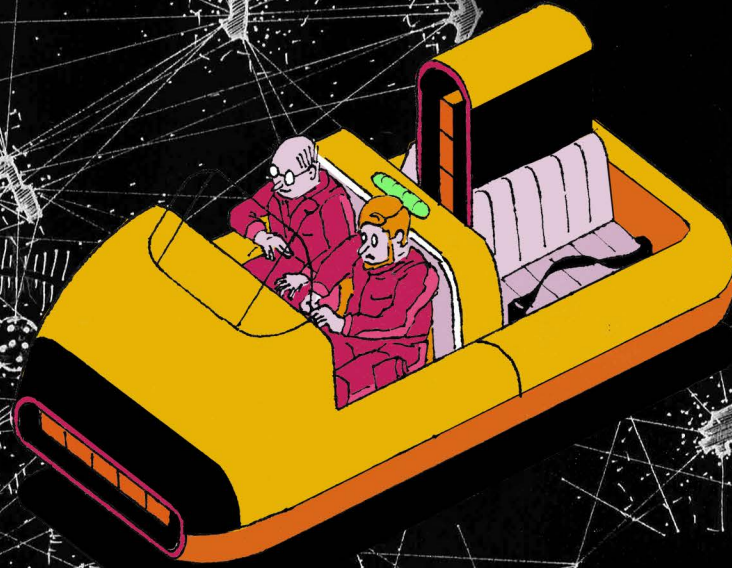


# AMSTERDAM 2049

*story-driven scenarios to prepare the city for autonomous vehicles*



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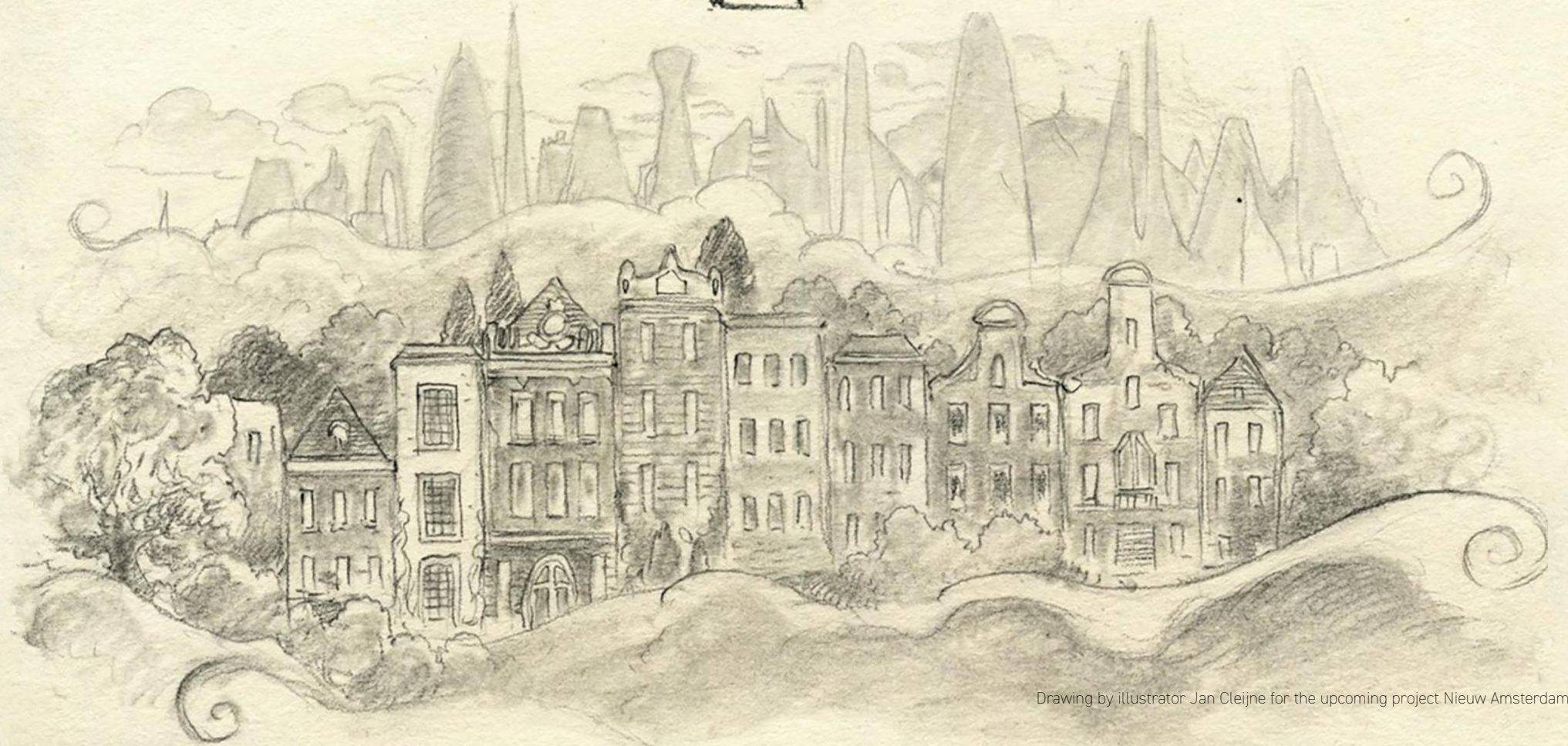
Jos Kenter P5

first advisor Dr. Víctor Muñoz Sanz | second advisor Dr. Ir. Maurice Harteveld

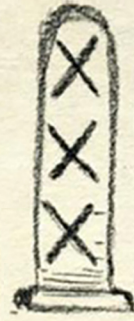
AMSTERDAM  
2049



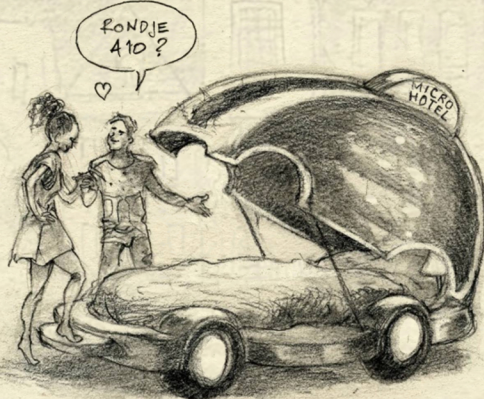
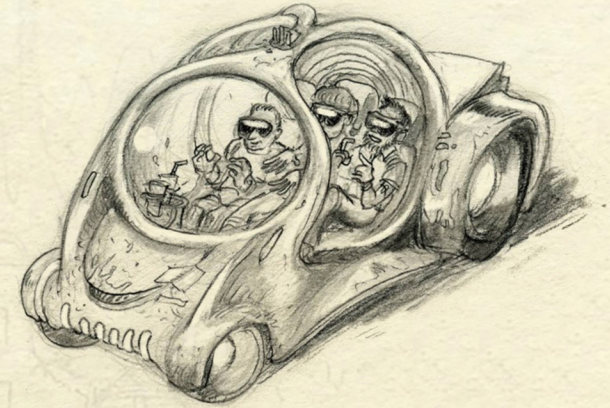
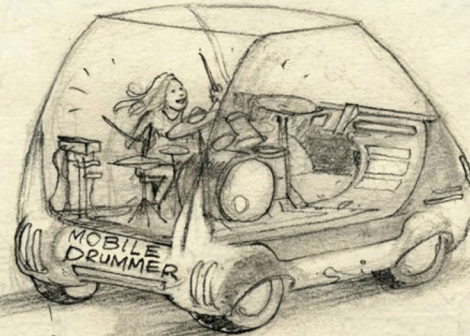
AND THE ARRIVAL OF  
THE AUTONOMOUS VEHICLE

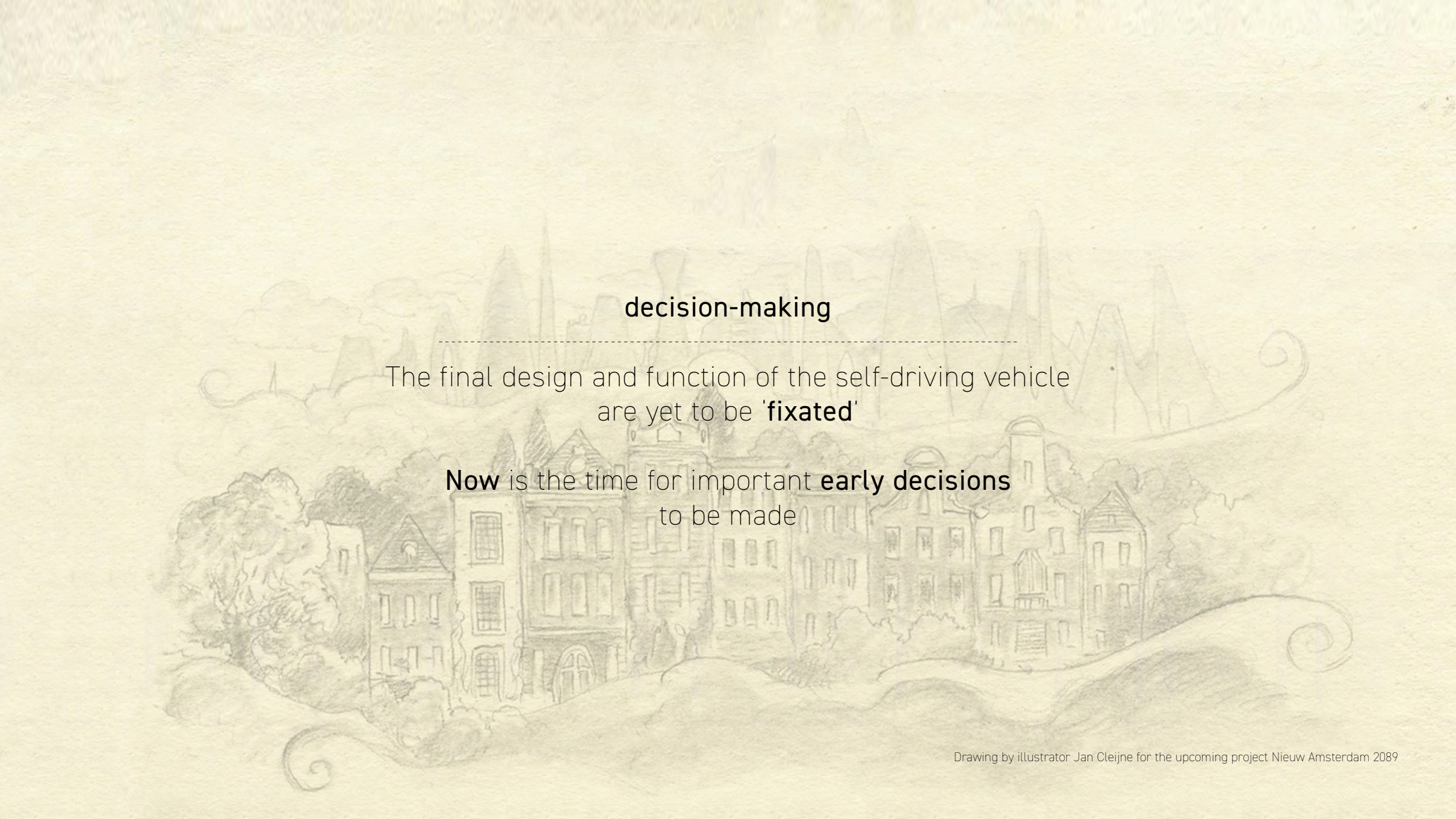


# AMSTERDAM 2049



# AND THE ARRIVAL OF THE AUTONOMOUS VEHICLE






## decision-making

---

The final design and function of the self-driving vehicle  
are yet to be **'fixated'**

**Now** is the time for important **early decisions**  
to be made



## storytelling x scenarios

---

There is a need for qualitative, imaginative, and diverse stories about potential 'self-driving futures'

## THESIS & PRESENTATION STRUCTURE

# THESIS & PRESENTATION STRUCTURE

Background



# THESIS & PRESENTATION STRUCTURE

Background

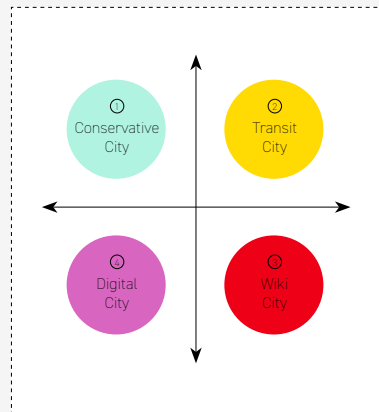
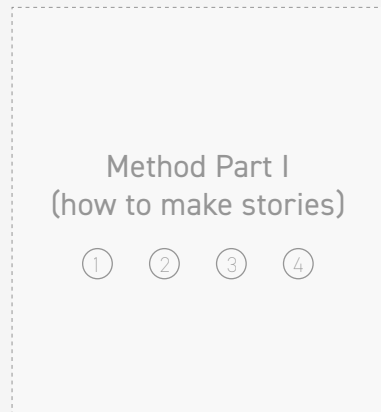
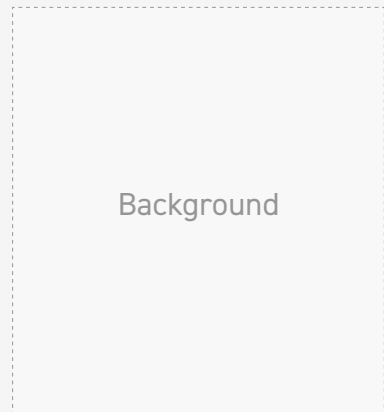
**Method Part I**  
(how to make stories)

