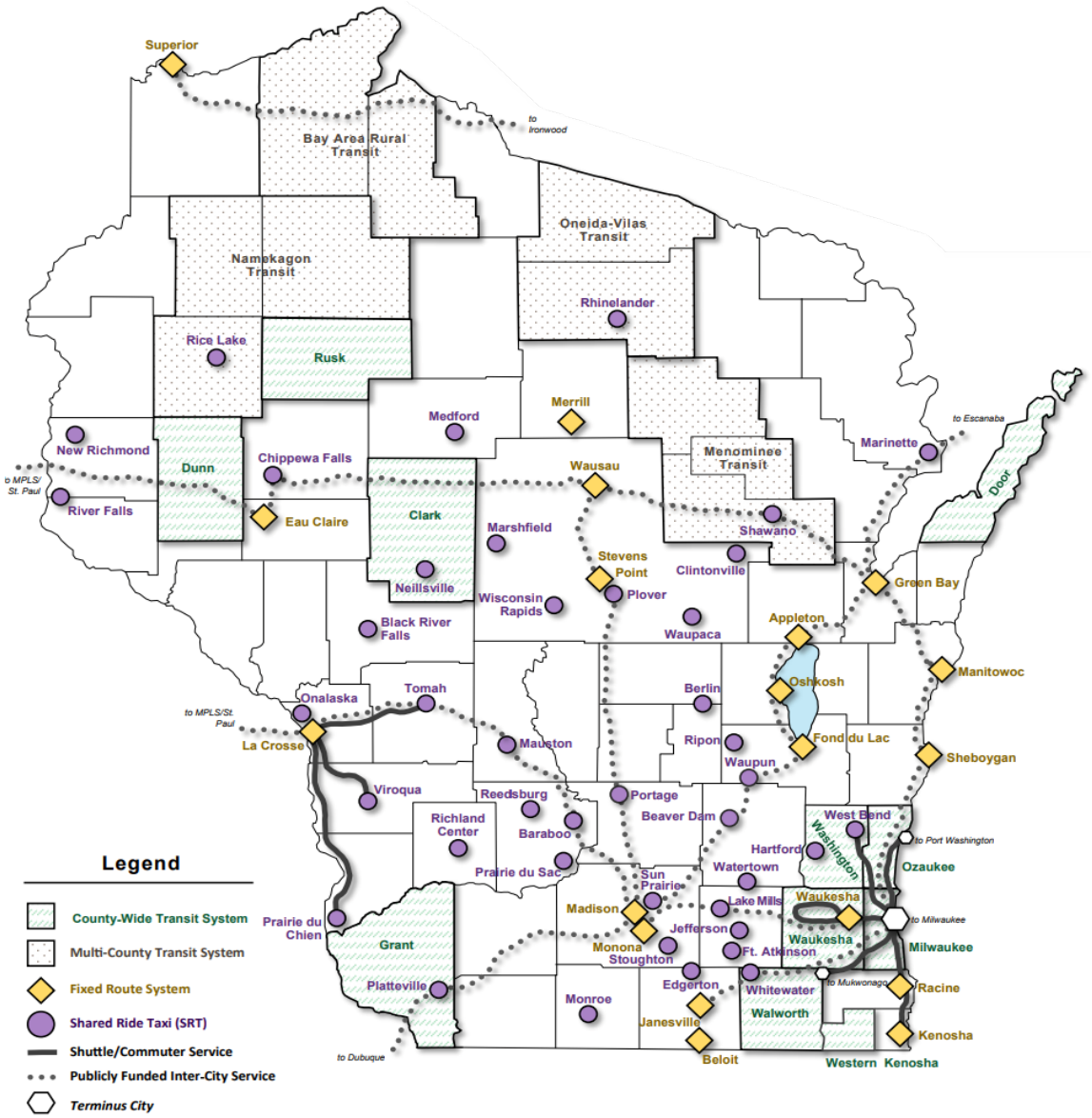


Source: Wisconsin Department of Administration Demographic Services Center, 2013

Identification of Critical Issues

2. Lack of public transport travel experience

- Residents in suburban and rural communities of Wisconsin have ***little access to fixed route transit*** but ***more chances to use shared-ride taxi***.

