SMART URBAN FUTURES

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where we stand – where we aim

- Planetary urbanization
- Revolutionary ‘smart’ transition: digital systems&algorithms steering us
- Unpredictability of the change – reguirements for planning

GENERAL AIMS:

To **enhance understanding** of becoming urban dynamics and impact of technology in Smart City

➡ to suggest **new methods and tools** for urban planning and management regarding new ways of life, new work and new mobility

➡ to **support constantly renewing urbanity** for viable business and high-quality urbanism.

Theories: the backbone

- Increasingly **complex cities**
- Urban metabolia and morphological view
- Urbanity on the threshold of a transition
- Planning encounters complexity

Theories: the backbone

- Increasingly complex cities
  - *Actors' interaction – regulatory frame*
  - *Unpredictability*
  - *Selforganizing resilient patterns, feedback*

Theories: the backbone

- Urban metabolia and morphological view
  - *Cities are dynamic and have ‘metabolia’*
  - *Flows of good, information&people*
  - *Good locations, spatial configuration*
  - *Feedback to the flows: circular process*

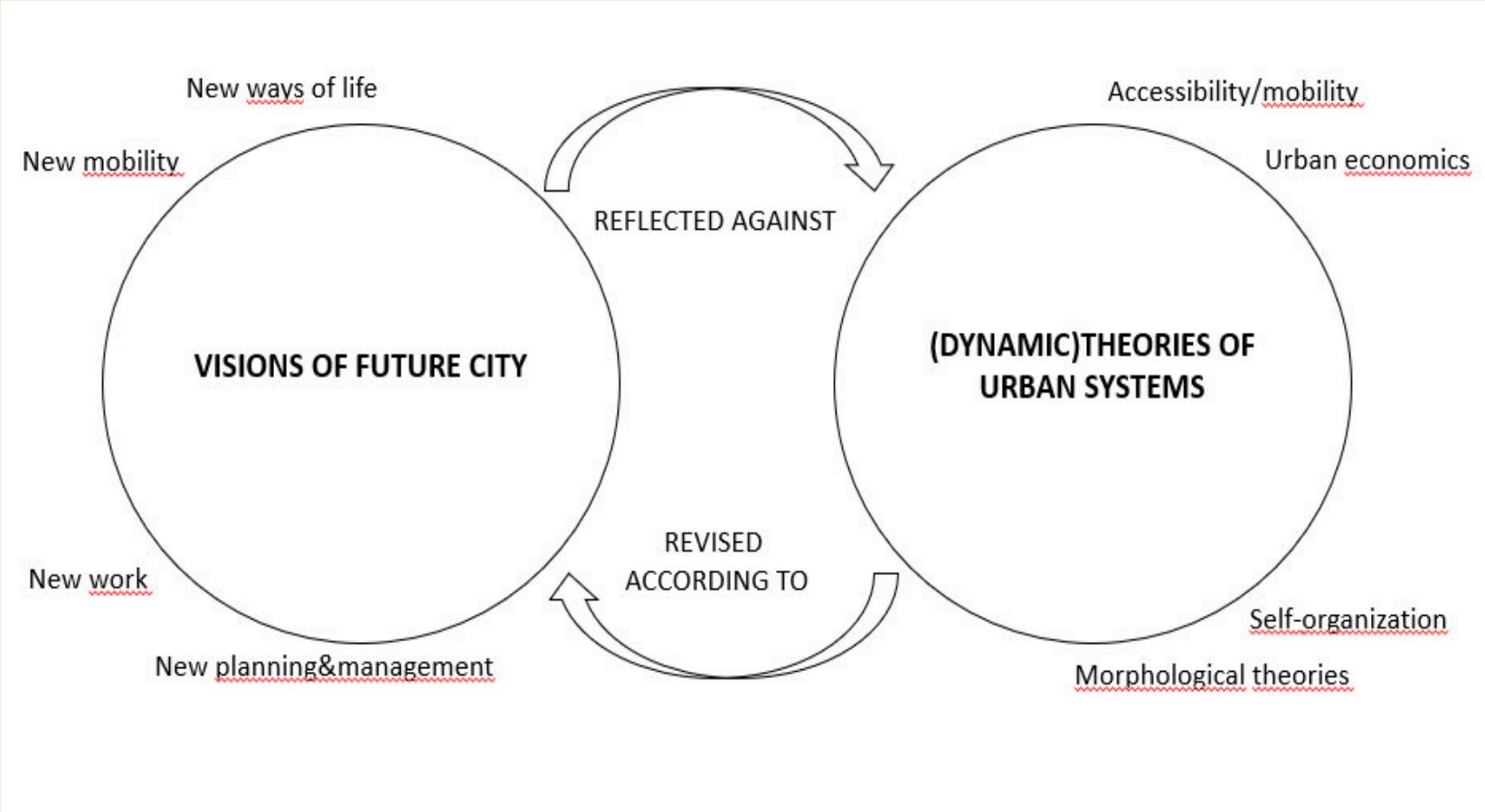
Theories: the backbone

- Urbanity on the threshold of a transition
  - *Evolving through sudden transitions – qualitative surprising change*
  - *Role of ICT&transport tech*
  - *Distances ‘shrink’*
  - *New spatial configurations and logics*

Theories: the backbone

- Planning encounters complexity
  - *Urban systems as ecosystems*
  - *Guiding vs. control*
  - *Trial and error: observe, evaluate, correct*