- ①
- ②
- ③
- ④

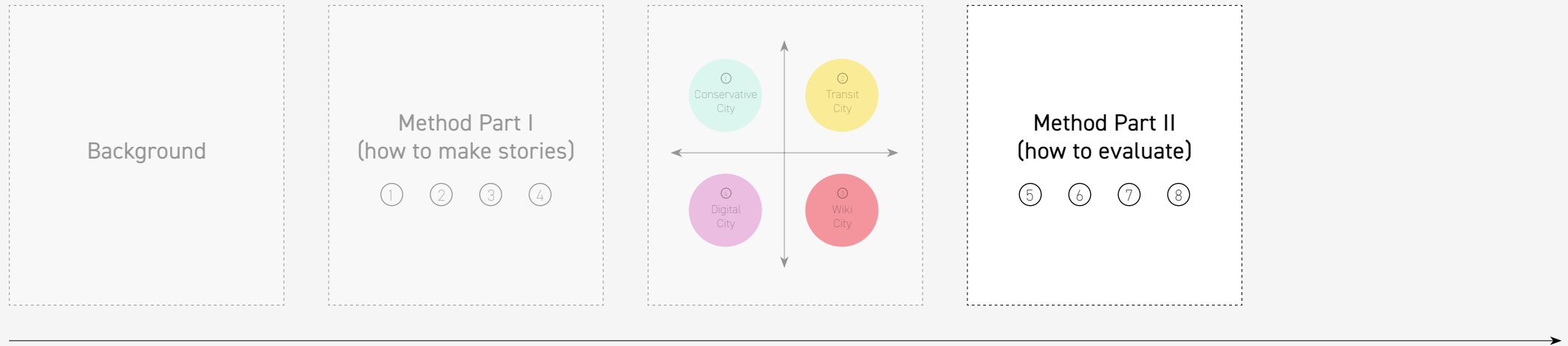




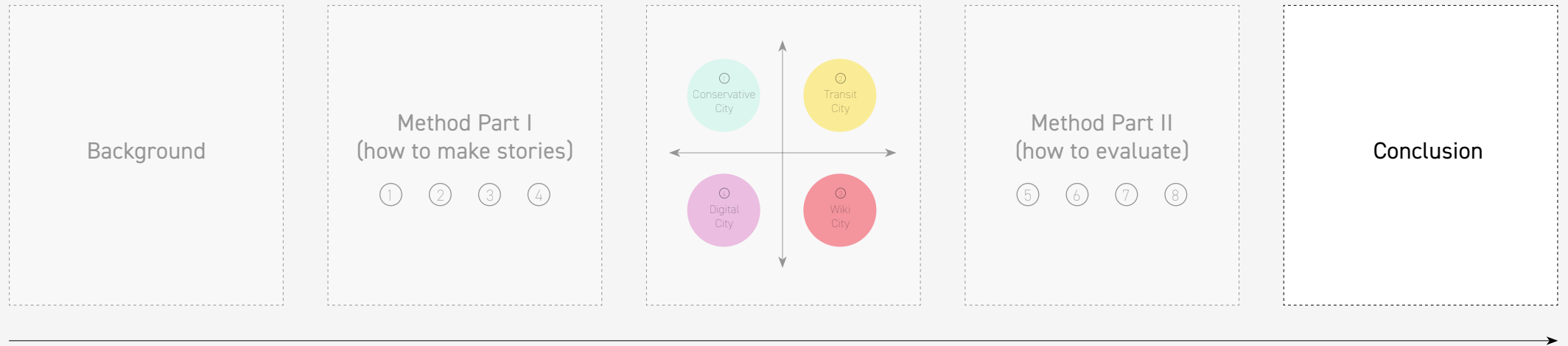
# THESIS & PRESENTATION STRUCTURE



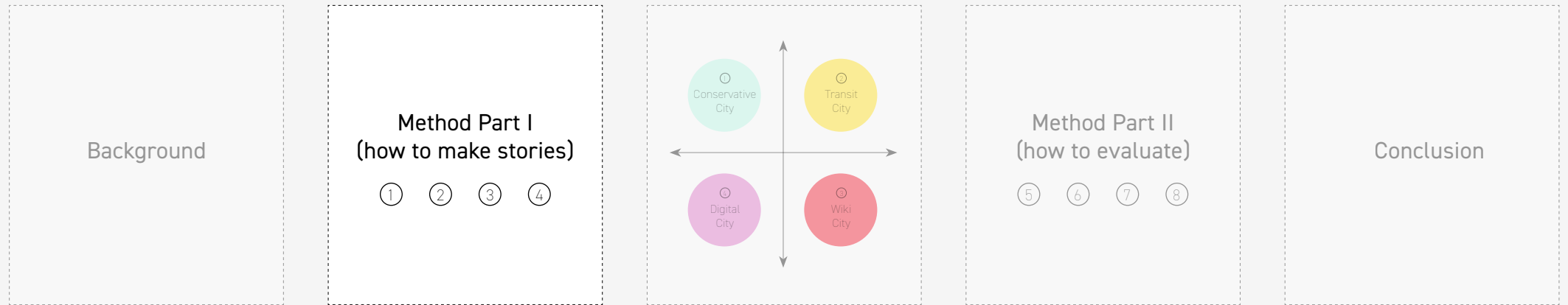
# THESIS & PRESENTATION STRUCTURE



# THESIS & PRESENTATION STRUCTURE



# THESIS & PRESENTATION STRUCTURE



## method part I

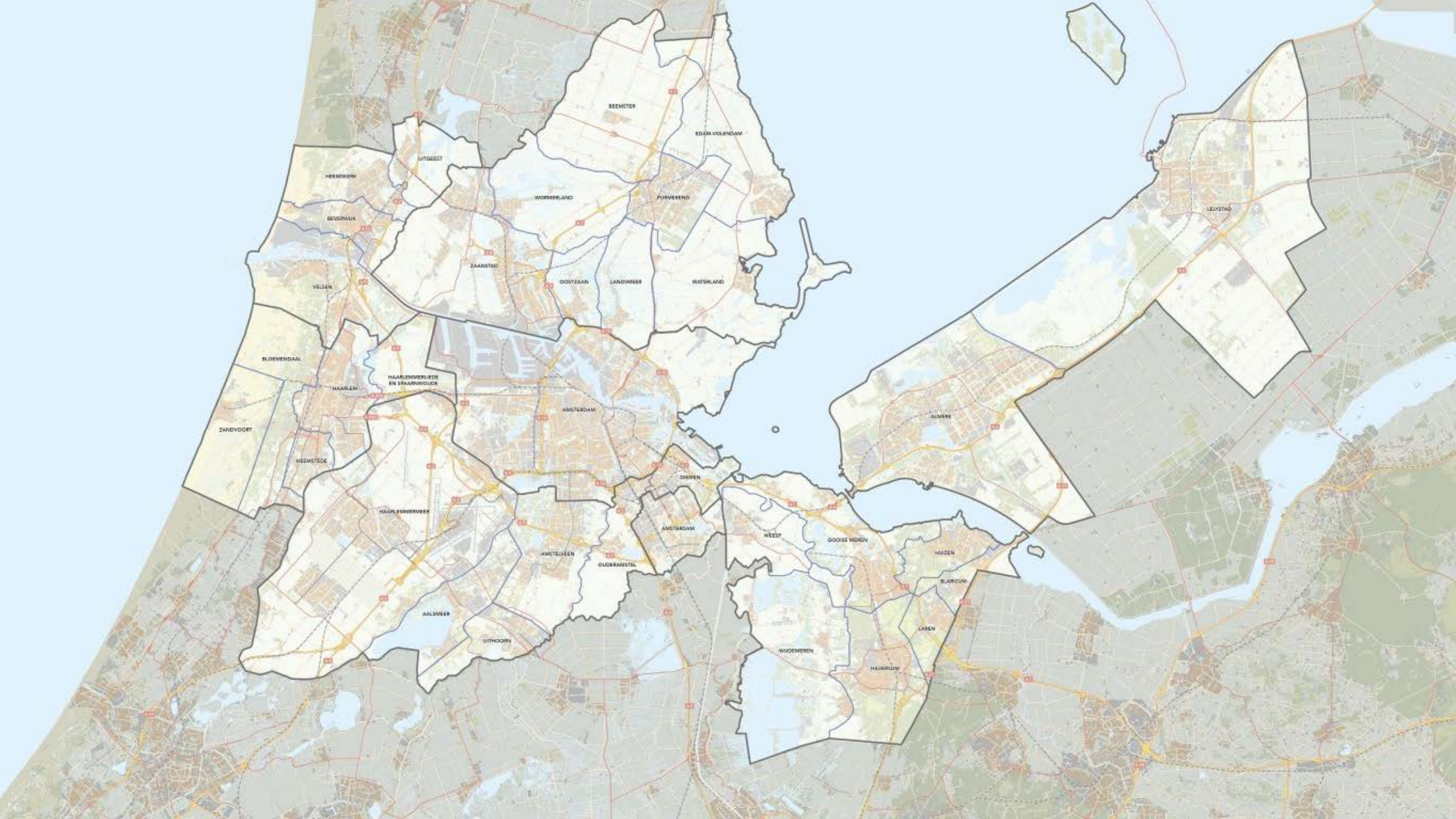
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- scope (1): location & relevant actors
  - foundation (2): worldviews
- structure (3): timeline and socio-technical dynamics
  - infill (4): internal logic x decisions

## method part I

---

- **scope (1): location & relevant actors**
  - foundation (2): worldviews
- structure (3): timeline and socio-technical dynamics
  - infill (4): internal logic x decisions



BEEMSTER

EDAM-VOLENDAM

UITGEEST

HERBEEKERK

WORRELAND

ZIJVERENDI

BEIJERWIJK

ZAANSTAD

OOSTZAAN

LANDINEER

WETSRLAND

VELSEN

BLOEMENDAAL

HAARLEM

HAARLEMVERLEDE EN SPAARWUDDER

AMSTERDAM

ZANDVOORT

HEEMSTED

DIJVEN

ALMERE

HAGHESLOVENVEER

AMSTERDAM

WEEP

GOOSEHORN

HUIZEN

AMSTELVEEN

OLDEBRAMSTEL

BLARCUM

AALSVEER

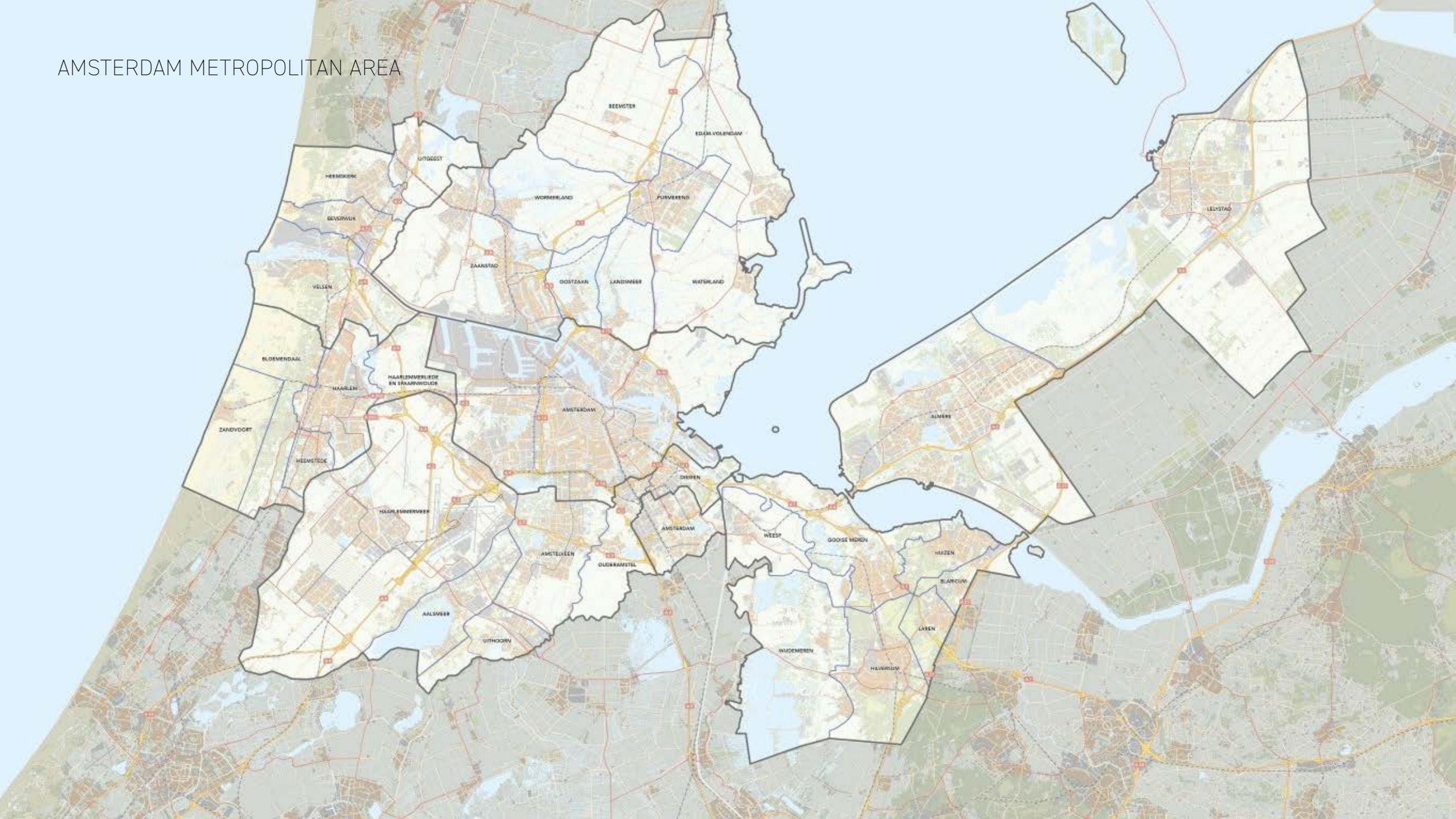
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WIJDEMAREN

