

REHVA 3 BRUSSELS SUMMIT CONFERENCE

12-13 November 2018

Tuesday 13 November 2018, 9.30 – 16:30
PENTA Hotel, Chaussee de Charleroi 38, 1060 Brussels, Belgium

“Smart buildings for smart users -
implementing the new EPBD”

Smart users for smart buildings The Mobistyle project

MOBISTYLE ENERGY HEALTH
INDOOR ENVIRONMENT

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HUYGEN Engineers & Consultants



MOBISTYLE is a 42-months European project focusing on motivating end users' behavioral change through ICT based personalized information on user's energy usage, indoor environment and health.



Duration: October 2016 – March 2020



MOBISTYLE

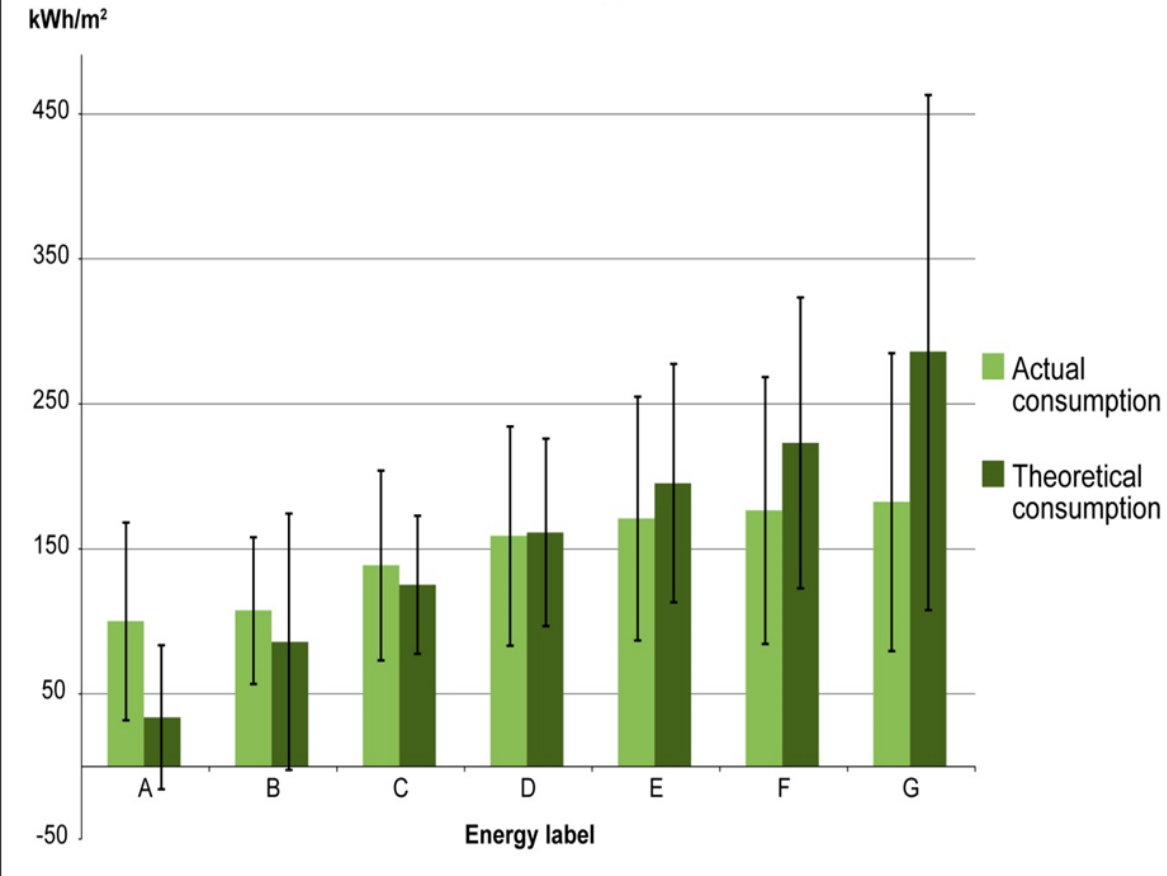


*Smart users for smart buildings
The MOBISTYLE project
Brussels, 13 Nov 2018*



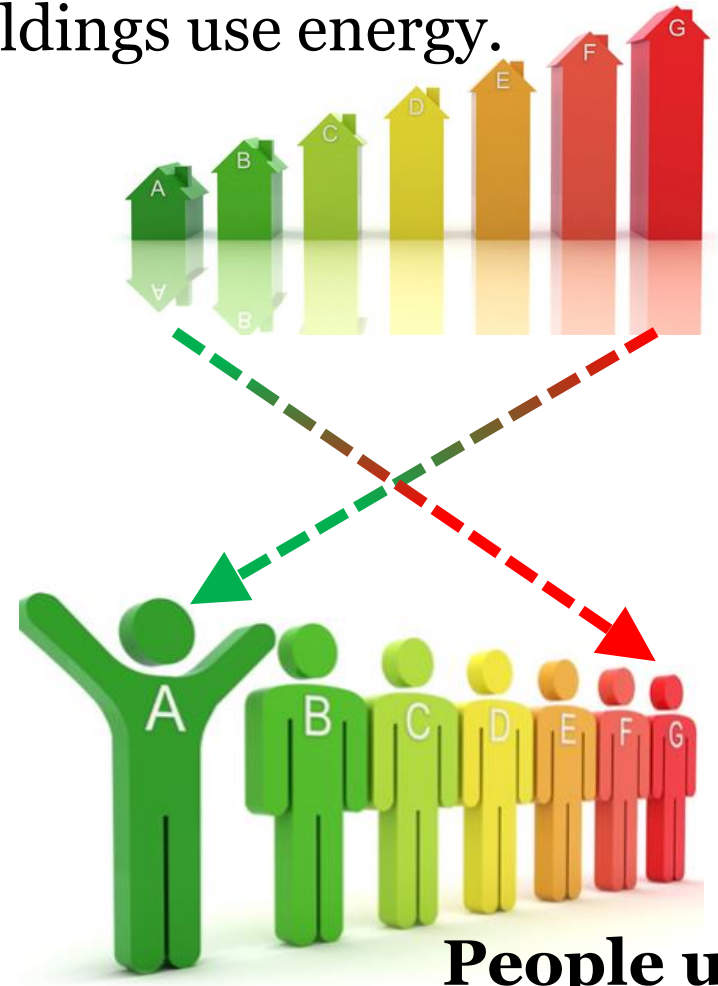
MOBISTYLE PROJECT VISION

Actual and theoretical energy consumption per m² of detached housing per energy label



REFERENCE: UserTEC – User Practices, Technologies and Residential Energy Consumption. P. Heiselberg, AAU, Denmark [LINK](#).

Buildings use energy.

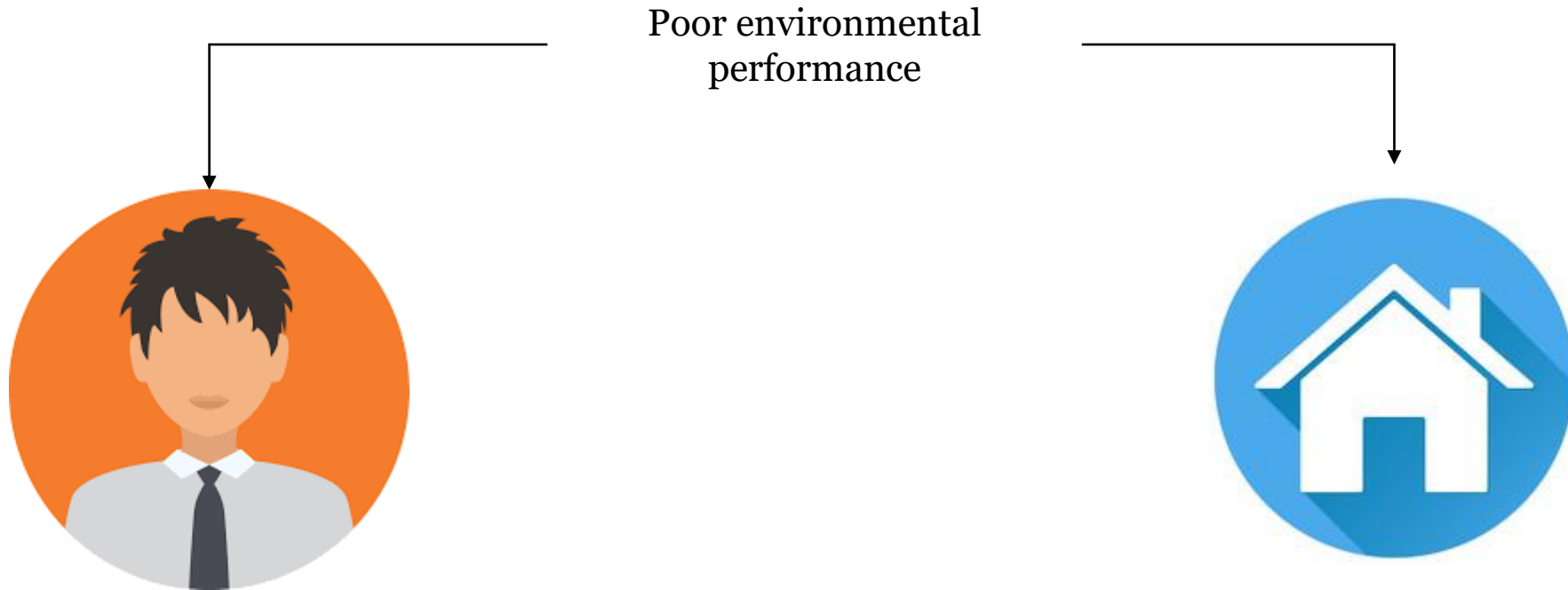


People use energy.