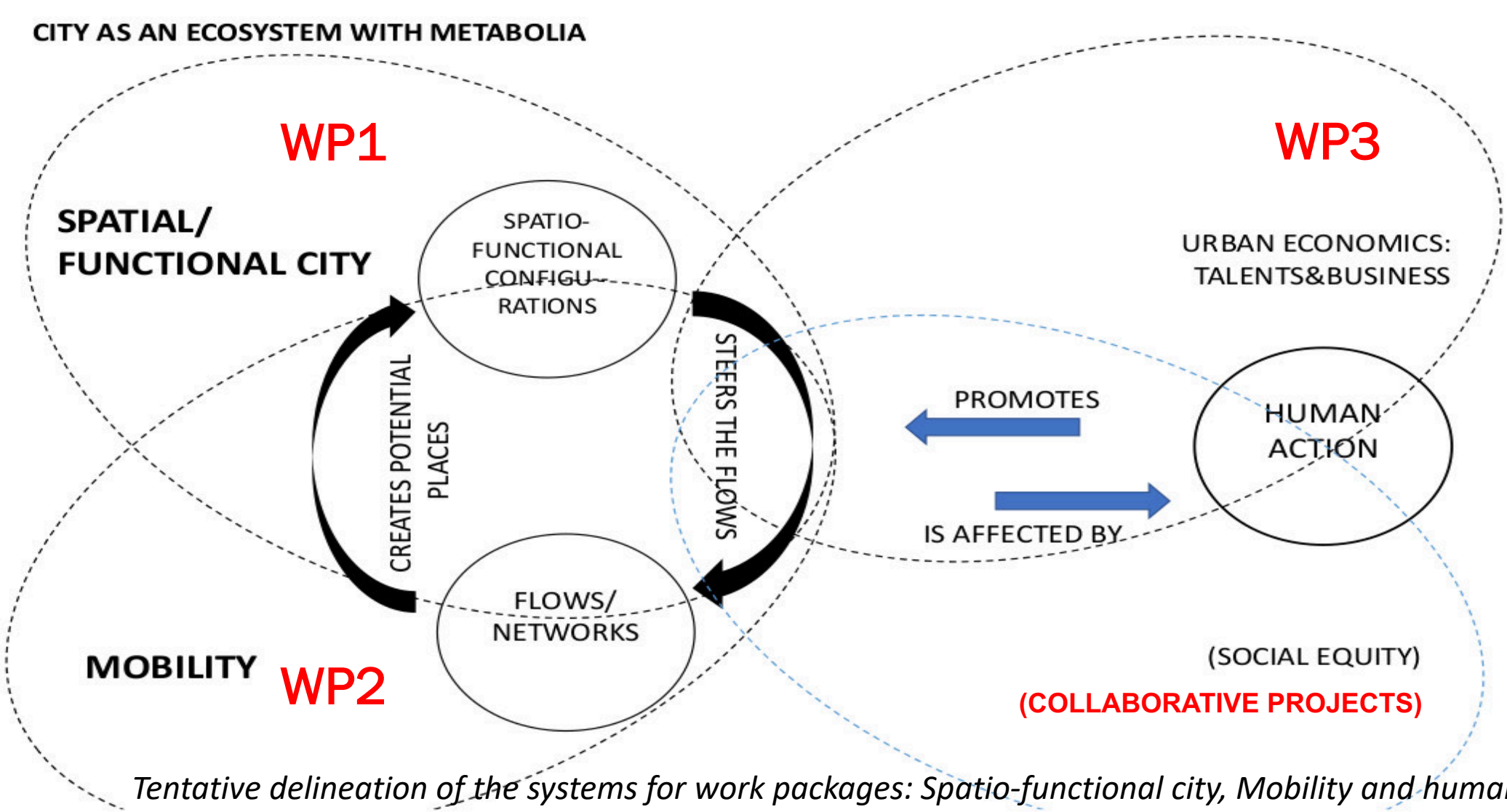
Relationship: visions - theories



For details of potential theories: Project Plan pp.5-6

Possible actions imply using existing urban dynamic theories in the interplay with (plausible) visions and sphere of innovations

STRUCTURE OF THE RESEACRH



Tentative delineation of the systems for work packages: Spatio-functional city, Mobility and human action.

WORK PACKAGES: general

Research group : collective effort - individual projects

Starting points:

cities are in a flux: technology, life style, work, economy

role of physical city will change

