

Manchester

Stavanger

Sabadell

Prague

Leipzig

Eindhoven

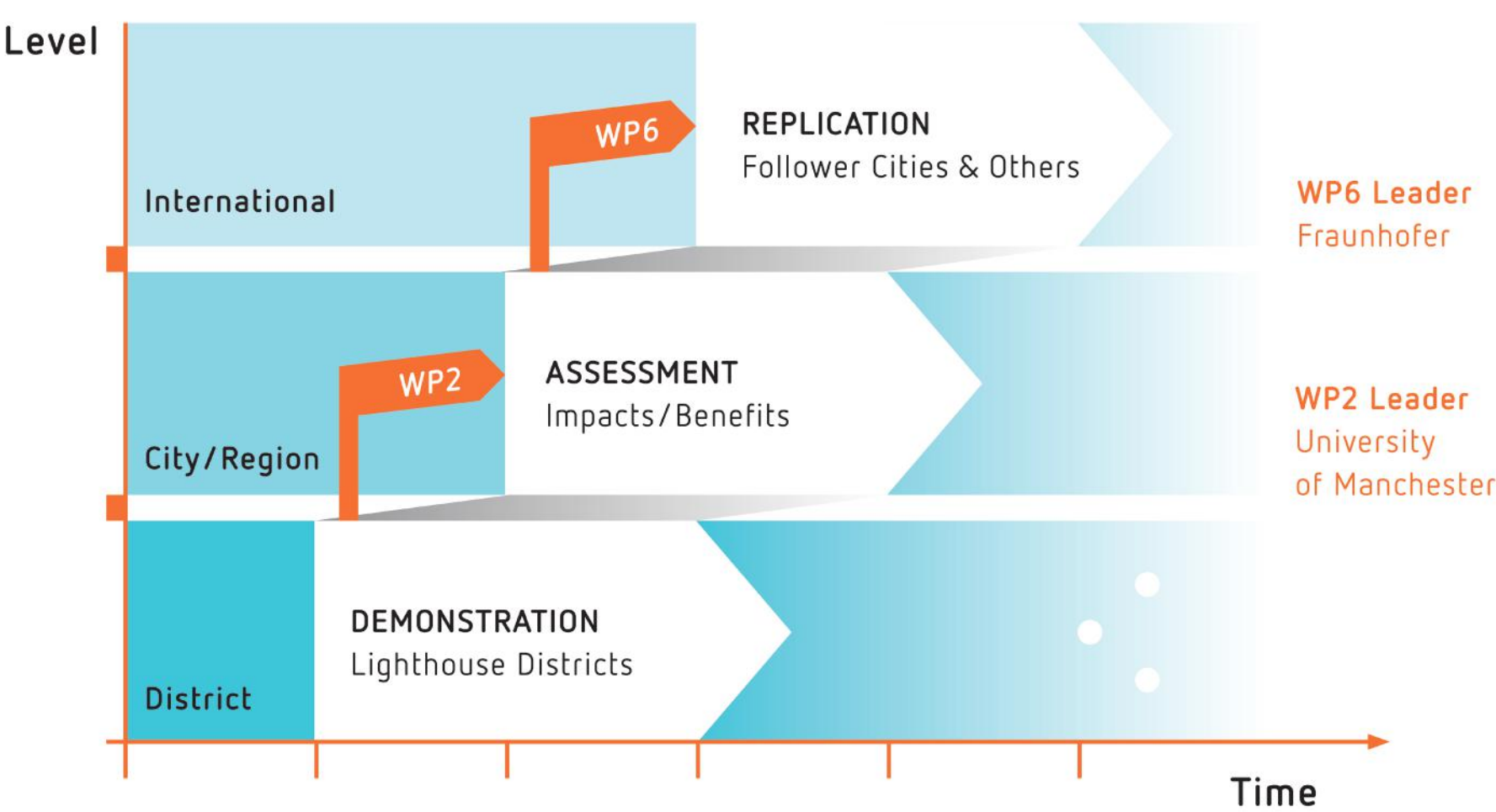
# triangulum

DEMONSTRATE · DISSEMINATE · REPLICATE

## MONITORING & EVALUATION



The Smart City Replication Framework



Three Phases of Triangulum  
Credits: Fraunhofer / Andreas Jung

### A Unique Impact Assessment Approach

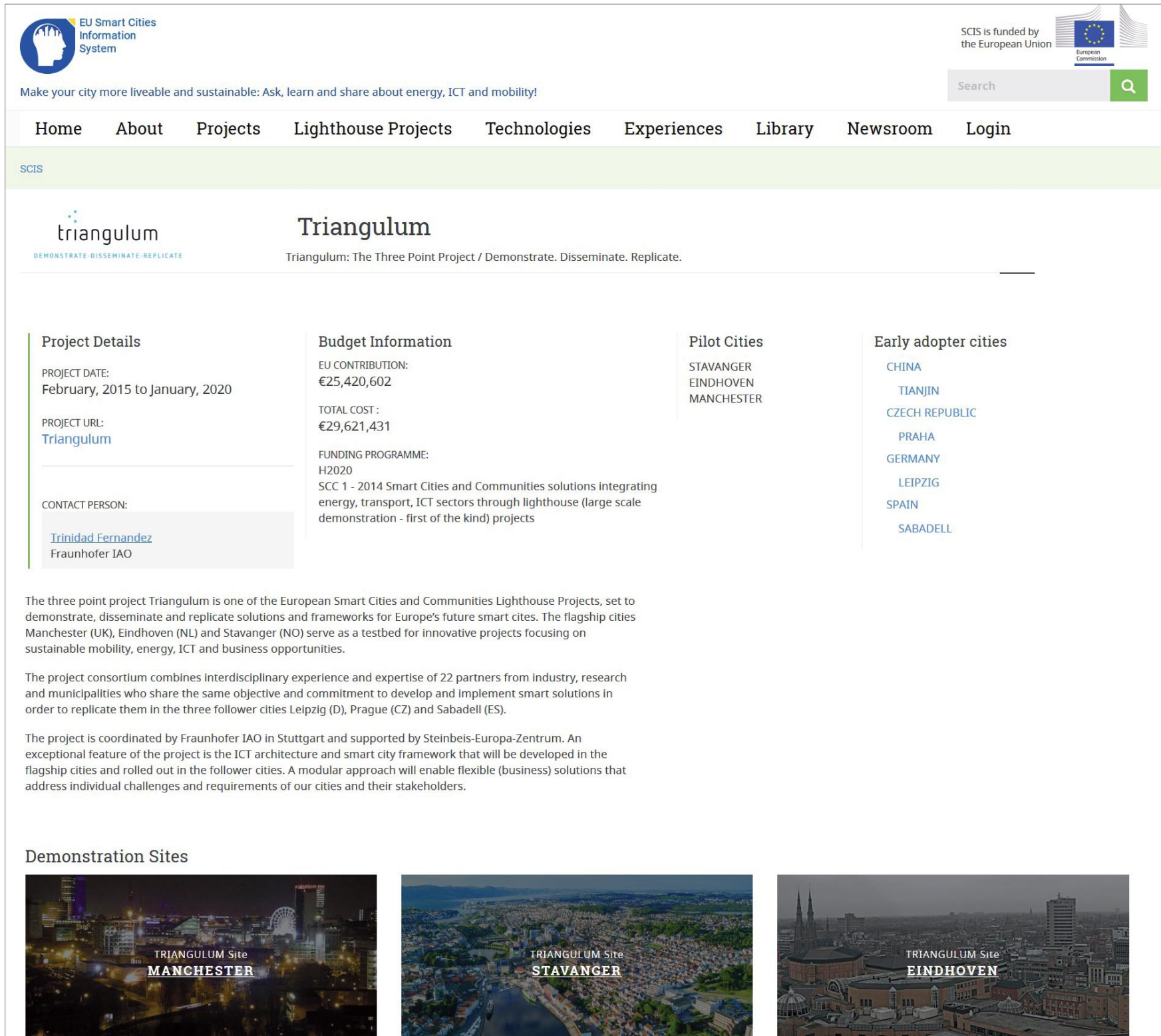
- Triangulum has co-produced a unique impact assessment approach with partners to assess impacts at different levels and to support replication.
- This approach captures hard and soft impacts relating to smarter use of resources and changes in governance and behaviour.
- The approach also projects the potential impacts of scaling up smart solutions to meet broader city goals.
- Results have been published in three peer reviewed papers addressing data governance (in the journal *Informatics*), smart sustainability (in the journal *Technological Forecasting and Social Change*) and the use of smart districts (in the journal *Sustainable Cities and Society*).



Electric Battery Bus in Stavanger  
Credits: Katelien van den Berge, Stavanger Kommune

### Smart Energy and Mobility Impacts

- Triangulum is saving more than 1,100 t CO<sub>2</sub>e per annum through smart energy projects, the equivalent of removing 234 cars from the roads.
- Almost 100 homes in Stavanger are smart metered and more than 70 renovated homes in Eindhoven are now saving ~60% on energy bills.
- Electric vehicles, E-Assist cargo bikes and battery buses and associated business cases have been trialled and successfully rolled out within and beyond partner organisations.
- Scaling up the Triangulum smart energy projects to cover all offices in Manchester city centre would achieve 11.5% of required savings to be zero carbon by 2050.



SCIS – Smart Cities Information System  
Credits: SCIS

### Leaving a Legacy

- 90% of Triangulum demonstrations produced 12-24 months of data that are hosted in city data platforms, open access repositories and SCIS to inform future analysis and replication.
- City Level Impacts include >€60m of new funding for smart projects in the Lighthouse Cities involving 77 new partners, the Nordic Edge event (Stavanger) and the establishment of the Brainport Smart Region (Eindhoven).
- Triangulum has enabled partner cities to become smarter through changing processes, enhancing skills and developing buy-in amongst politicians, companies and citizens.

### Website

[www.triangulum-project.eu](http://www.triangulum-project.eu)



This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No 646578