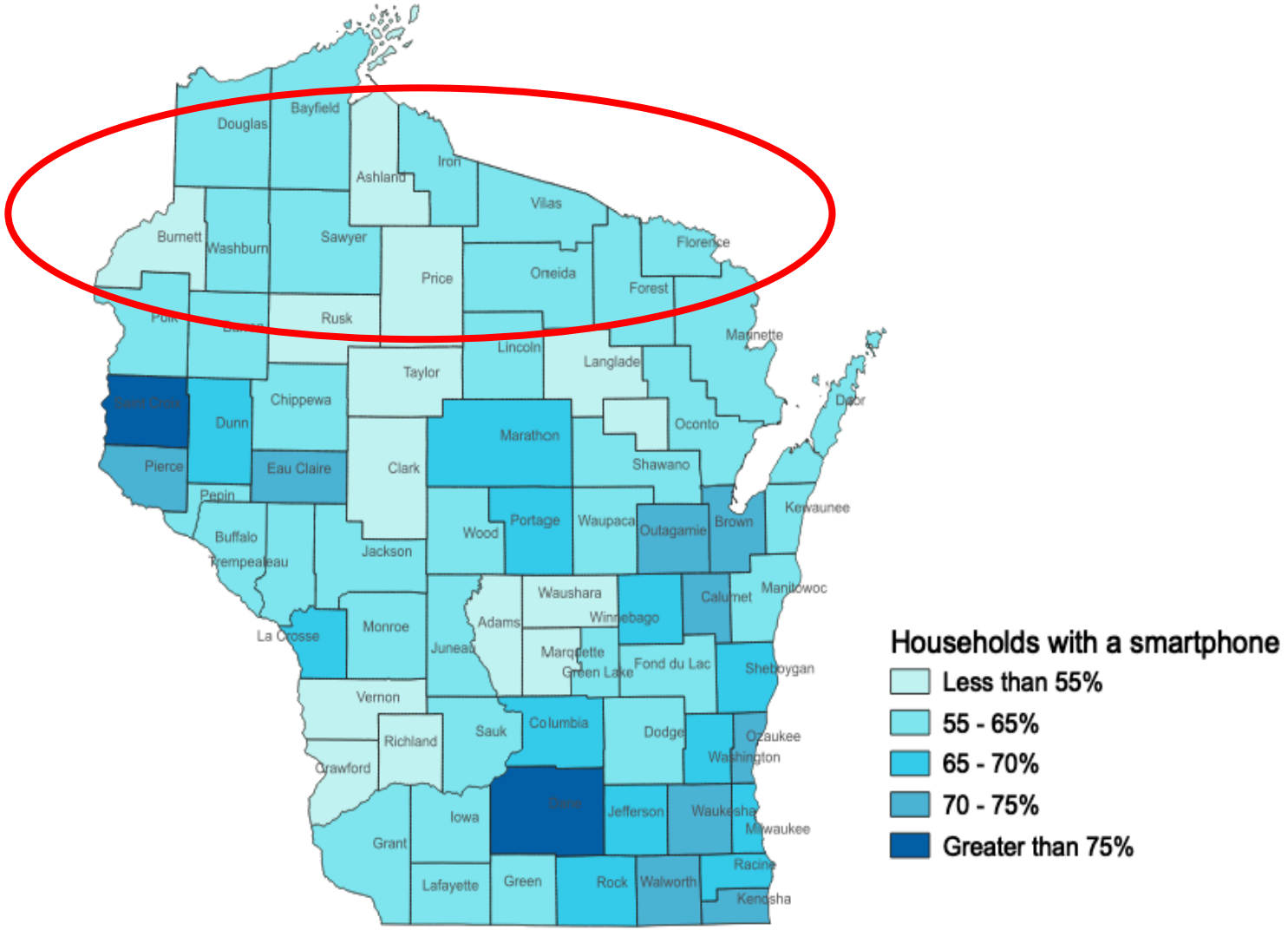


Source: https://wisconsindot.gov/Documents/travel/pub-transit/system-map.pdf

Identification of Critical Issues

3. Limited smartphone service availability

- **High percentages of households with smartphones mostly lie in urbanized areas.**



Source: ACS 2017 5 Year Estimates; Hubbuch, 2018

Identification of Critical Issues

4. Municipal boundaries

- **Travel demand are across county borders** to reach job destinations, healthcare providers, shopping, and other activities.
- **Public transportation services are limited to county borders**.

5. Funding

- **Local governments have limited funding resources.**
- **Many local elected officials do not have the experience of using public transit.**

"We are inherently conservative because it isn't our money (public money); We don't want to waste anything; we cannot be the first person to buy an electric bus; we are really conservative to try something new and have to follow someone else who will take the first step."

Identification of Critical Issues

6. Staff availability

- **Staff overloaded with multiple functions**

"I have to pick up phones, schedule, and dispatch vehicles all by myself."
"With increasing demand for shared ride taxi there is a request for increased service. However, increased service demand cannot be freely implemented due to the constraints. "

7. Limited capacity

- **Limited service capacity due to funding limitations**

"Standard wait time is somewhere between 30 minutes or more. This is due to the limitation of the number of vehicles on the road - limited resource."

8. Technical capabilities

- **Limited capabilities to deal with complex problems**
- **Few eligible businesses to contract out to**

Response Strategies

Critical Issues

- Aging population
- Lack of public transport travel experience
- Limited smartphone service availability
- Municipal boundaries
- Funding
- Staff availability
- Limited capacity
- Technical capabilities

Key Strategies

- Collaboration among stakeholders
- Tailored service package
- User Interface design
- Pilot project

Response Strategies

Collaboration among stakeholders

Targeting Issues
- Aging population
- Municipal boundaries
- Funding
- Staff availability
- Limited capacity
- Technical capabilities

❑ **Business Models**

- **Public-Private-Partnerships (PPP, P3s)**

Enough funding to implement MaaS
Lack a driving force due to no market competition