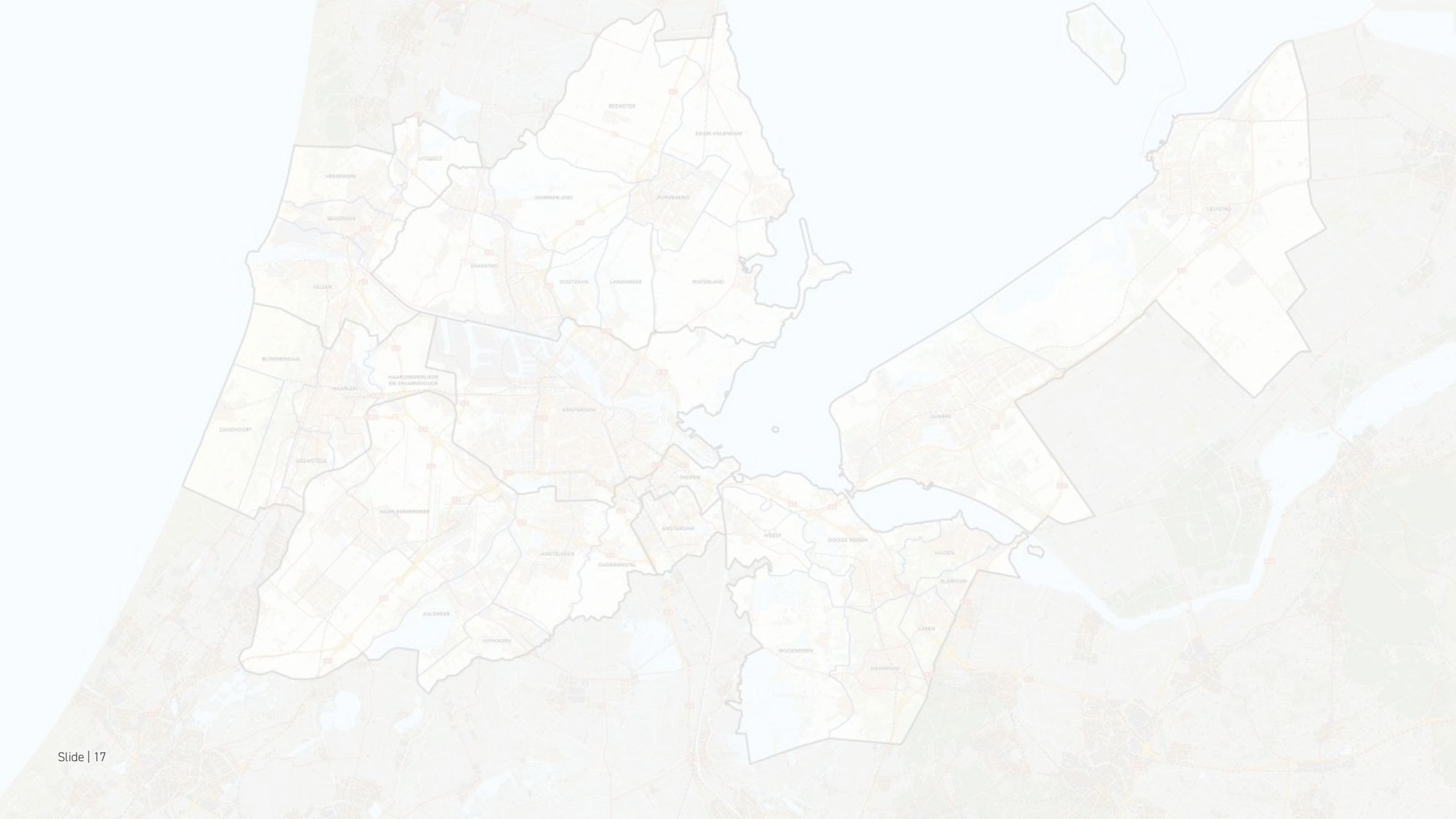
LAREN

HAVIGHOUM

# AMSTERDAM METROPOLITAN AREA







relevant actors

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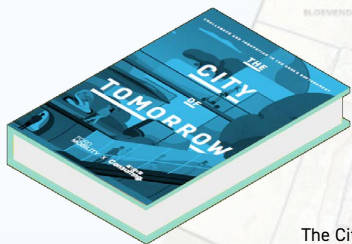


relevant actors

---



Journey of the Future, NS



The City of Tomorrow, Ford Foundation



Sidewalk Mobility Plan, Sidewalk Labs (Alphabet)

relevant actors

public documents



Journey of the Future, NS



The City of Tomorrow, Ford Foundation

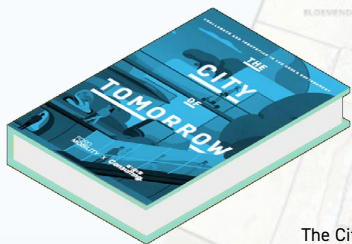


Sidewalk Mobility Plan, Sidewalk Labs (Alphabet)

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The City of Tomorrow, Ford Foundation



Sidewalk Mobility Plan, Sidewalk Labs (Alphabet)

public documents



Structuurvisie Amsterdam 2040



Mobiliteitsaanpak Amsterdam 2030



Amsterdam Schone Lucht 2030

# METHOD STEP 1: LOCATION & ACTORS



Structuurvisie Amsterdam 2040















Mobiliteitsaanpak Amsterdam 2030



Amsterdam Schone Lucht 2030

## Core Values Amsterdam

## Elaboration

	Core Values Amsterdam	Elaboration
Socio-economic	 SOCIAL EQUITY & INCLUSIVENESS	Improve inclusive mobility options, make existing systems more accessible, affordable and reliable
	 HEALTHY - ACTIVE SOCIETY	Incentivize active lifestyles and limit excessive traffic. Walking and biking should remain attractive options in the city
	 ECONOMIC PROSPERITY	Ensure important districts, mainports and hubs remain well accessible - provide high frequency PT and good road connections
	 SOVEREIGNTY & PARTICIPATION	Involve citizens in the city's future: encourage local entrepreneurship and support bottom-up initiatives
Mobility	 RESILIENT & DIVERSE MOBILITY (ECO)SYSTEM(S)	Preserve an open and innovative climate in which a diversity of actors can constantly improved and experiment
	 HIGH QUALITY SERVICES AND INFRASTRUCTURES	Invest in making local and regional infrastructures (and systems) future proof (smart, AV-ready)
	 TRANSPORT EFFICIENCY	Improve traffic management, reduce congestions, make smart use of data, allow for AV platoons and high frequency public transport
	 TRANSPORT CONNECTIVITY	Offer digital (app/platform) and physical (HUB) integration of modalities, payment schemes, traffic information etc.
Spatial	 SUSTAINABLE MOBILITY	Ensure future mobility becomes emission-free and environmental friendly
	 URBAN QUALITY	Make urban quality and liveability a top priority. Protect public space and connect green/blue infrastructures
	 LAND-USE SUSTAINABILITY	Preserve open space (limit urban- and infrastructural expansion), focus on densification & transformation of existing city
	 TRANSIT ORIENTED DEVELOPMENT	Develop mixed use, transit-oriented, car-restraining urban areas, use new mobility innovations in line with these goals
	 PEOPLE ORIENTED DEVELOPMENT	Values of people should go before those of traffic (in the city). Focus on walkability, bikeability and liveability

# METHOD STEP 1: LOCATION & ACTORS

	●	●	●	●
Core Values Amsterdam	Local Mobility Vision by Smart Mob	Public Transport Vision by NS & Prorail	Car Industry Vision by Ford	Service Providers Vision by Google
Socio-economic	 1.1	 2.1	 3.1	 4.1
	 1.2	 2.2	 3.2	 4.2
	 1.3	 2.3	 3.3	 4.3
	 1.4	 2.4	 3.4	 4.4
Mobility	 1.5	 2.5	 3.5	 4.5
	 1.6	 2.6	 3.6	 4.6
	 1.7	 2.7	 3.7	 4.7
	 1.8	 2.8	 3.8	 4.8
	 1.9	 2.9	 3.9	 4.9
Spatial	 1.10	 2.10	 3.10	 4.10
	 1.11	 2.11	 3.11	 4.11
	 1.12	 2.12	 3.12	 4.12
	 1.13	 2.13	 3.13	 4.13

## method part I

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- scope (1): location & relevant actors
  - **foundation (2): worldviews**
- structure (3): timeline and socio-technical dynamics
  - infill (4): internal logic x decisions