MOBISTYLE PROJECT VISION



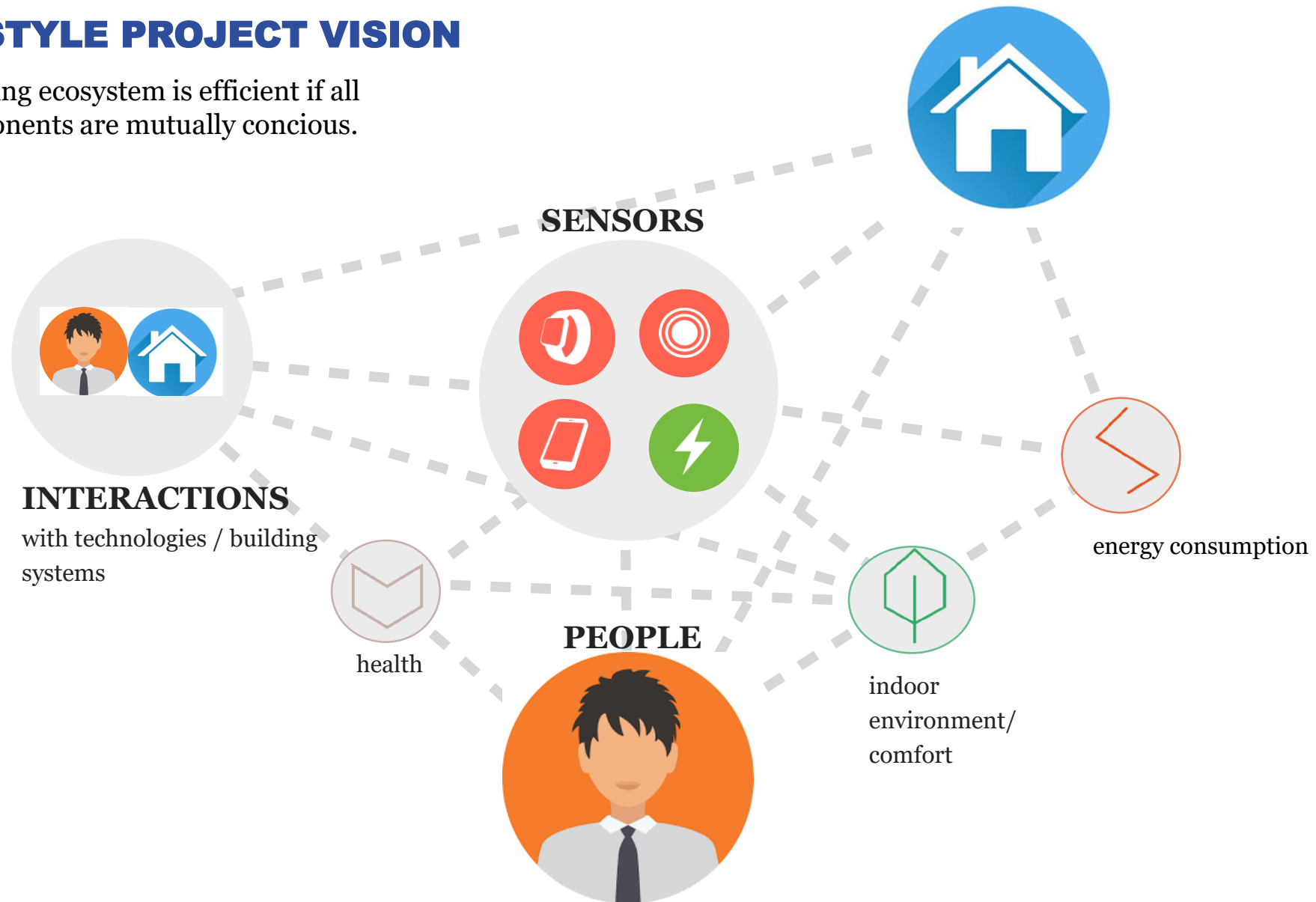
Key factors from the targeted **building occupants** that may lead to a decline in building performance:

- Incorrect system operation (lack of knowledge on control)
- Inefficient behaviour (lack of user awareness)



MOBISTYLE PROJECT VISION

The building ecosystem is efficient if all the components are mutually conscious.