technology: driver of change & method to understand/steer urban processes

WORK PACKAGE 1.

Urban spatial data analytics in urban design and planning

Aim:

to gain **new knowledge and understanding** of urban spatio-functional configurations,
their changes over time, and morphological and other patterns and regularities (e.g. rhythms)
how people (will) use the city. Reading&making high-quality, sustainable city.

Objectives: study of sustainable urban form; evolution of activity nodes; role of new nodes; case studies (projects)

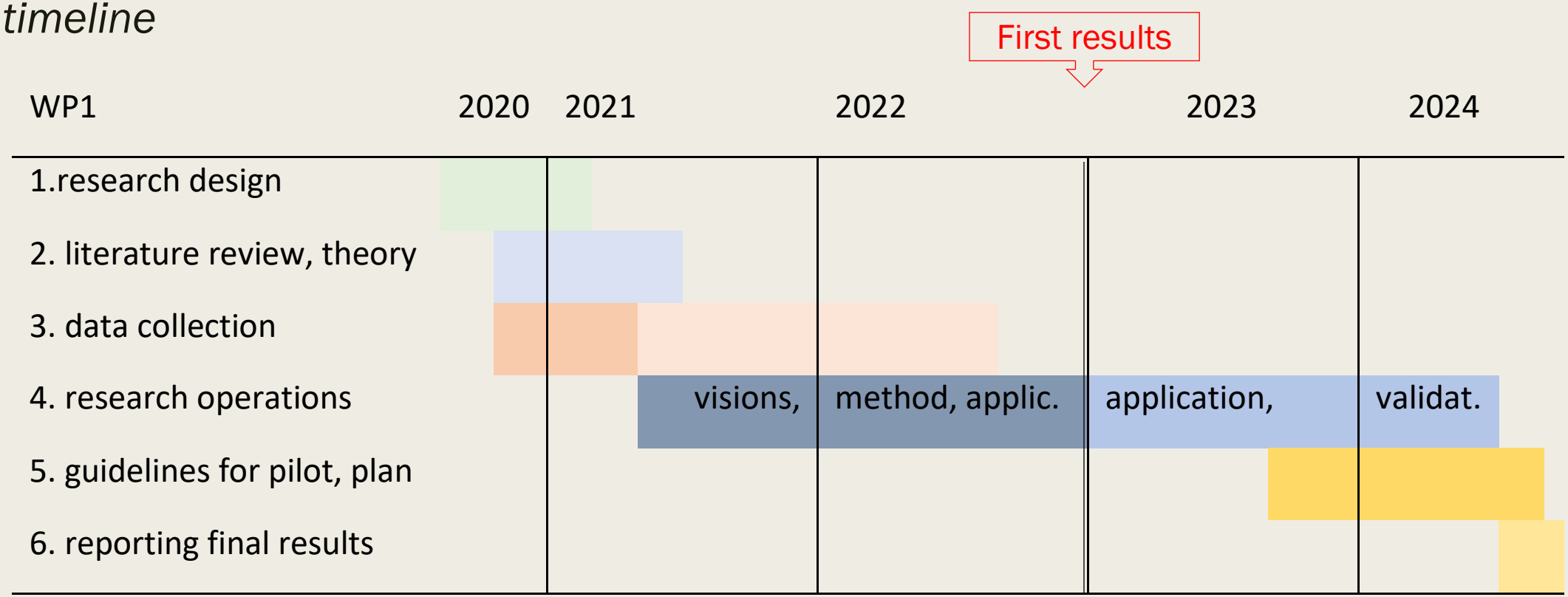
WORK PACKAGE 1.