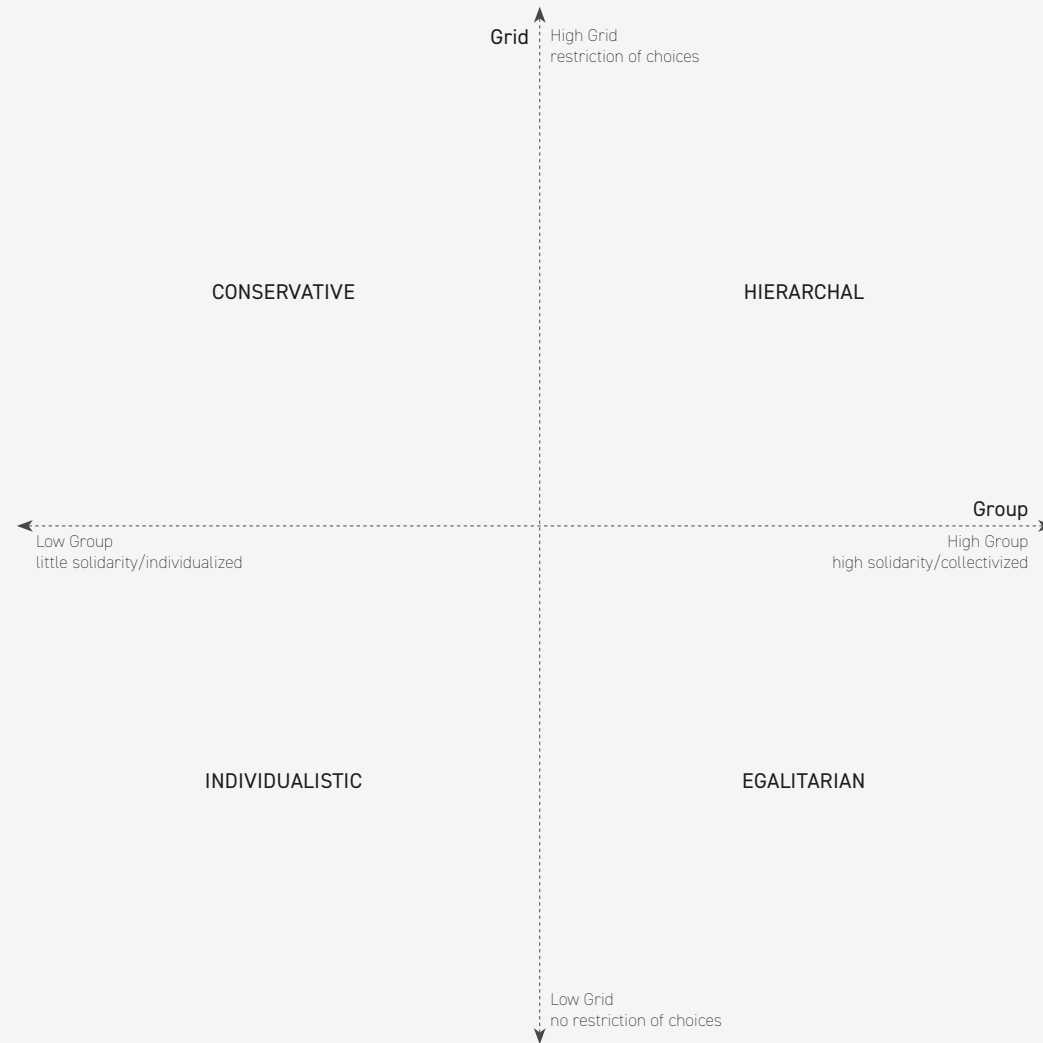
## METHOD STEP 2: WORLDVIEWS



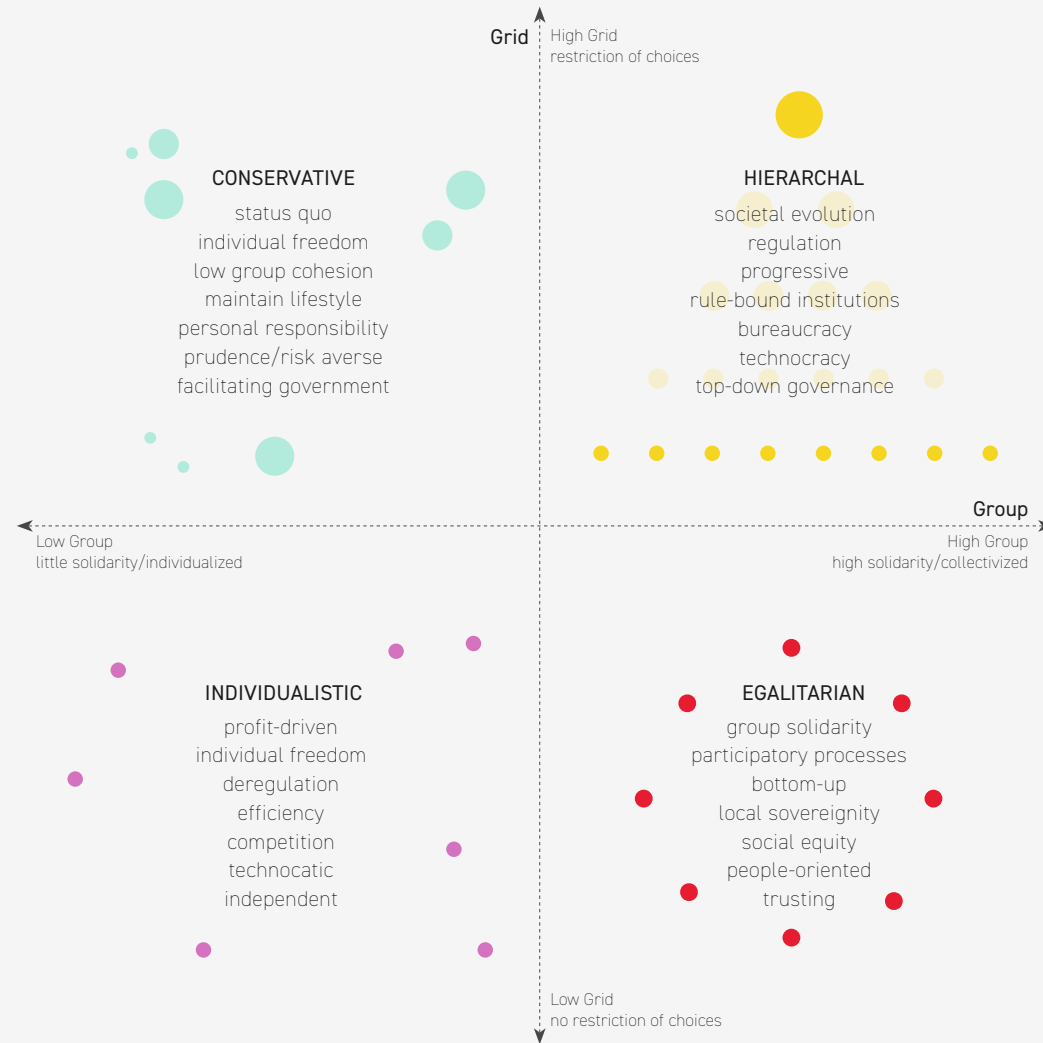
## METHOD STEP 2: WORLDVIEWS



## METHOD STEP 2: WORLDVIEWS



# METHOD STEP 2: WORLDVIEWS



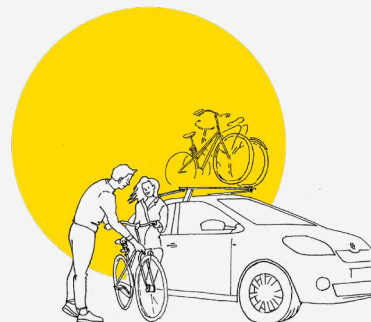
Murat Bayir and his family (the conservatives)

residence: Osdorp  
work/education: roofer/handyman  
family life: married, 3 kids and grandma  
mobility: private service van



Cecile de Groot (the hierarchist)

residence: de Pijp  
work/education: student  
family life: single  
mobility: bike and public transport



Johan Zevenhuizen (the individualist)

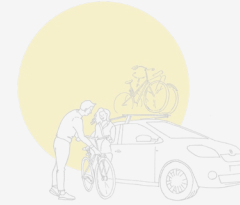
residence: Houthavens  
work/education: private equity associate  
family life: engaged, no kids  
mobility: lease car, taxi



Julia and Dries Salome (the egalitarianists)

residence: Indische buurt  
work/education: retired/piano teacher  
family life: married, kids moved out  
mobility: walking, public transport, car





Johan Zevenhuizen (the individualist)

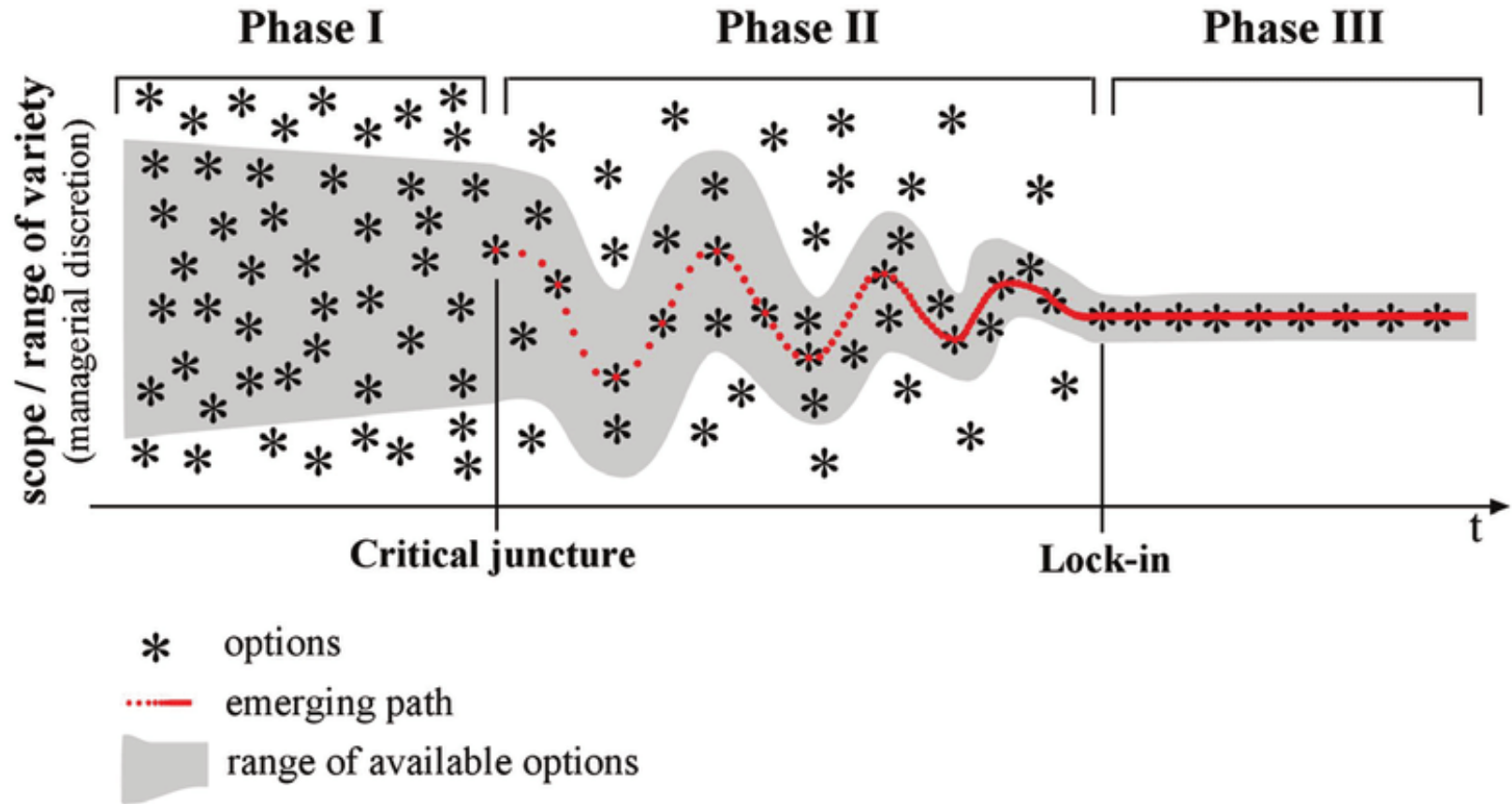
residence: Houthavens  
work/education: private equity associate  
family life: engaged, no kids  
mobility: lease car, taxi