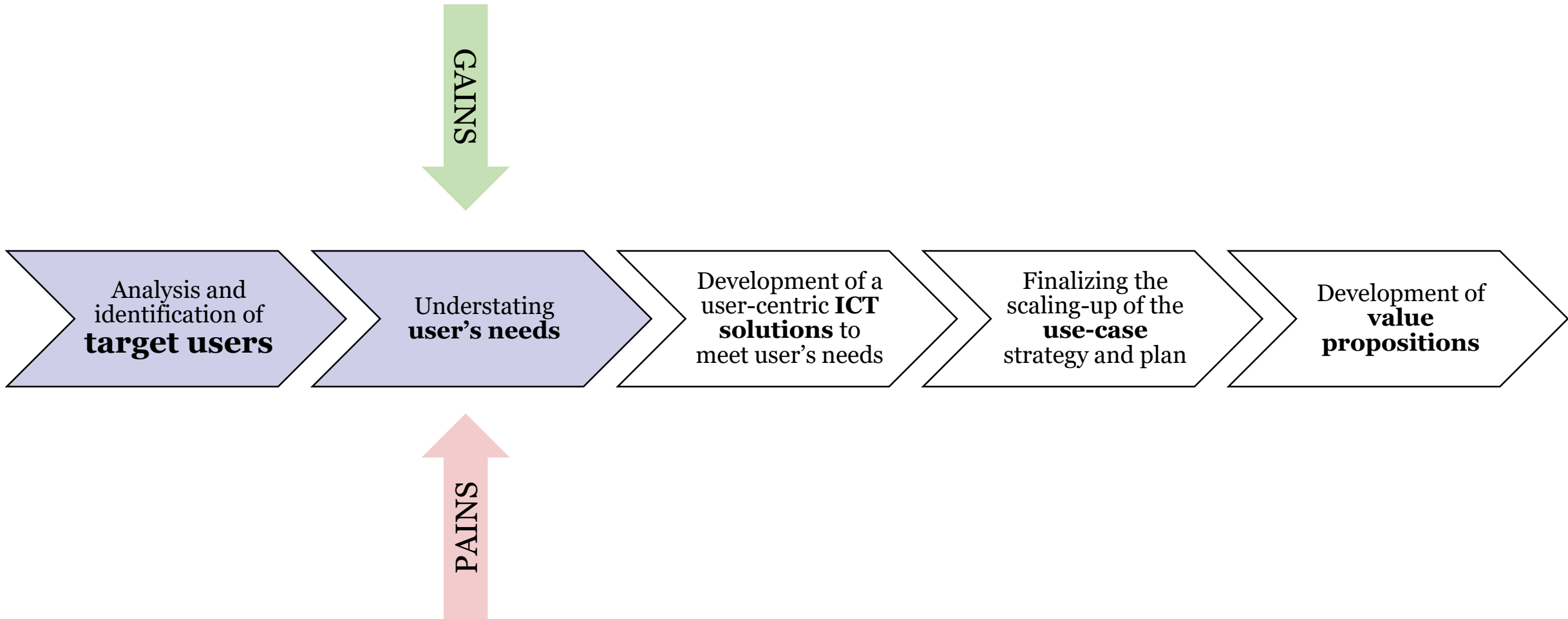


MOBISTYLE USER-CENTRIC APPROACH



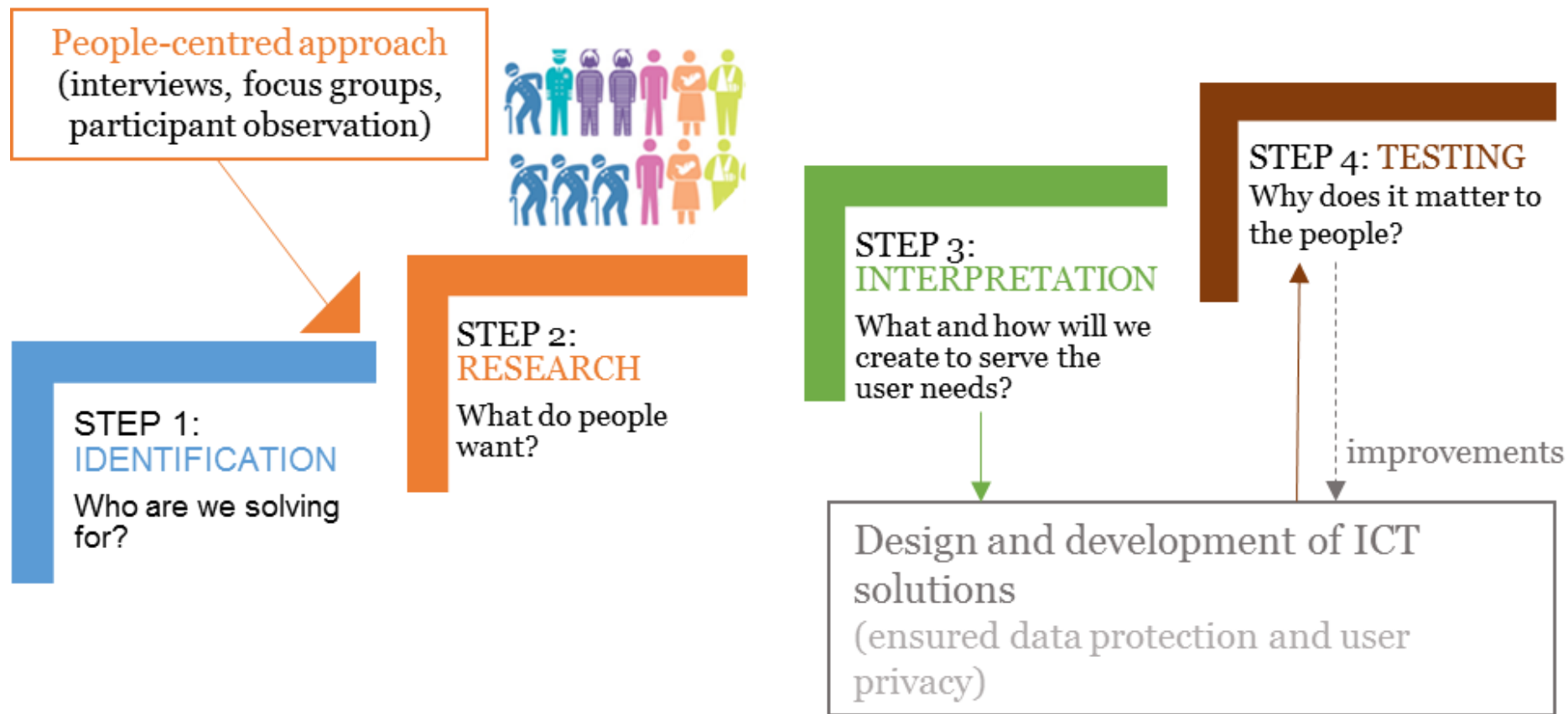