Tentative hypothesis

- *Due to the transition to technology mediated urbanity, the ways to use the city will change, along with emergence of new daily rhythms, new activity nodes, new centralities; new opportunities for sustainable urbanism and energy efficiency.*

WORK PACKAGE 1.

timeline



WORK PACKAGE 1.

Potential data

- Relevant literature
- Statistical data and GIS data: services, firms, industries, employees, households; census, occupations, employment, education, income, language. Tourisms (hotels, Airbnb). General nationwide trends in these (stats). *City of Tallinn, Statistics of Estonia*
- Cell phone data (if available during appropriate time) indicating individual location. If possible connected to above characteristics (however, anonymized). Phone operators *(will be checked)*
- Alternative data: commuting data/working place data+interview, survey combined with stats *(Smart Card)*
- *D*ata of energy, gas, water consumption in buildings (neighborhoods/larger units). Indoor temperature values (*Mainor Oü))*
- 3D data of buildings (morphology); CAD-building data *(City of Tallinn)*

WORK PACKAGE 1.

Expected results, *(alternatives)*

Systemic model of relationships between anticipated future modes of work, mobility and lifestyles, including

Role of old and new activity nodes, their change in time

Sustainable urban morphology in different scale(s)

Computational, spatial analyses and/or simulation tools

New methods and policies for urban planning and management: guidelines

WORK PACKAGE 2.

New urban design and analyses methods for transforming mobility and urban morphology'

Aim:

To produce computational/GIS-tool(s) to evaluate the impact of decisions regarding transportation mode and/or changes in activity nodes to the overall behavior of the flows in the network.

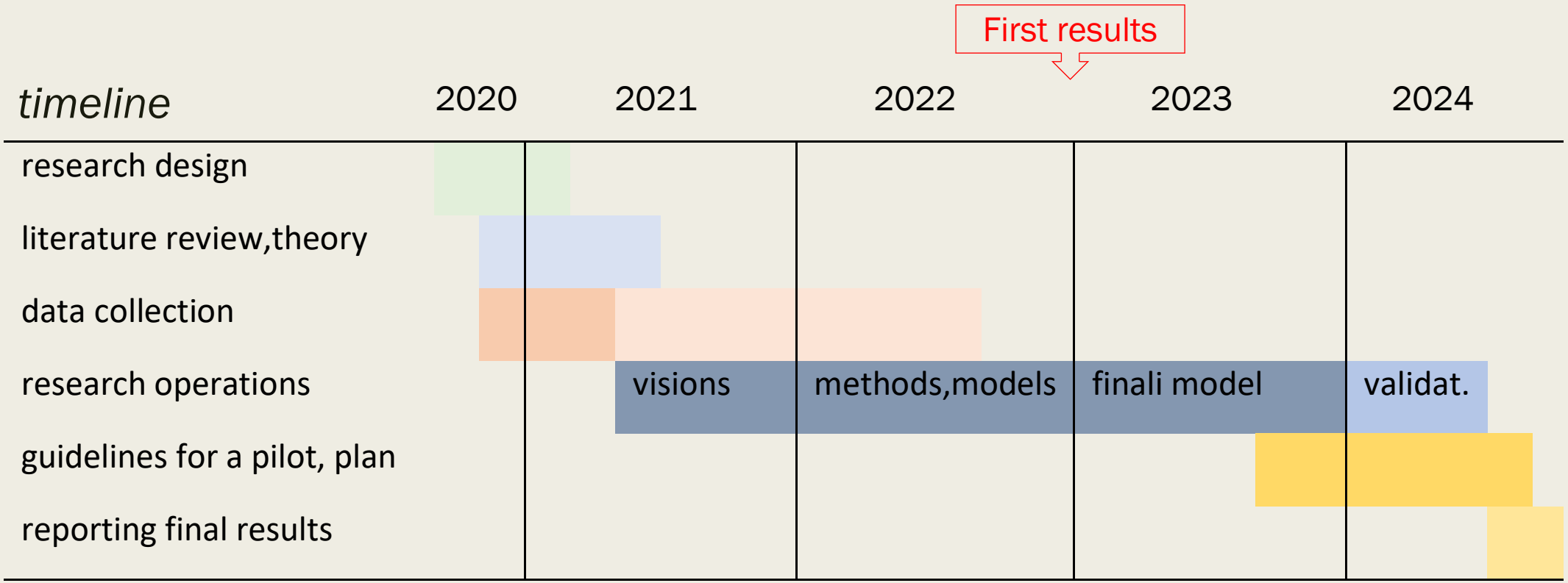
Objectives: topology and (anticipated) use of transportation networks; Impact oftravel mode decisions (existing and novel, emerging modes); computation tools for studying dynamics; case studies – existing projects