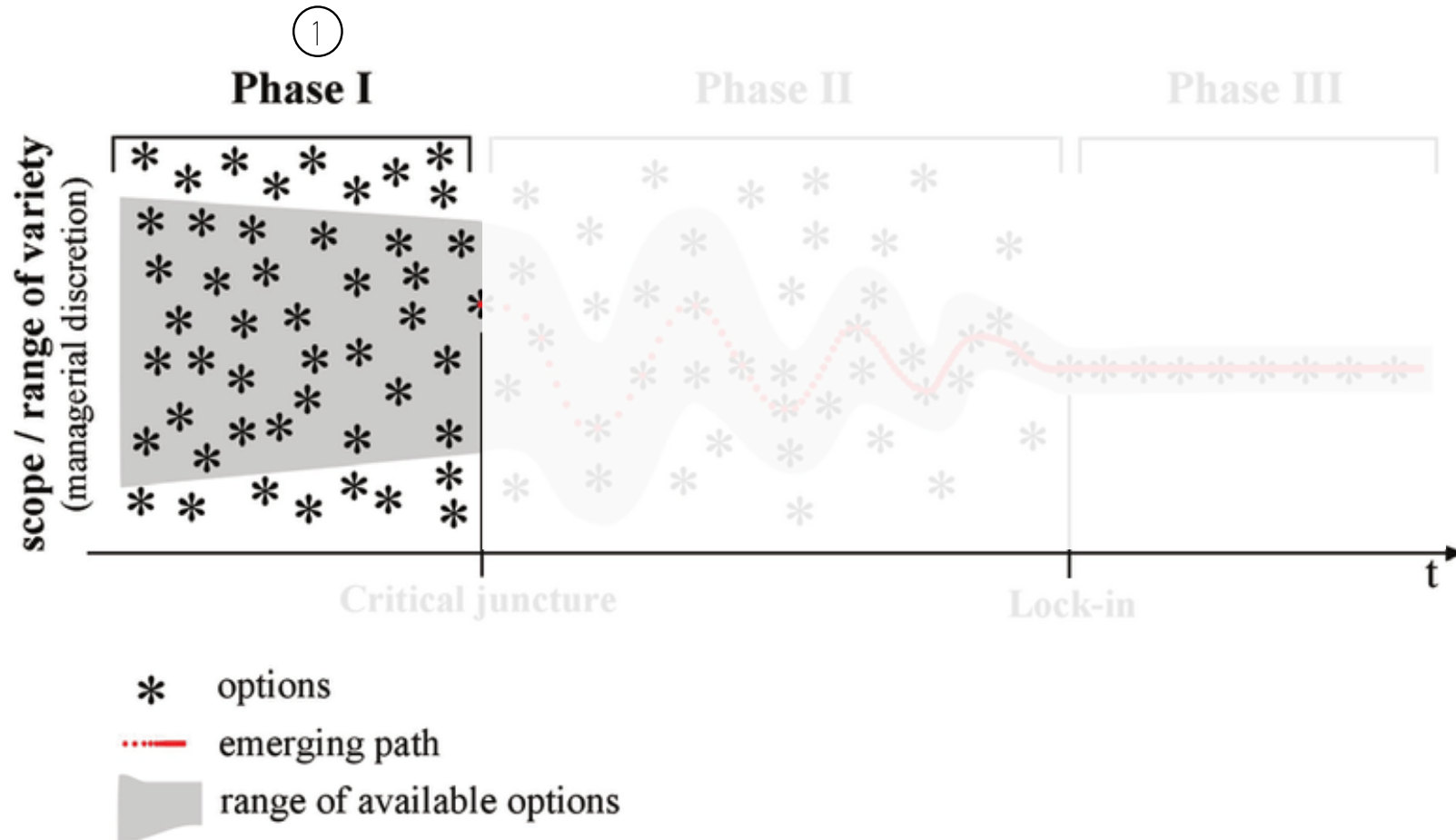
## method part I

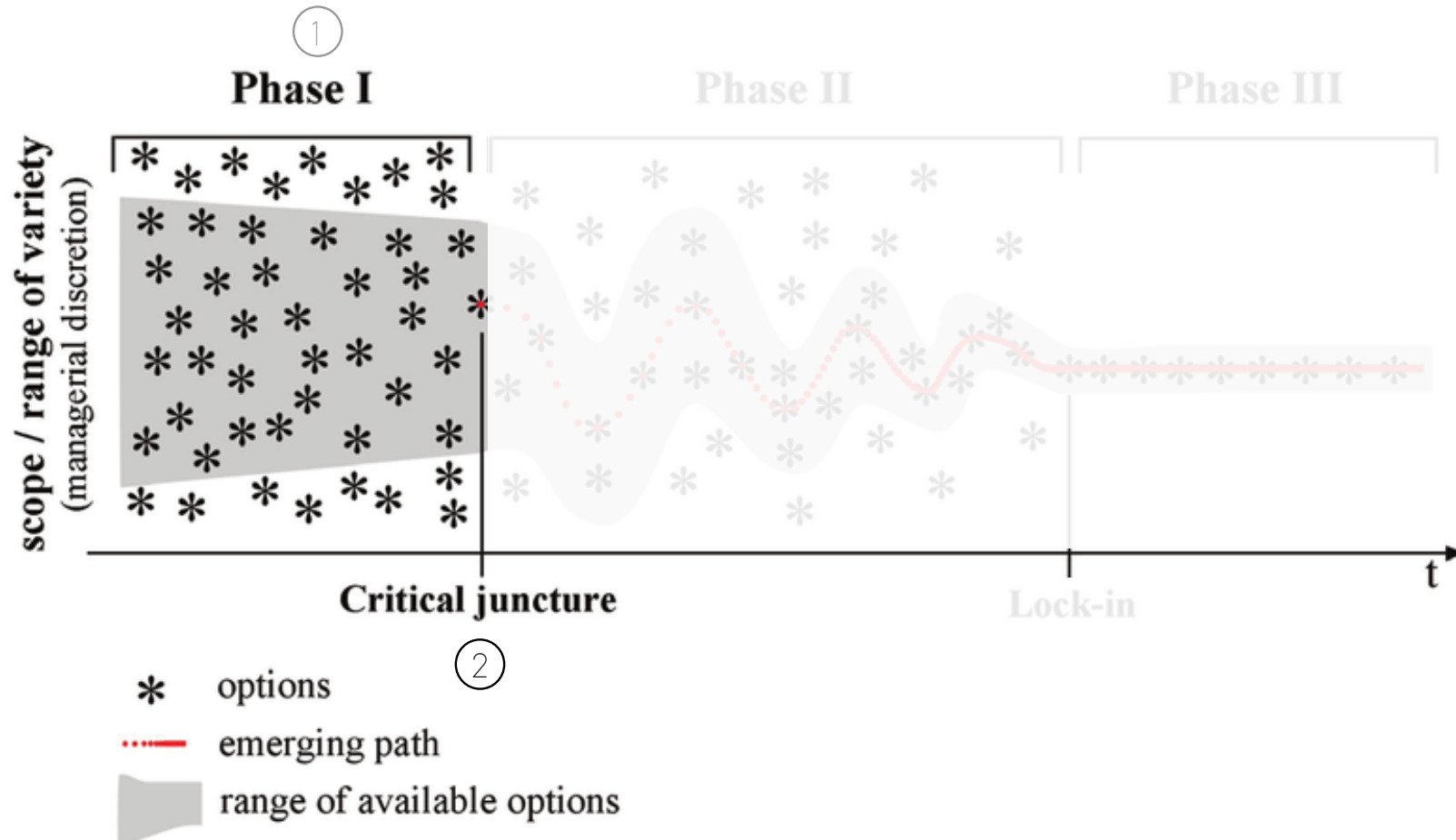
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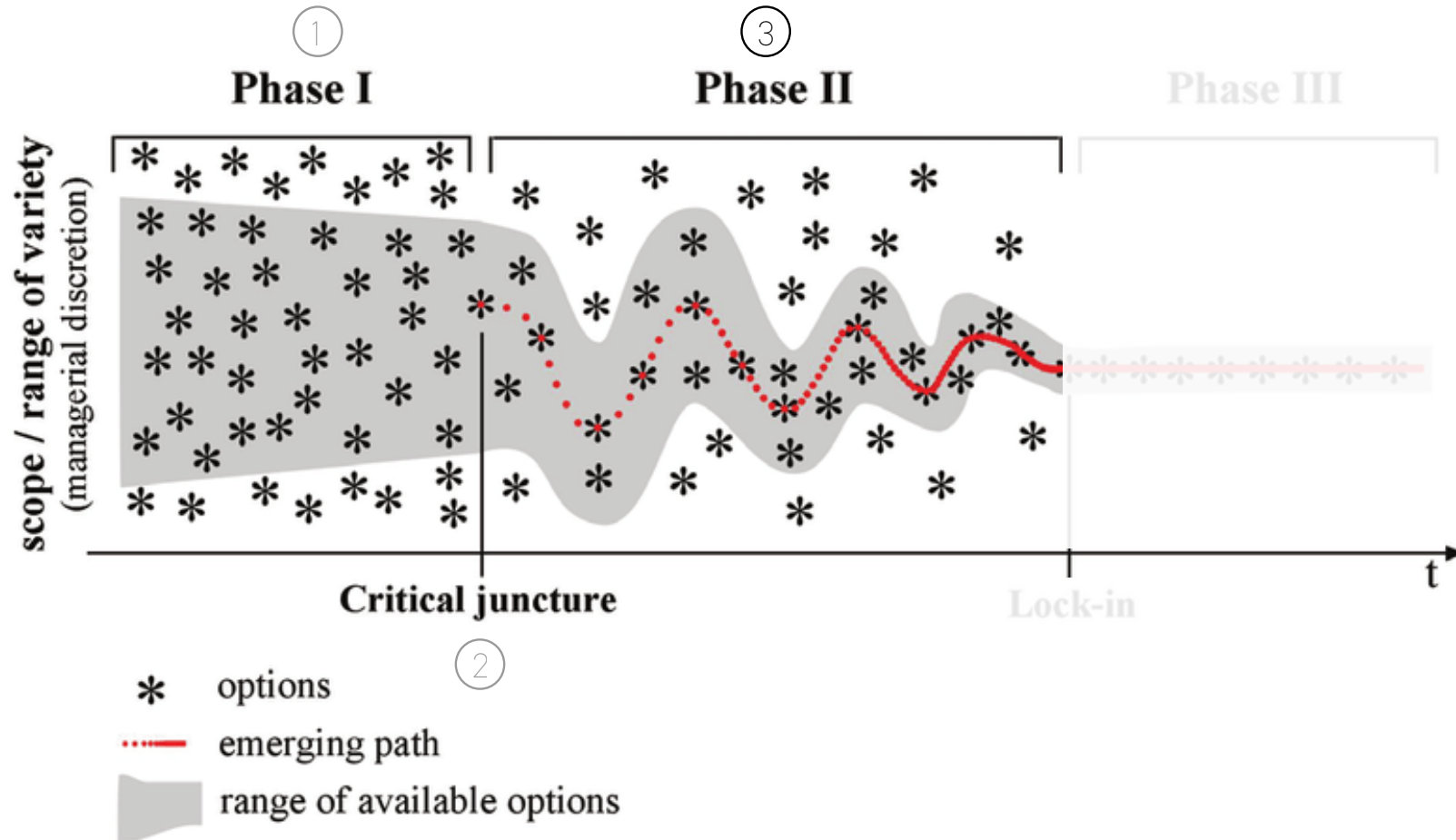
- scope (1): location & relevant actors
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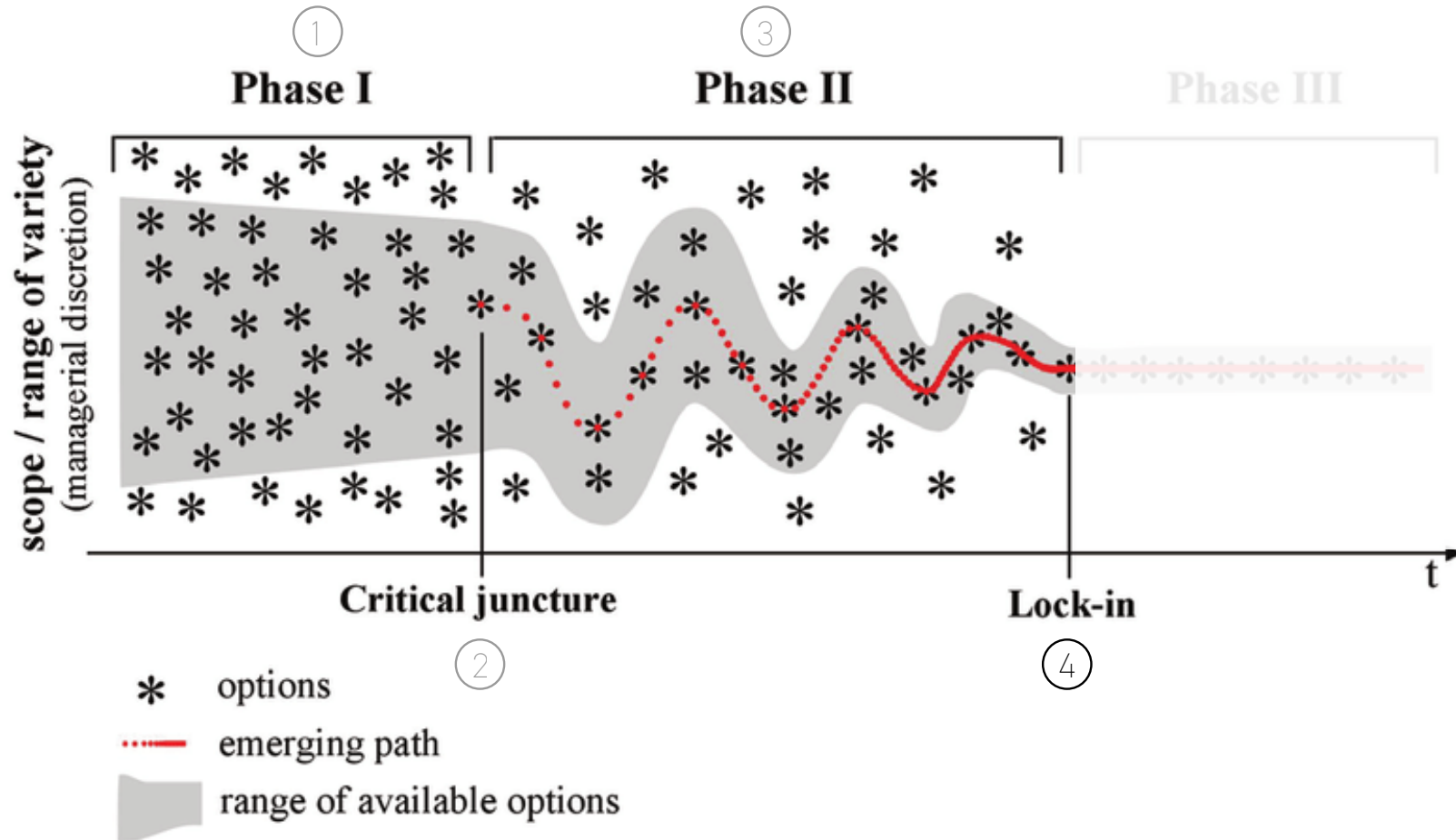