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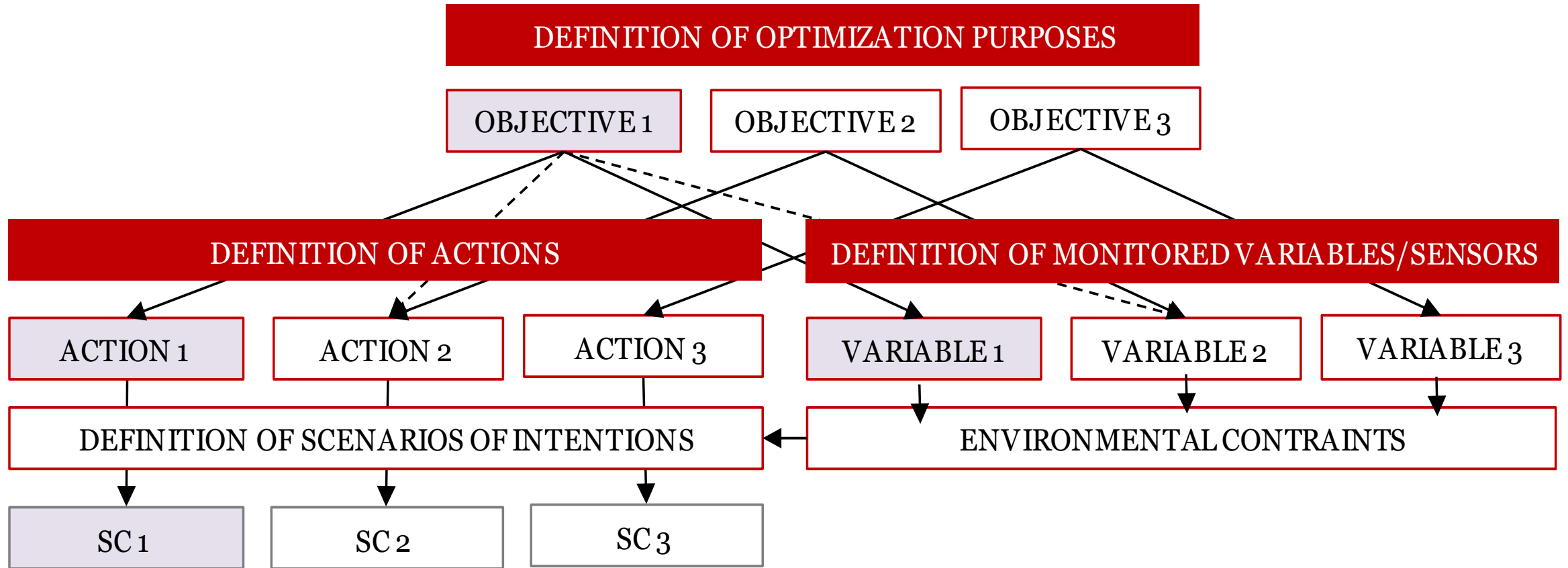