WORK PACKAGE 2.

Tentative hypothesis

- changing preferences regarding the modes of transportation due to ongoing urban transition and *digitalization, will change (decrease?) the amount of the daily trips/makes them more unpredictable/multimodal.*

WORK PACKAGE 2.



WORK PACKAGE 2.

Potential data

- Statistical data and GIS data: Street network and public transport networks, data of passengers. Traffic and urban plans. Land use: services, firms, industries, employees, households; Tourisms (hotels, Airbnb). General nationwide trends in these (stats) (in cooperation with WP1). *City of Tallinn, Statistics of Estonia*
- Cell phone data (if available during appropriate time) indicating individual location. If possible connected to above characteristics (however, anonymized). (Phone operators, Positium)
- Alternative data: commuting data/working place data+interview, survey combined with stats *(Smart Card). In addition, possibility to apply*
- ÜC mobility research material: land use data, Bercman smart pedestrian crosswalk data; parking system statistics; Bikeep statistics(outdoor bike parkings in ÜC); various previous mobility research (questionnaires about mobility preferences) about mobility questionnaire for Ülemiste area workers, tram passengers data, public transport accessibility analysis; and coming planned pilots: FABULOS self driving bus pilot and mobility data collection in Lõõtsa - Suur-Sõjamäe crossroad.

WORK PACKAGE 2.

Expected results, *(alternatives)*

Systemic model of future probable trends regarding the modes of transportation, mobility patterns

A computational tool (simulation/GIS) for monitoring impact of individual decisions to mobility patterns/dynamics

Role of network structure and topology in the mobility patterns

Urban management policies for guiding he system

WORK PACKAGE 3.

Smart city urban economics and urban design:

Guiding of complex processes

Aim:

to understand the preferences and drivers of key smart city actors affecting their location. Developing policies for enhancing urban economic processes and quality of urban life.

Objectives: Key smart city industries, activity nodes and key actors; their preferences and attracting features.

