



## **PRISMA PILOTS RRI ROADMAPS**

# **RDM**

CEN workshop background document

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## The Company:

The RDM Group, produces small low-speed self-driving pods. These are envisioned as being deployed for the 'last mile' of a journey, such as between a railway station and the final destination. They also might be used in shopping malls, university campuses, airports, or for parcel delivery.

The company RDM is part of several consortia receiving funding from Innovate UK, a body that distributes government funds for research. Amongst the project members are also Jaguar Land Rover and Milton Keynes Council. Furthermore, RDM has been involved in UK research council funded projects on automated cars managed by Warwick Manufacturing Group, Warwick University, including the projects INTACT, SWARM, and SMARTER.

### Commitment

- The RRI PRISMA pilot has been endorsed by the Chief Technical Officer
- Motivation for RRI: exploring ways to ensure societal acceptability of the final product: involve a diversity of stakeholders to discuss about how vehicles should be conducted, how the data collected should be used in order to respect people's rights and how autonomous vehicles could affect or improve the public spaces, urban planning or commerce.

### Context, materiality and experimentation

- Type of pilot organization: SME
- Country: UK
- R&I project selected: self-driving pods
- Technology: Autonomous vehicles
- Relevant regulatory regimes: General Data Protection Regulation, safety, security, mobility and environmental regulation
- Type of R&I activities: in-house and cooperative research (public -private partnership)
- Type of business: business to business, business to consumer
- Time to Market (indicative): 3-5 years
- CSR policies: none explicit
- RRI Maturity Level: Tactical

### Materiality & experimentation

- Key stakeholders: universities and other research partners, suppliers, commercial partners, local governments funders, local communities, and end-users of the pods (both private citizens and businesses), media and the general public
- Key ethical, legal and social issues: information privacy, commercial use of private data, and urban planning, safety of trials on public roads
- RRI actions selected for the PRISMA pilots: embedded ethicist

## Validation aspects (key performance indicators)

- The most significant criteria identified with the company to analysis and monitor over time the impacts (in terms of costs & benefits) of the RRI actions on the self-driving pods project are<sup>9</sup>
  - Q1.2: Feasibility of the technology solution; Q1.5: Product reliability
  - Q2.1: Product acceptability; Q2.2: Product safety;
  - Q3.4: Customer satisfaction, meeting new consumers' needs or requests; Q3.7: Fulfil ethical and social requirements
  - Q4.3: Address regulatory barriers; Q4.5: Risk management; Q4.7: Avoid irresponsible behaviour
  - Q5.3: Market penetration;

## RRI Roadmap

### RRI VISION

Developing automated and personalized public transport to reduce traffic, pollution and parking land use in urban areas. The vision is to develop this technology in a way that is:

- carried out in consort with all involved, especially its end users and those who live in the spaces in which it will be deployed
- both safe and inconspicuous, and tested rigorously
- proactively open, transparent and fair about its use of people's personal data
- demonstrably an improvement in sustainability terms

### R&I Technologies and products

*Electric Automated Cars for Public Transport:* The core deployment of the technology is the automated vehicle for the purposes of public transport in a city.

*Market for Retailers in Routes:* Among the possible revenue models for the technology is the creation of a market among retailers for advertisements or even offers of different destinations to customers.

*Smart sensors of real time traffic densities, transport demand:* The technology includes a set of different sensors that can detect, predict, and avoid traffic congestion, with a set of driverless pods acting as an aggregated group.

*Electric commercial vehicles for urban deliveries:* Alongside the passenger carrying function is the possibility of deploying the vehicles for delivery of goods.

*Urban pods as data collectors and transmitters:* The pods must collect a great deal of data in order to function, and this is likely only to increase as data collection technology in general improves and gets cheaper.

## Drivers and challenges for RRI

### Drivers (technology)

- **Fixed business hours making for peaks and troughs in demand:** Transport in cities is subject to rush hours and quiet periods; in rush hours the infrastructure will be heavily stretched and there will therefore be great value in finding ways to reduce the demands upon it, for instance through the creation of the kind of park and ride scheme proposed by the RDM driverless technology.
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- **Multiplication of delivery technologies by large internet retailers:** The various proposed uses of the driverless pod include their use as a delivery channel for internet retail products. This is one of the several potentially lucrative uses of the technology.

## Challenges

- **Difficulties of automated transport off motorways:** It is challenging to deploy automated vehicles — even slow-moving ones — in complex residential environments that include cyclists, pedestrians, and larger vehicles. Success will depend on robust technological solutions to the various problems raised.
- **Oversight about data collection:** RDM projects is designed on the model of service in exchange of data” — raising revenue by brokering the data provided by users — so users need transparent information about the data collected and used, in order to provide informed consent. Transparency also avoids a possible uses of users’ data beyond the individual’s expectations.
- **Transparency in communication with users:** road-users need to be informed about the behavior of autonomous vehicles

## Risks and barriers to be addressed by RRI actions

- **Public misapprehensions about safety and risks:** alongside technological robustness, in order to succeed it will be necessary to take the correct path being with regard to popular attitudes towards the technology
- **Crowding of pedestrian spaces by delivery vehicles:** If the vehicles are perceived as crowding pedestrian spaces, especially where they are in a delivery function, then public uptake will be diminished
- **Resistance to vehicle sharing:** In order for the efficiency with regards to reducing congestion, it will be necessary for the vehicles to operate with a ridesharing function. It remains to be seen how far there is a market for this product that sits in between public transport, on one hand, and private cars and taxis on the other.
- **Protocols for data exchange with authorities**

## RRI approaches, tools, actions

### Anticipation & Reflection

- **Advanced Simulation and Testing of Speeds, environments,** also based on stakeholder engagement: in order to anticipate and characterize possible risks or conflictual situations. This will improve the risk management and safety procedures and will highlight the conflicts in order to solve them.