- **Public-Private-People-Partnerships (PPPP, P4s)**

Reduce costs of governments
Risks and concerns due to incomplete legislative protection

- **Shared-ride taxis**

Serving as a skeleton of MaaS in suburban and rural areas

Reference: Aapaoja et al., 2017; Konig et al., 2016

Response Strategies

Collaboration among stakeholders

Targeting Issues
- Aging population
- Municipal boundaries
- Funding
- Staff availability
- Limited capacity
- Technical capabilities

❑ **Collaborations among governments**

- **Establish ad hoc funding programs to satisfy special groups**

e.g., Funding programs from Wisconsin DOT (Department of Transportation) and DHS (Department of Health Services) for Older adults

❑ **Operational agreements**

- **Create agreements for cross-county-boundary MaaS systems**

e.g. Geographical scopes of operation, obligations, data exchange, and revenue allocations

Response Strategies

Tailored service package

Targeting Issues
- Aging population
- Lack of public transport travel experience

❑ **Information provision**

- **Providing customized information**

e.g., Health centers and community activities to older adults; Shopping discounts and park & ride lots to people having few public transit experiences

❑ **Customized trips**

- **Consistent with users' preferences**

Cost, accessibility, reliability, speed, presence of caregivers, etc
e.g., Volunteer/paid transportation service, health care trips, cross-boundary trips, paratransit service for older adults; park and ride, shared-ride taxi, and carsharing for people not familiar with transit

❑ **Service bundling strategies**

- **Monthly, yearly membership**
- **Free trail**

Response Strategies

User interface design

Targeting Issues
- Aging population
- Limited smartphone service availability

❑ **Household-based access V.S. Individual-based access**
- Booking, payment and rating
- Real-time tracking and updates

❑ **Elderly & disabled-friendly App**
- Vision, hearing, mobility, cognition difficulties
- Icons, pictures, sounds, interactive elements, and reminders friendly to older adults

❑ **Telephone customer service & Website**

Response Strategies

Pilot project

Targeting Issues

- Aging population
- Lack of public transport travel experience
- Limited smartphone service availability
- Municipal boundaries
- Funding
- Staff availability
- Limited capacity
- Technical capabilities

❑ **Customer investigations**

- Older adults
- Households without smartphones
- Travelers lack of public transport travel experience

❑ **Projects involving components of MaaS**

- Collaborations among stakeholders, tailored service packages, user interface design, etc.

❑ **Follow-up surveys**

- Test the effectiveness of MaaS services in small urban and rural areas.
- **Opportunities V.S. Risks?**

For more info…

Tommy G. Thompson Center on Public Leadership
UNIVERSITY OF WISCONSIN-MADISON

CONNECTING WISCONSIN OF TOMORROW: METHODS TO IMPROVE PUBLIC MOBILITY UNDER FUTURE SOCIAL, ECONOMIC AND TECHNOLOGICAL CHANGES

FINAL REPORT

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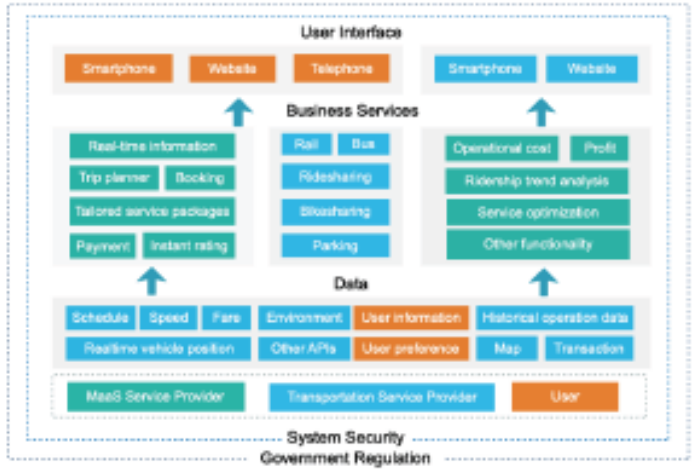

Figure IV: System Architecture for MaaS in Wisconsin

Strength	Weakness
• User Flexibility • User Convenience • Transparency • Personalization • Promoting sustainable and health lifestyles	• Technology investment requirement • Equity • Funding • Ease of Use • Wireless Connectivity Issues
Opportunities	**Threats**
• Sustainable and intermodal travel options • Young talent to Wisconsin • Complimentary services • Equity • Cross-boundary solutions	• Partnership establishment Uncertainties with transportation service providers • Hard to change travel patterns and behavior • Subscription model • Privacy concerns • Government Approval Requirements

Figure III: SWOT Analysis

Figure V: Roadmap for implementing Mobility as a Service in Wisconsin

ACKNOWLEGEMENT

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Brian Engelking, Transit Manager, Waukesha Metro Transit;
Lynn Gilles, WIPTA chair/Transit manger, City of Fond Du Lac;
Kevin Muhs, Executive Director, SEWPRC;
Ian Ritz, Chief of Transit Section, Wisconsin DOT;
Justin Running, General Manager, Running Incorporated
Jeff Sponcia, Transit Manager, MCTS;
Jason Wittek, Transit Superintendent, Ozaukee County