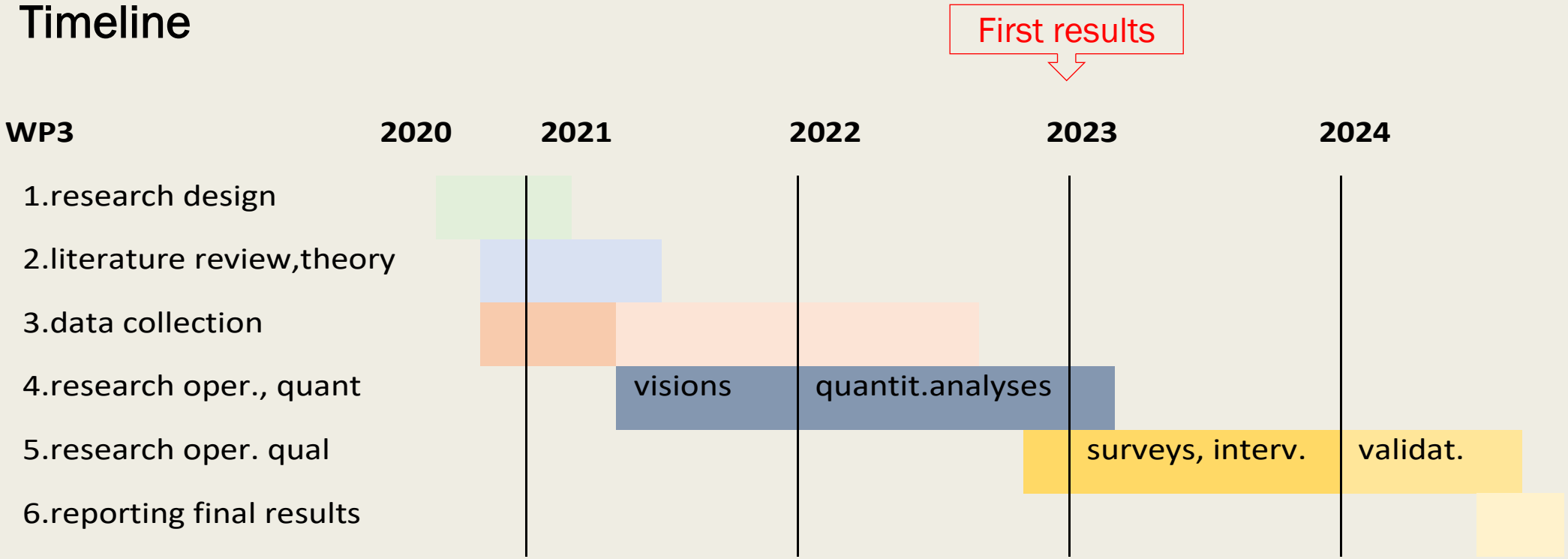
WORK PACKAGE 3.

Tentative hypothesis

- *“Future ’smart city’ talents’ preferences regarding their environment differ from prior ones, along with their understanding of the concept of work”.*

WORK PACKAGE 3.

Timeline



WORK PACKAGE 3.

Potential data

- Relevant literature
- Statistical data and GIS data: Land use: services, firms, industries, employees. General nationwide trends in these (stats) (in cooperation with WP1). (*City of Tallinn, Statistics of Estonia)*
- Traffic network data/shared results from Space Syntax -analyses (City of Tallinn)
- Data gathered by surveys and interview *(during the research). In Addition, possibility to apply*
- Customers NPS - net promoter score; Ülemiste City web Google Analytics data; and/or relevant social media data *(Mainor OÜ)*

WORK PACKAGE 3.

Expected results

Recognizing future key industries and actors in urban economics

location preferences and operational logics of the key actors

produce policies for attracting them

guidelines for planning&management for improving urban quality in concert with promoting economic viability

EXPECTED RESULTS & PLANNED IMPLEMENTATION

GENERAL PROCESS OF PRODUCING RESULTS	CONTEXT/SCALE
1. Better understanding of **smart complex transition** towards smart city for –	**(General knowledge of urban system)/Tallinn-Estonia**
2. Knowledge of how to **guide urbanity** & develop planning; in practice, producing --	**Tallinn (region)**
3. Guidelines, rule and principles, and/or policy recommendations, to be carried out in --	
4. **Experiments** 'in vivo' – pilot projects, living lab++ setting the example globally…	**Ulemiste City – the World**
5+ …producing overall policies for continuous urban renewal: producing unique qualities autonomously	**General/Tallinn-Estonia**

In five years - -

- Channel international expertiese & build new local empirical knowledge of smart cities
- can be used in planning, management and desicion making, using models, GIStool, simulations
- Increase international visibility
- A of A among internationally recognized SC research units with specific knowhow
- Top quality research&teaching program, UC as breeding ground for experiments with international visibility

Last but not least - about recruiting

3 positions (3 WPs)

Opening positions: 1st June – 1st July

Starting: September 2020

Qualifications: WP1 and 2: Preferably GIS, computing skills

- Flexibility needed – updating the Plan if necessary

Thank you!

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