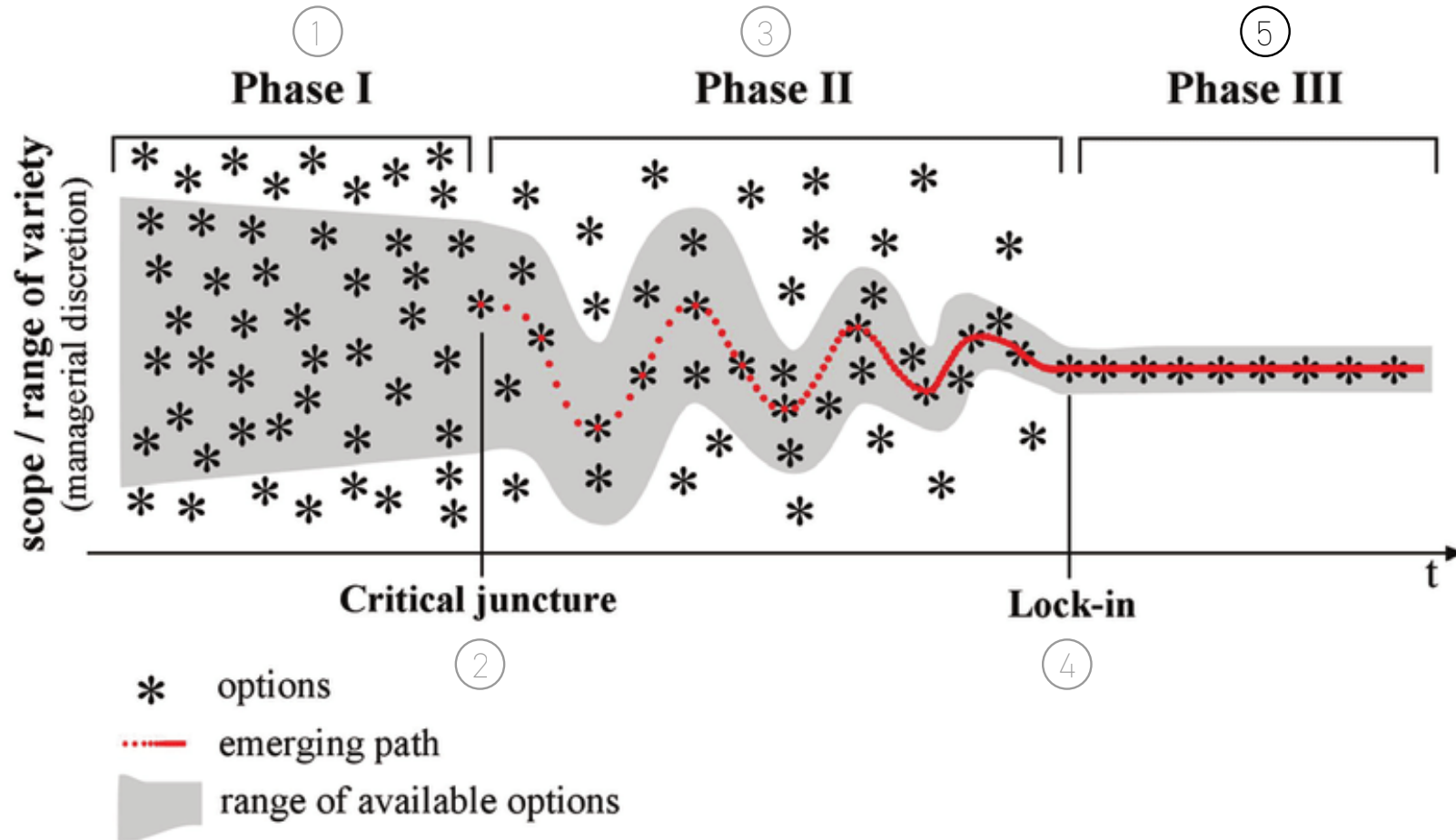


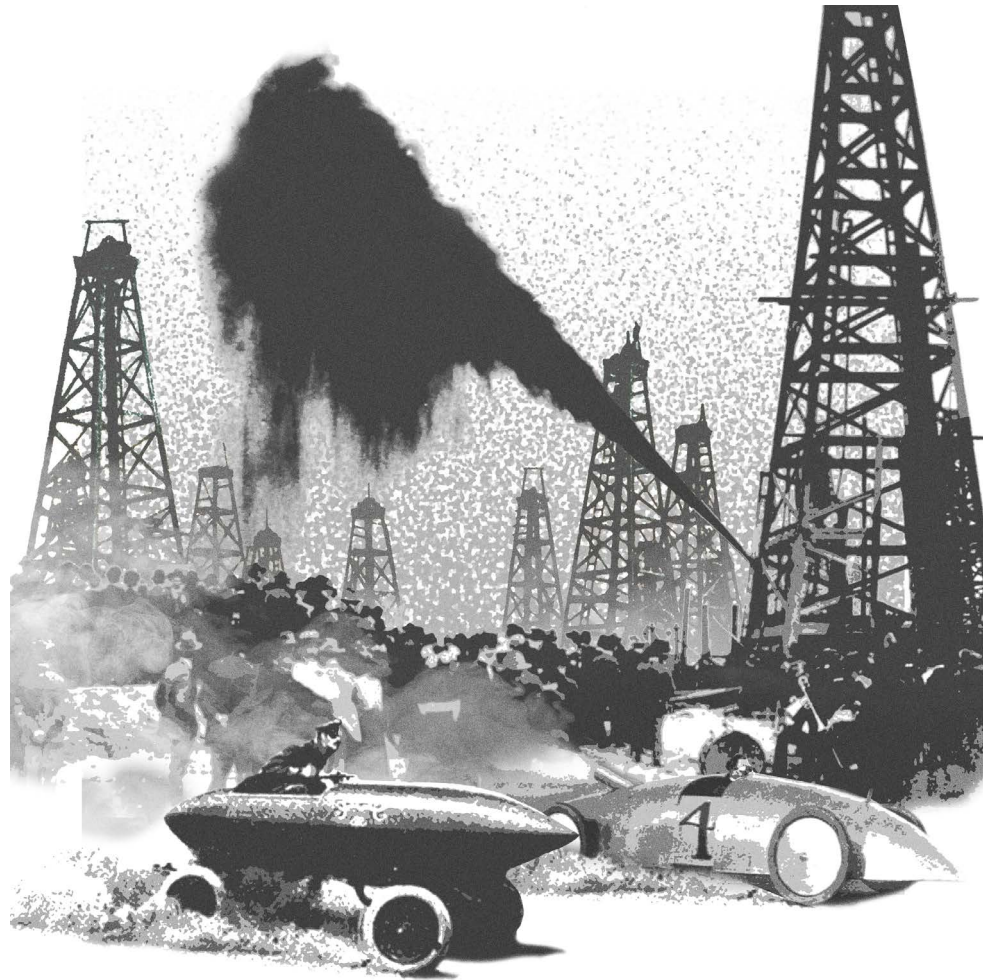




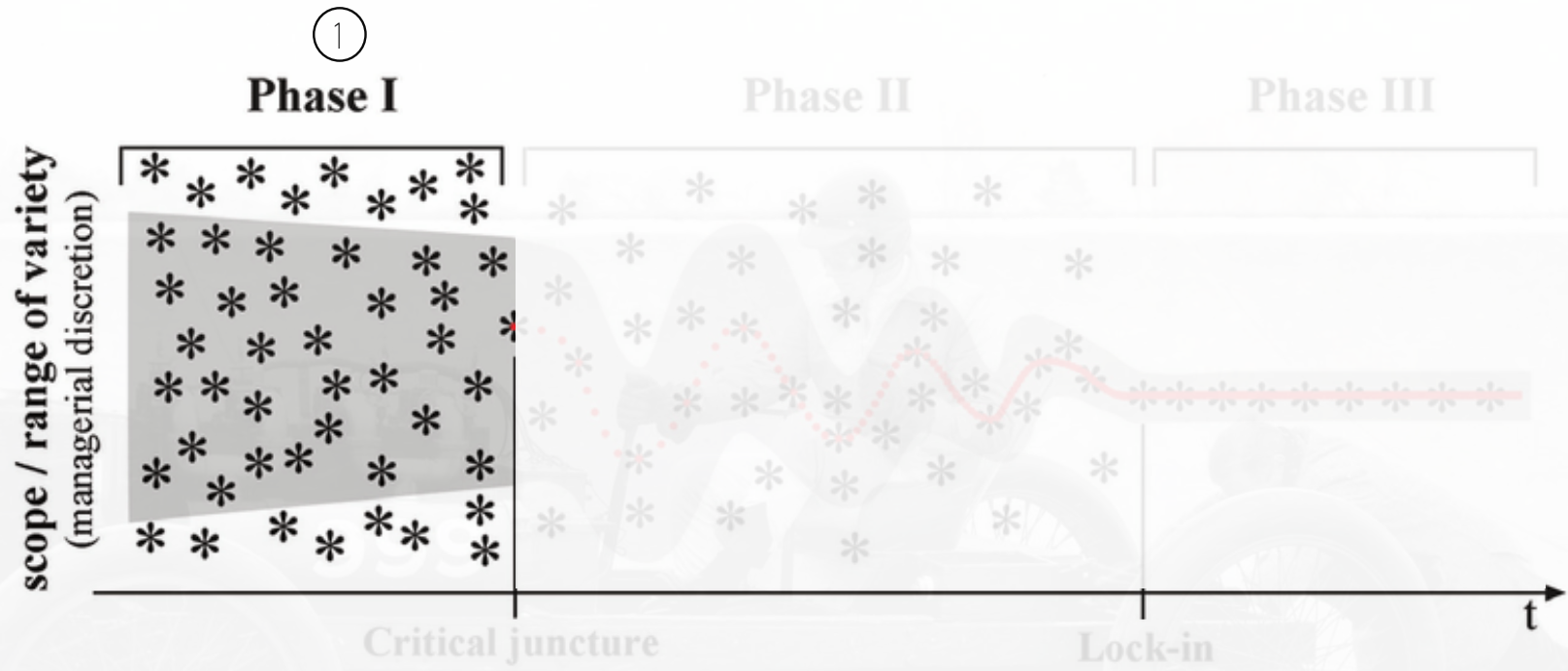








1900 - 1950  
the arrival of the petrol car



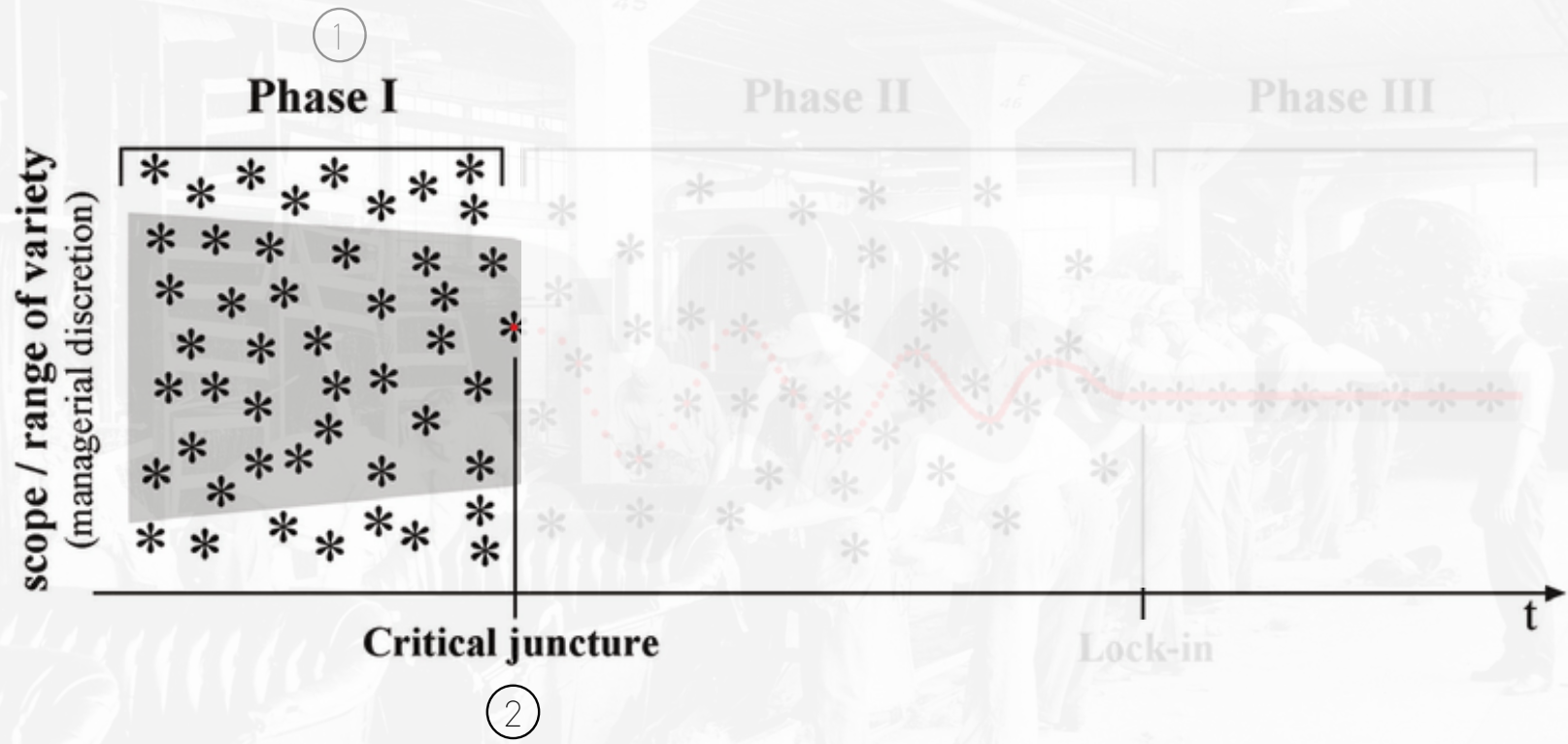
## Phase I: Speed Machine Races

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The social carriers of the automobile around the turn of the century were mostly wealthy sportsmen and businessmen (Laux 1982), and the performance and characteristics of automobiles like the Ford Model T and Mercedes were in line with their needs: **speed and durability**