MOBISTYLE USER-CENTRIC APPROACH





MOBISTYLE BEHAVIOURAL ACTION PLAN



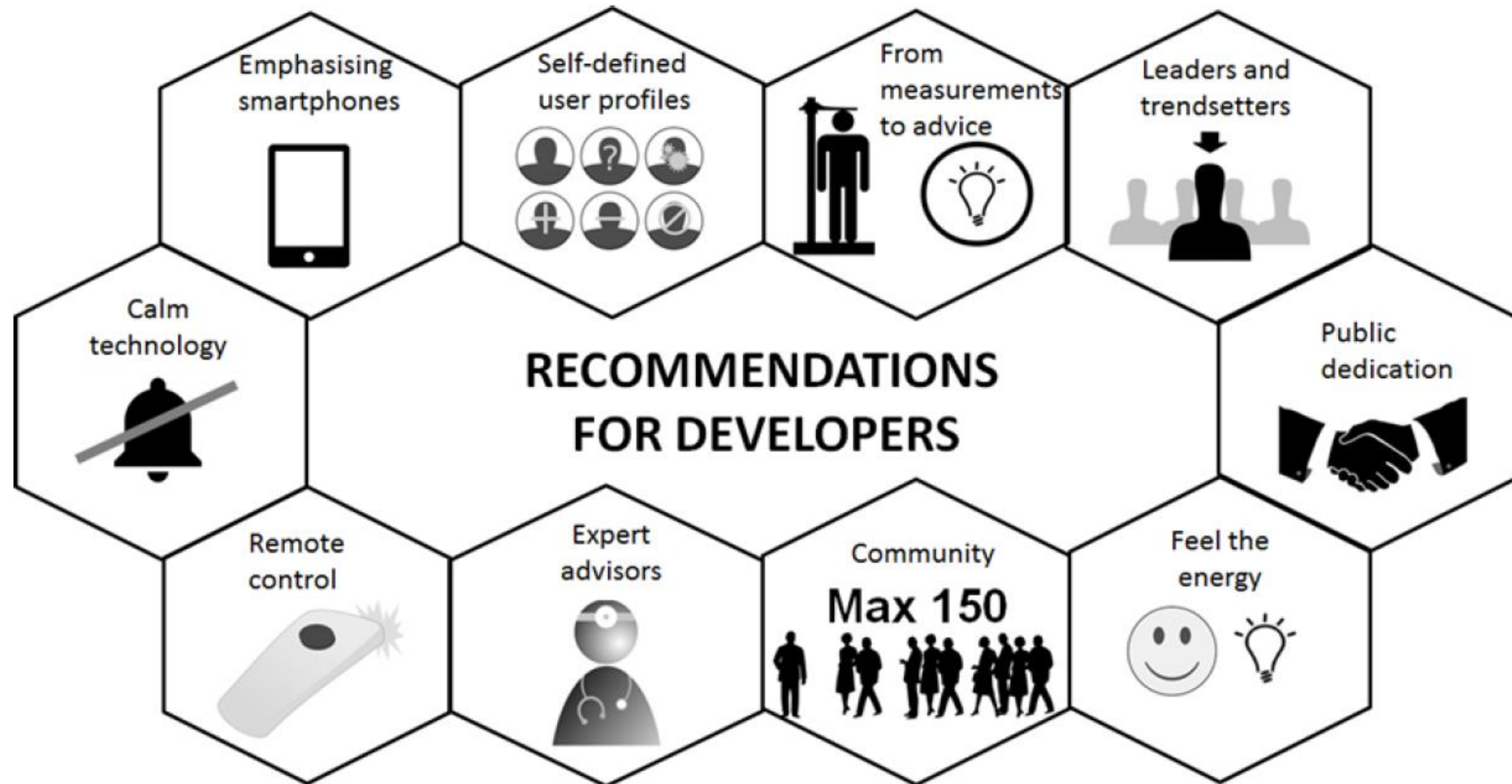


MOBISTYLE ICT SOLUTIONS DEVELOPMENT



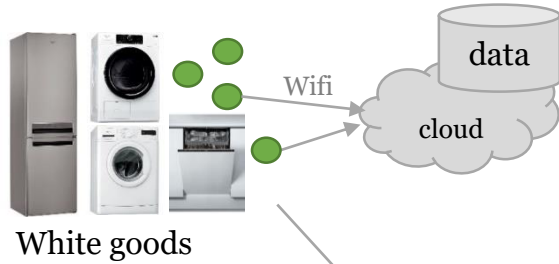


MOBISTYLE RECOMMENDATIONS FOR ICT SOLUTIONS DEVELOPMENT



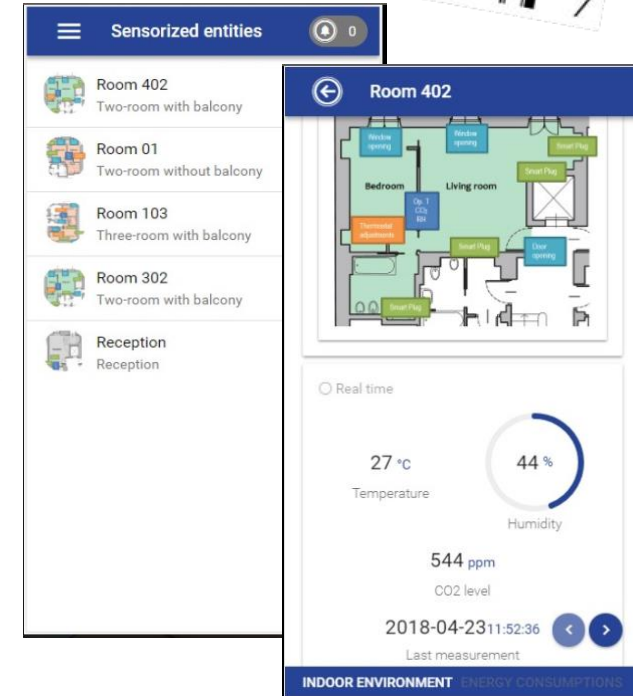
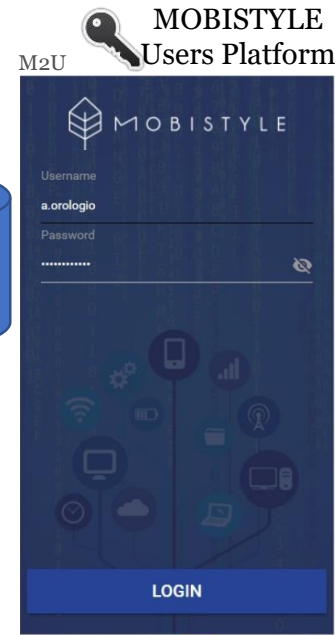
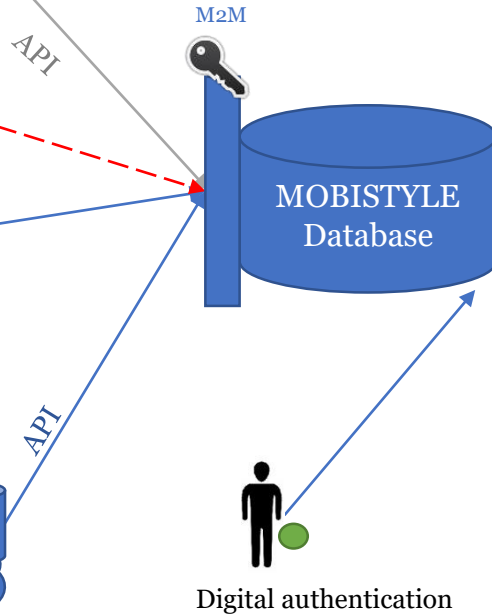


MOBISTYLE ICT ARCHITECTURE



Energy
IEQ
Health

Methodologies
(Algorithms, models)



MOBISTYLE



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MOBISTYLE ICT SOLUTIONS



Dashboard



Game

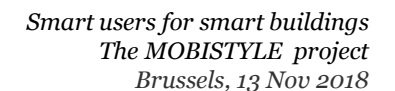
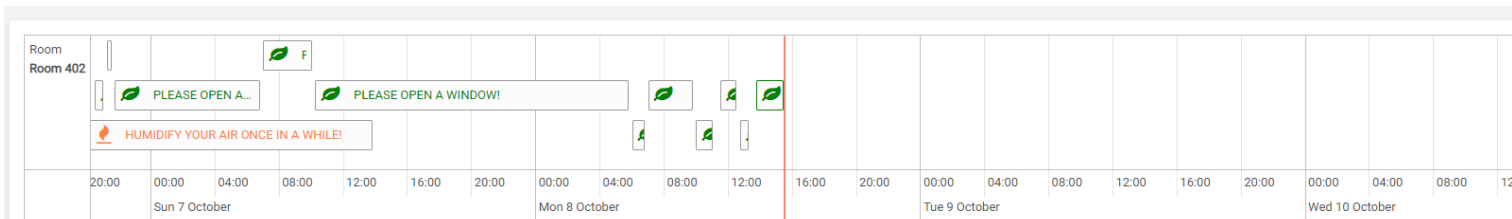
	MOBISTYLE Dashboard	MOBISTYLE Game
What is it?	<ul style="list-style-type: none">• Application for non experts• Data on energy use and IEQ based on measured parameters.• Visualisation can be customised for different roles (e.g. building occupant or building manager)• Objective is improving indoor environmental conditions and energy consumption through alerts/push messages recommends	<ul style="list-style-type: none">• A mobile application, that based on defined objectives for preferable user practices,• Nudges user to change practices in a fun way• It is able to track the effect of changed practices on energy use and indoor environment over time and compare with peers.• It provides scores to users for recommended practices and desirable changes.
For which purpose?	Monitoring & Raising awareness	Behavioral change & Raise awareness
For whom?	Building manager & Occupants (non-residential)	Residential users
Where it is validated?	Slovenian case & Italian case	Polish case & Danish case



- Web application developed in HTML and Javascript
- Aimed to both consumers and company managers
- Used primarily to configure rooms and suggestions

Mobile application:

- Android only ATM
- Same dashboard as desktop application
- Published as open beta version on Google Play
- Aimed to consumers only