### Inclusiveness

- **Co-creation with retailers, urban transport authorities, local residents** in order to involve who has a stake in the definition of the urban planning and to improve the positive social impacts of the project. The users could be interested in a service providing them information about places, to find shops with specific characteristics, or receive advertising based on their preferences.

### Responsiveness

- **Embedded ethicist:** translation of existing practices into RRI-terms
- **Environmental impact studies:** in order to select the best options for the development of autonomous electric vehicles usage and for environmental impact reduction (e.g. aiming at the maximum traffic reduction)

- **Oversight and transparency about data collection**, including use of specific ethical protocols to guarantee respect of users' rights

## Roadmap design

The aspects relevant for the uptake of RRI by the company have been synthesized in an overall diagram, following the visual approach described in the PRISMA exemplar roadmap (Figure 7).

The RRI roadmap developed in PRISMA is a useful starting point for RRI uptake. The PRISMA experience has been really informative for RDM, it allowed a small family business –with limited formal education in ethics or responsible innovation – to benchmark itself against the rest of the innovation world, have a better understanding of the values, needs and concerns of its customers, finally improving the product.

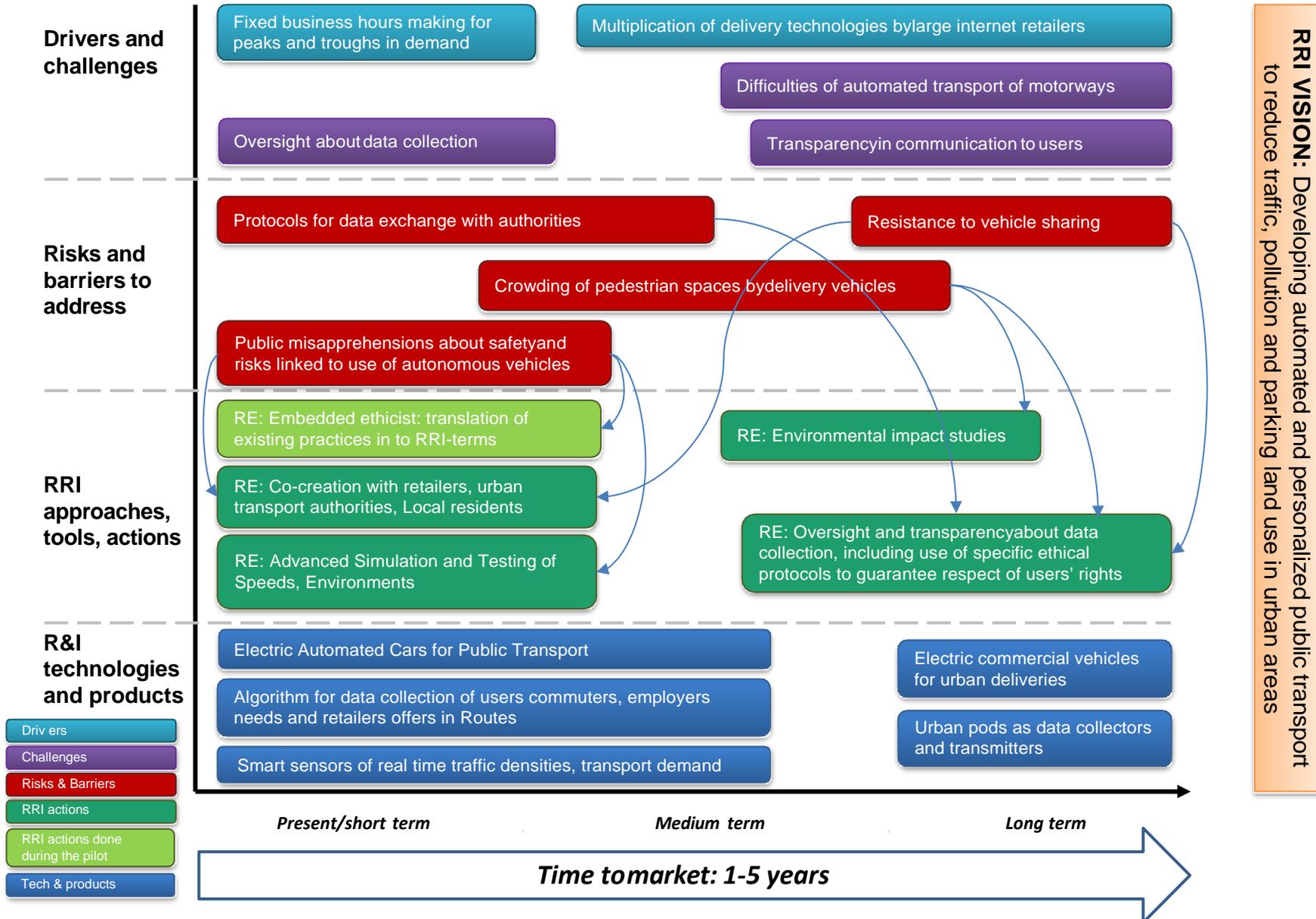


Figure 7 RDM, PRISMA RRI roadmap