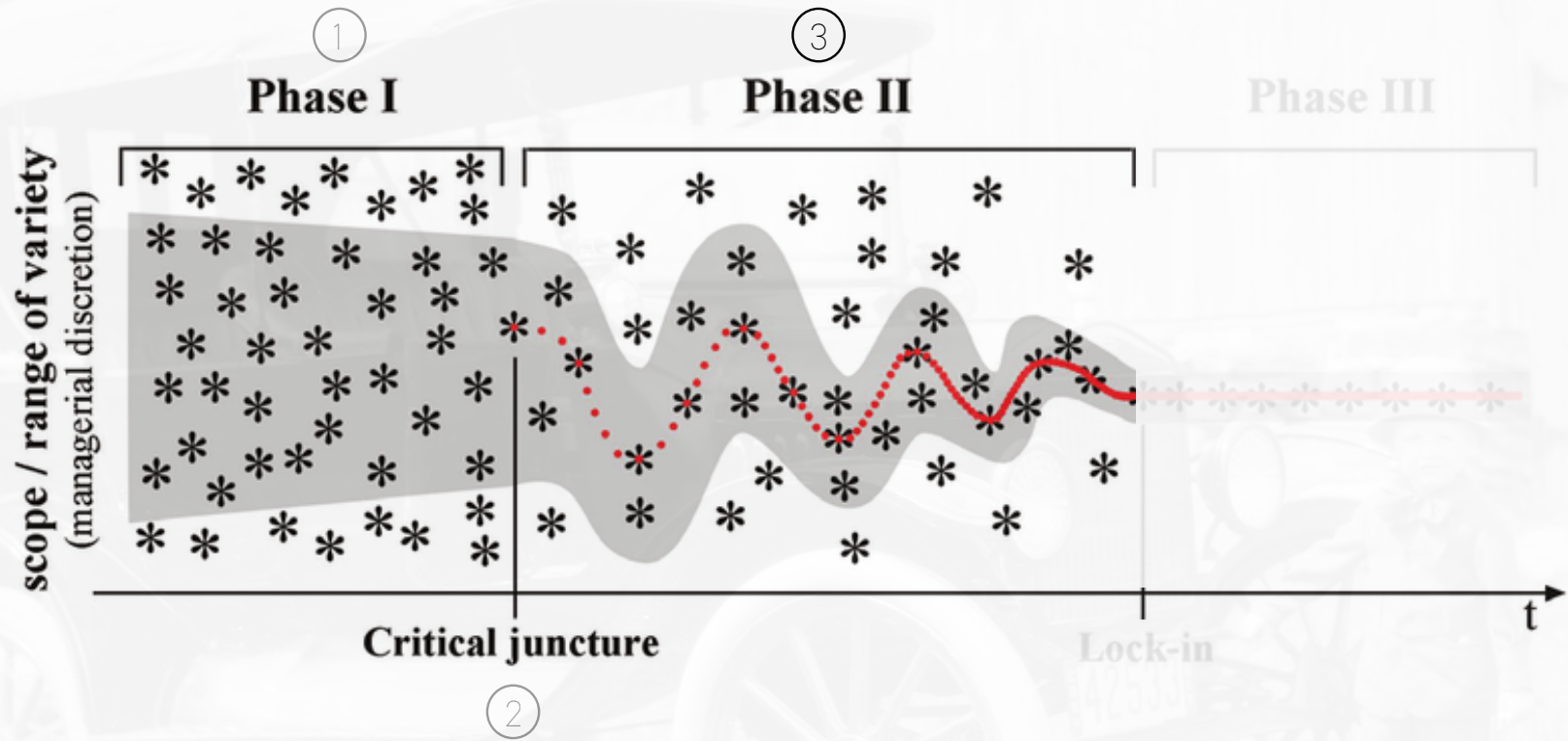




## Critical Juncture

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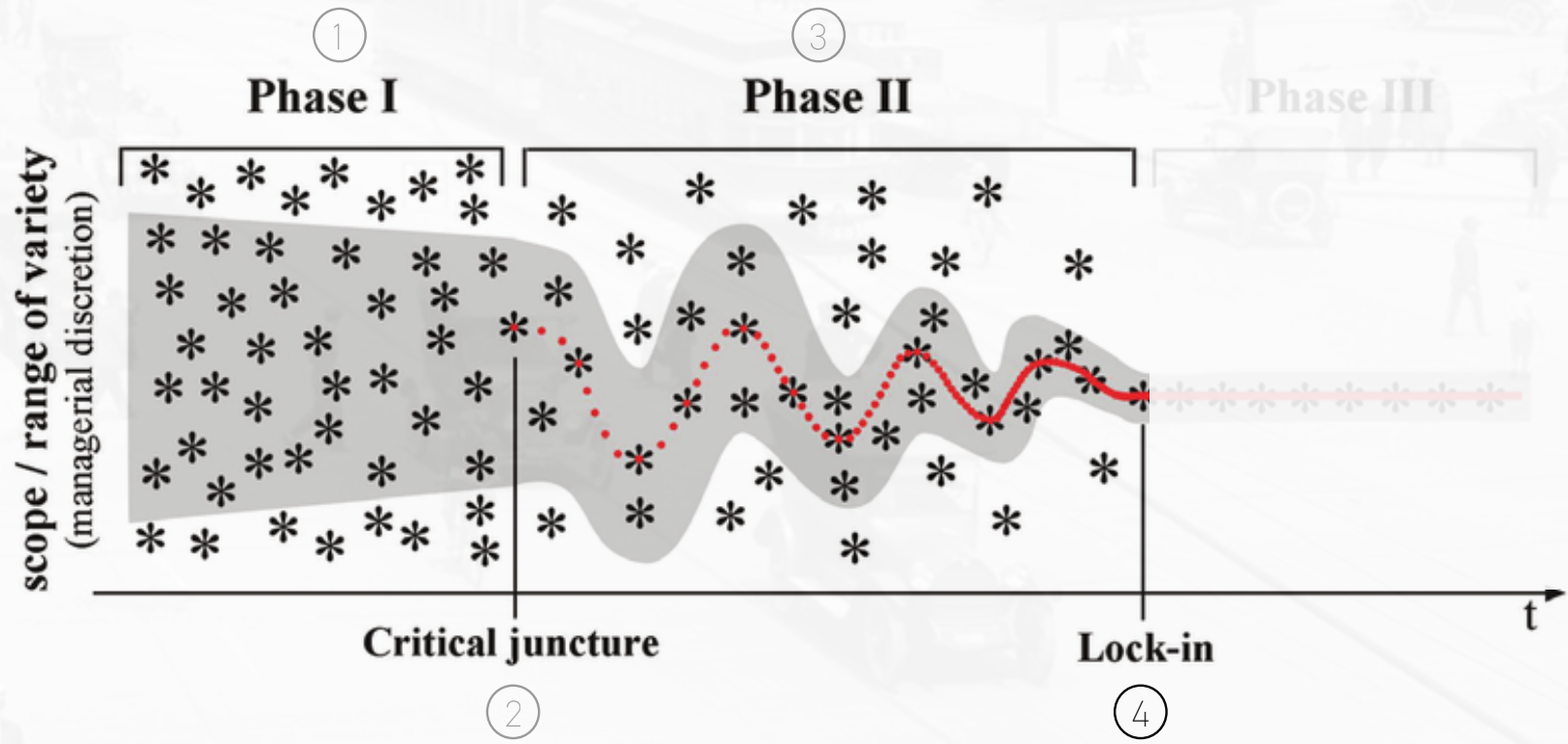
Mercedes and Ford gave the emerging automobile industry a standard (Vincenti 1990). It made life easier for designers and buyers, and allowed production processes to become more rational. **A dominant design emerged**



## Phase II: Democratization

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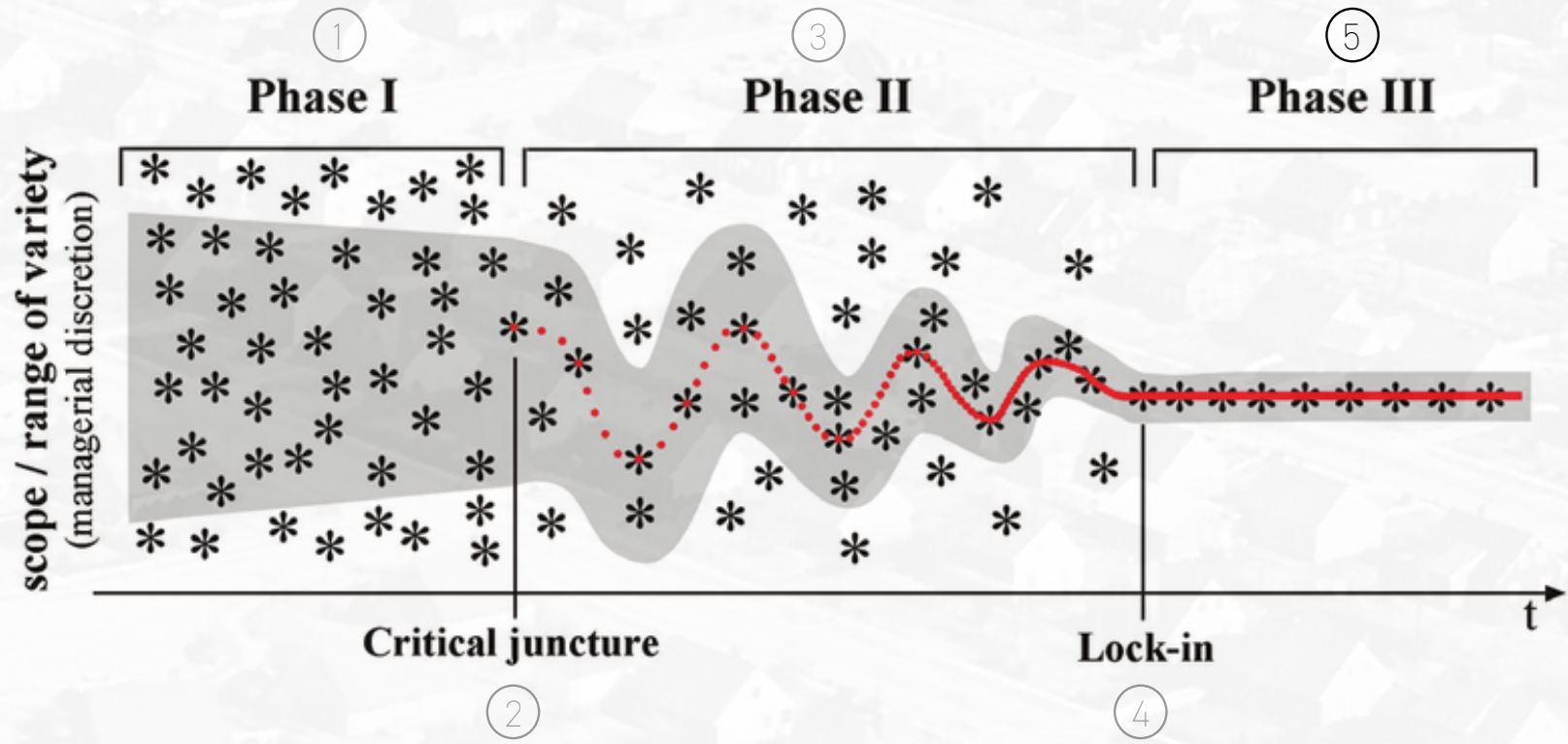
The sports vehicle was now primarily used for commercial and utilitarian purposes, e.g. by farmers and upper middle-class (Kline and Pinch 1993). These changing user conditions were never reflected in the basic outline of the automobile however. Also, the car was less suitable for inner-city purposes.

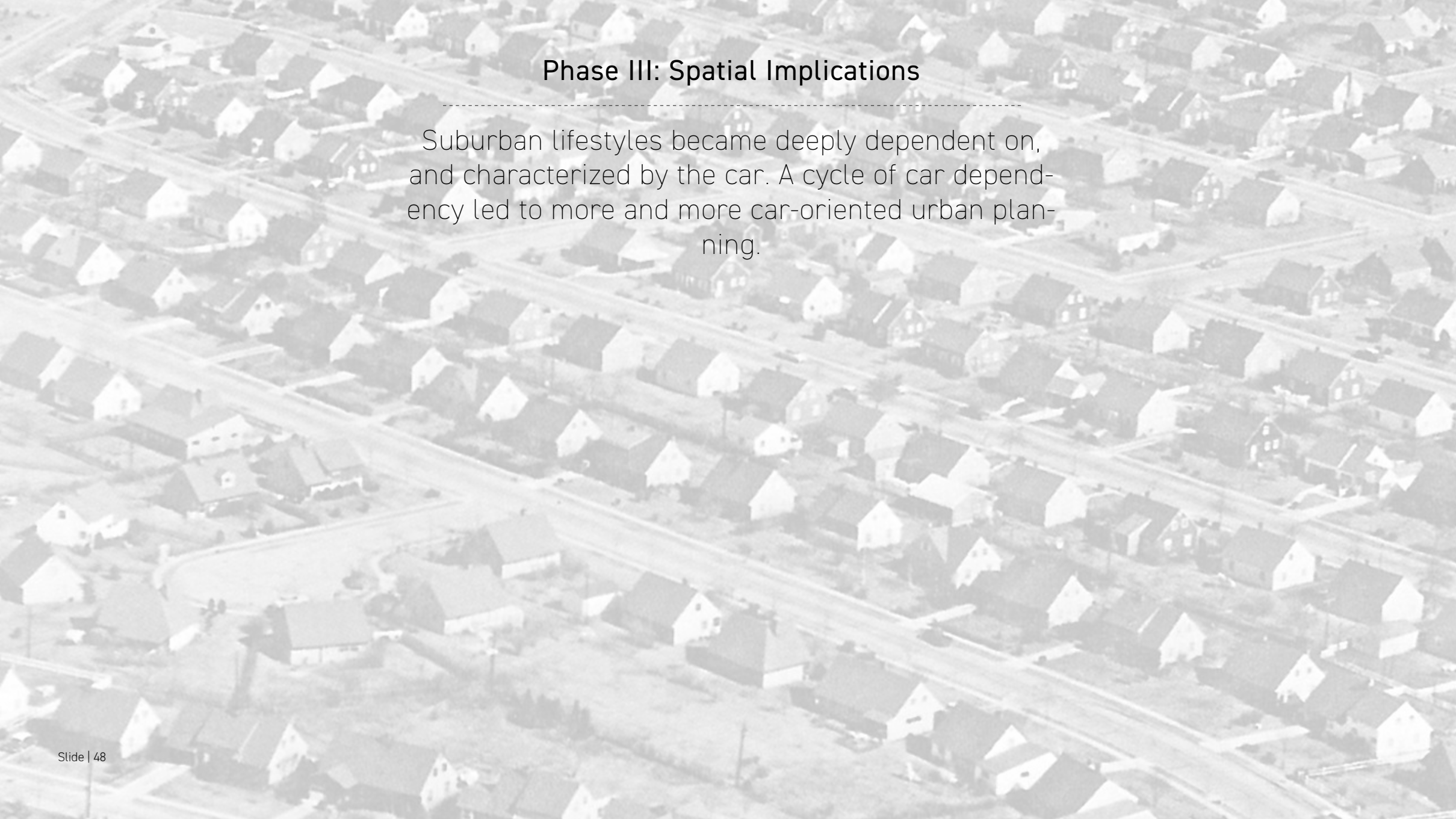


## Lock-In

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The private car rapidly expanded at the cost of other forms of mobility. The pedestrian was taken off the road through legal measures (jaywalking), and entire streetcar systems were shut down by car lobby's (Urry 2016).