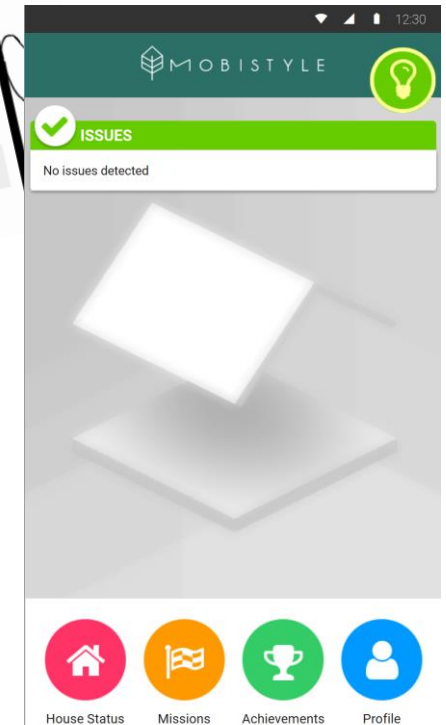


MOBISTYLE GAME



Mobile application:

- The MOBISTYLE Game is a mobile application that uses “nudges”, complemented by “tips”, to change user behaviour based on the sensors available in the residence.
- The game uses data captured from sensors for both triggering missions and detecting their completion.





MOBISTYLE USER CENTRIC APPROACH





MOBISTYLE DEMONSTRATION CASES

5 selected demonstration cases used to present real life situation in five different climatic regions (geo-clusters) covering different building types, different types of end-users and different scales (building, district).

QESKE



The Netherlands, Kerkrade:
Office building Qeske

Denmark, Aalborg:
Residential area Kildeparken

Poland, Wroclaw:
Smart city Wroclaw

Slovenia, Ljubljana:
Buildings of University
of Ljubljana

Italy, Turin:
Hotel L'Orologio



KILDEPARKEN
RESIDENTIAL AREA

SMART CITY WROCLAW



L'OROLOGIO
RESIDENCE



UNIVERSITY OF LJUBLJANA
SLOVENIA



University of Economics

Faculty of Computer and Information
Science





MOBISTYLE DEMONSTRATION CASES OBJECTIVES

Case	Reduce energy use	Improve IEQ	Improve Health	User practices
DK Kildeparken	Heating, DHW	Reduce overheating, improve IAQ	By better sleeping quality at night, reduced humidity levels in apartment	Heating setpoint, window opening, DHW use
SI University of Ljubljana	Indirectly, energy use reduction estimated	Reduce overheating, avoid glare, improve IAQ, lighting quality, view to outside	By providing motivation	Improve user interaction with building systems
IT Orologio Living Apartments	Electricity for HVAC and appliances	Reduce overheating, improve IAQ	By improve the sense of wellbeing in relation to indoor environment	Fan- coil setpoint, window opening, appliances and electric devices
NL Qeske office	Indirectly, energy use reduction estimated as a results of reduced heating setpoints		By exposing occupants to different temperature conditions	Perceived acceptability of varying temperatures
PL Smart City Wroclaw	Electricity for appliances and plug loads	Reduce overheating, improve IAQ, reduce humidity levels	By improving IEQ	HVAC setpoints, window opening,





MOBISTYLE USER-CENTRIC APPROACH





CONCLUSIONS

Energy efficiency at the heart of EU transition towards sustainable future.
NOT at the heart of building users.



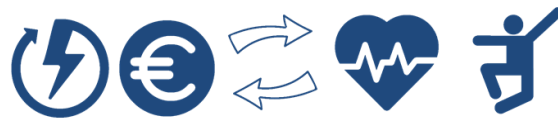


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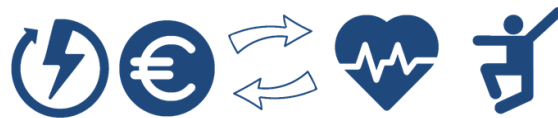
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We need to understand the current user behavior and make its energy demand visible to users.





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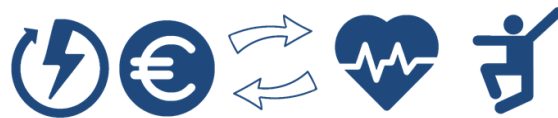
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Interdisciplinary work between engineers and social scientists can help understanding users.





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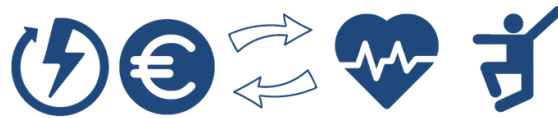
We start steering new behaviors by promoting practices with multiple benefits.





CONCLUSIONS

Promote solutions and services where goals on energy efficiency, good IEQ and health overlap.



Energy conscious and healthy behaviour becomes a way of life
and not only a one-time service



THANK YOU FOR THE ATTENTION!

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