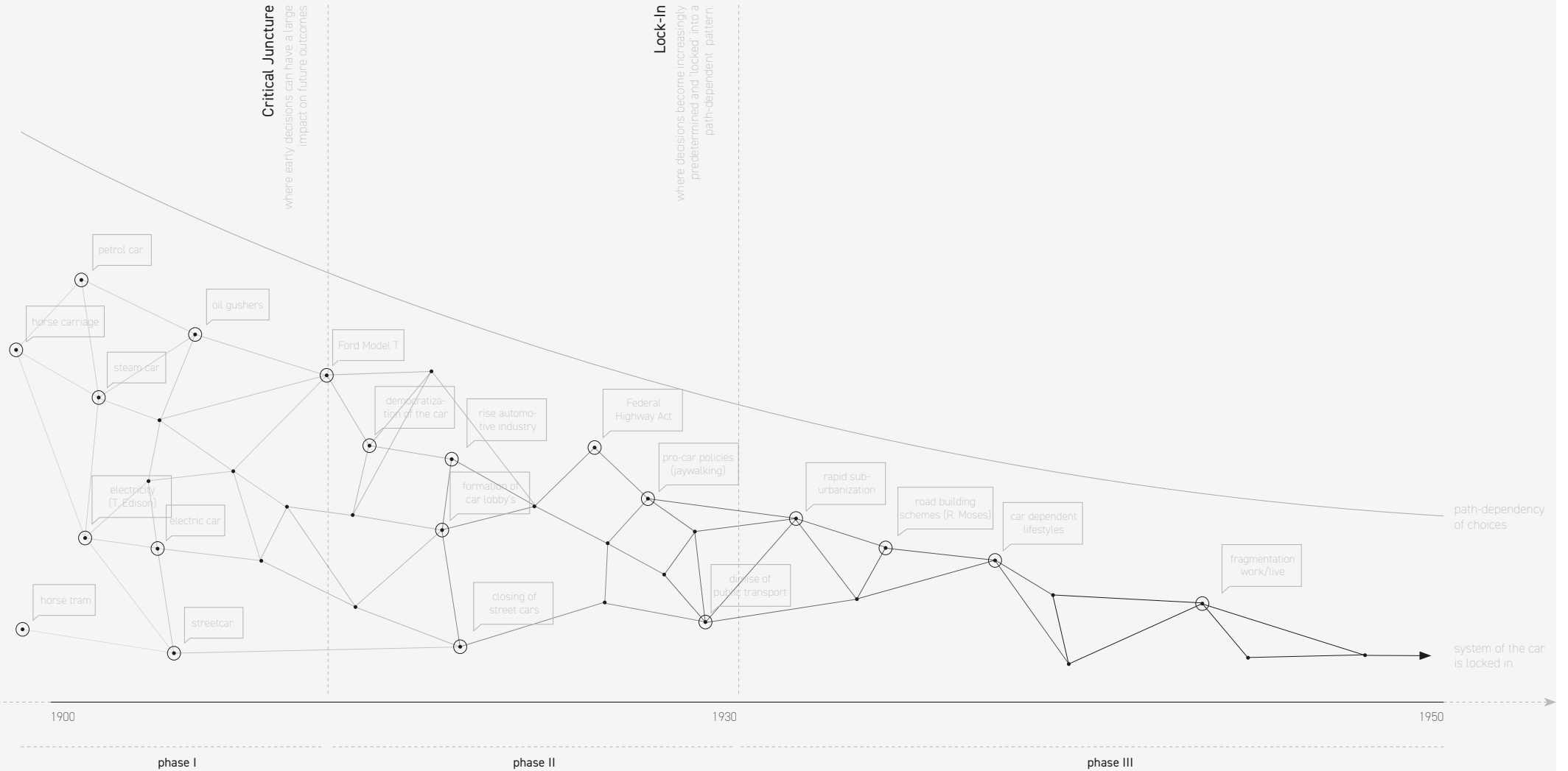
## Phase III: Spatial Implications

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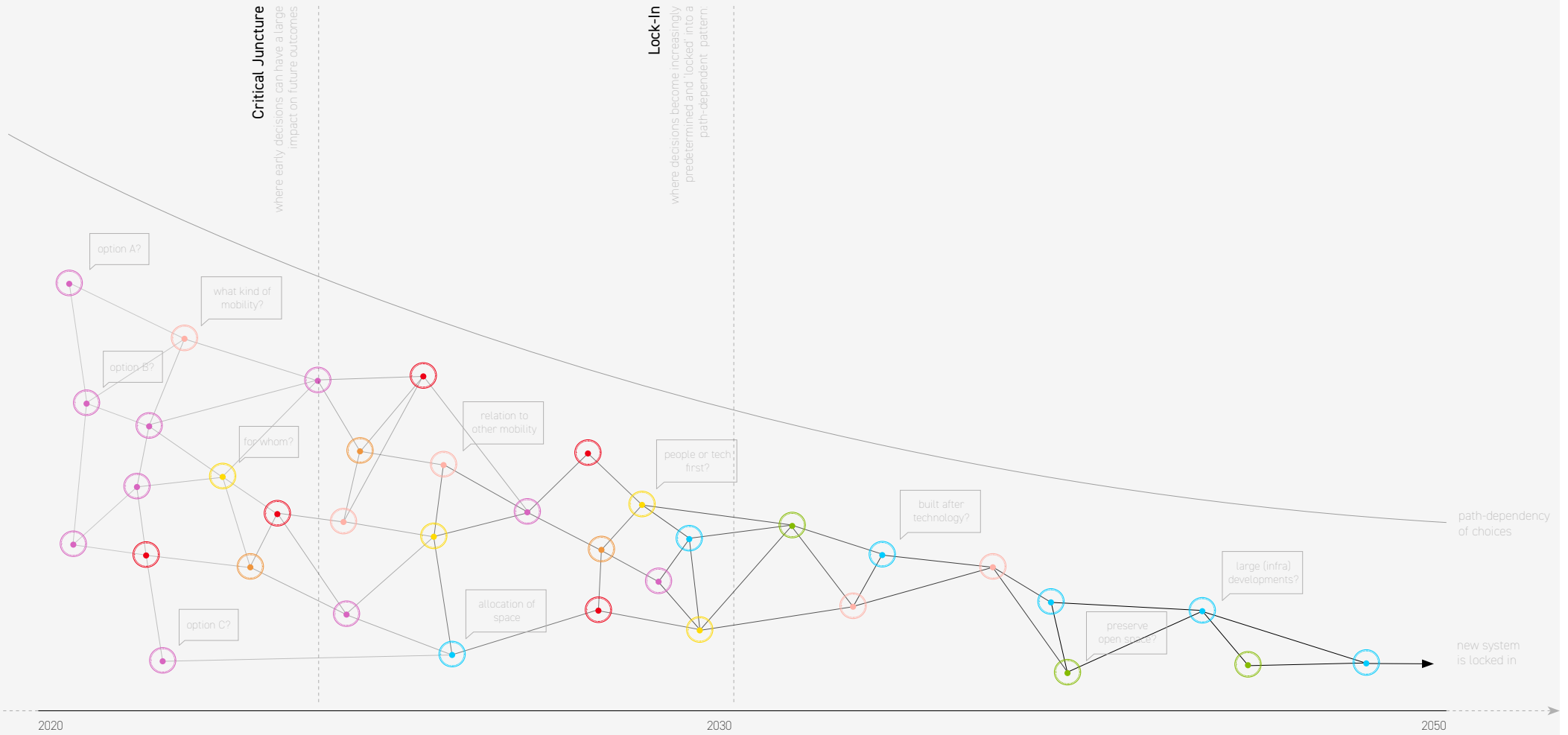
Suburban lifestyles became deeply dependent on, and characterized by the car. A cycle of car dependency led to more and more car-oriented urban planning.



# METHOD STEP 3: STRUCTURE, TIMELINE



# METHOD STEP 3: STRUCTURE, TIMELINE



- Governance
- Society
- Mobility
- Environmental
- Economy
- Technology
- Spatial
- Other

## method part I

---

- scope (1): location & relevant actors
  - foundation (2): worldviews
- structure (3): timeline and socio-technical dynamics
  - **infill (4): internal logic x decisions**

# METHOD STEP 4: INFILL

## Rationales the four different societal rationales

### Conservative Rationale

### Hierachal Rationale

### Egalitarian Rationale

### Individualistic Rationale

Socio-economic

#### Conservative



preserving current course



#### Hierarchy - Proactive State



top-down and technocratic



#### Wikicracy



local initiatives, city alliances and direct democracy



#### Corporatocracy

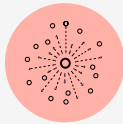


ruled by corporate interest



Mobility

#### Continue Car Culture



Continuation of individual freedom: cars and PAVs



#### Top Down Public System



Transit AVs incorporated in public transport system

TAVs/MaaS



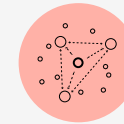
#### Inclusive and Local Transport



A hybrid system of local PT and a wide variety of independent AV services



#### On Demand & Fast Services



A system of on-demand personal rapid transit and AV platoons



Spatial

#### Car/PAV Friendly Development



sprawled out PAV-oriented developments



#### Transit Oriented Development



developments follow the top-down structure of public transport



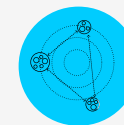
#### Organic People-Oriented Urbanization



locally steered development, with a focus on local character and qualities



#### High-Tech Paradises



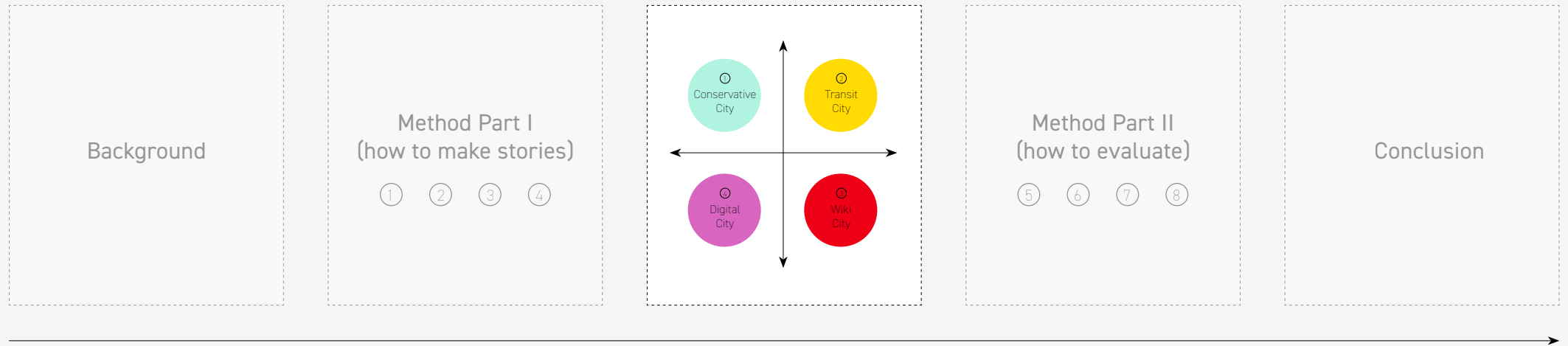
focus shifts towards profitable high-end smart city developments

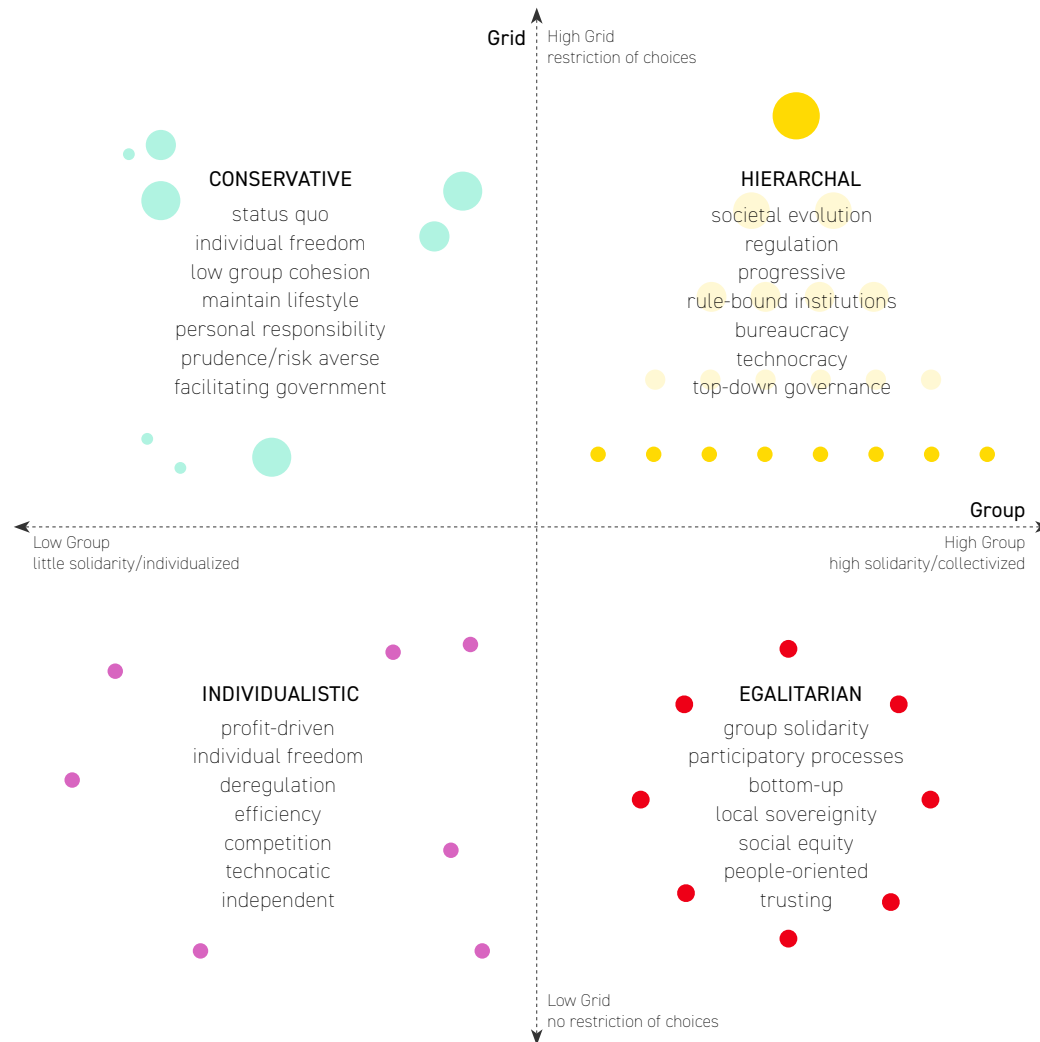


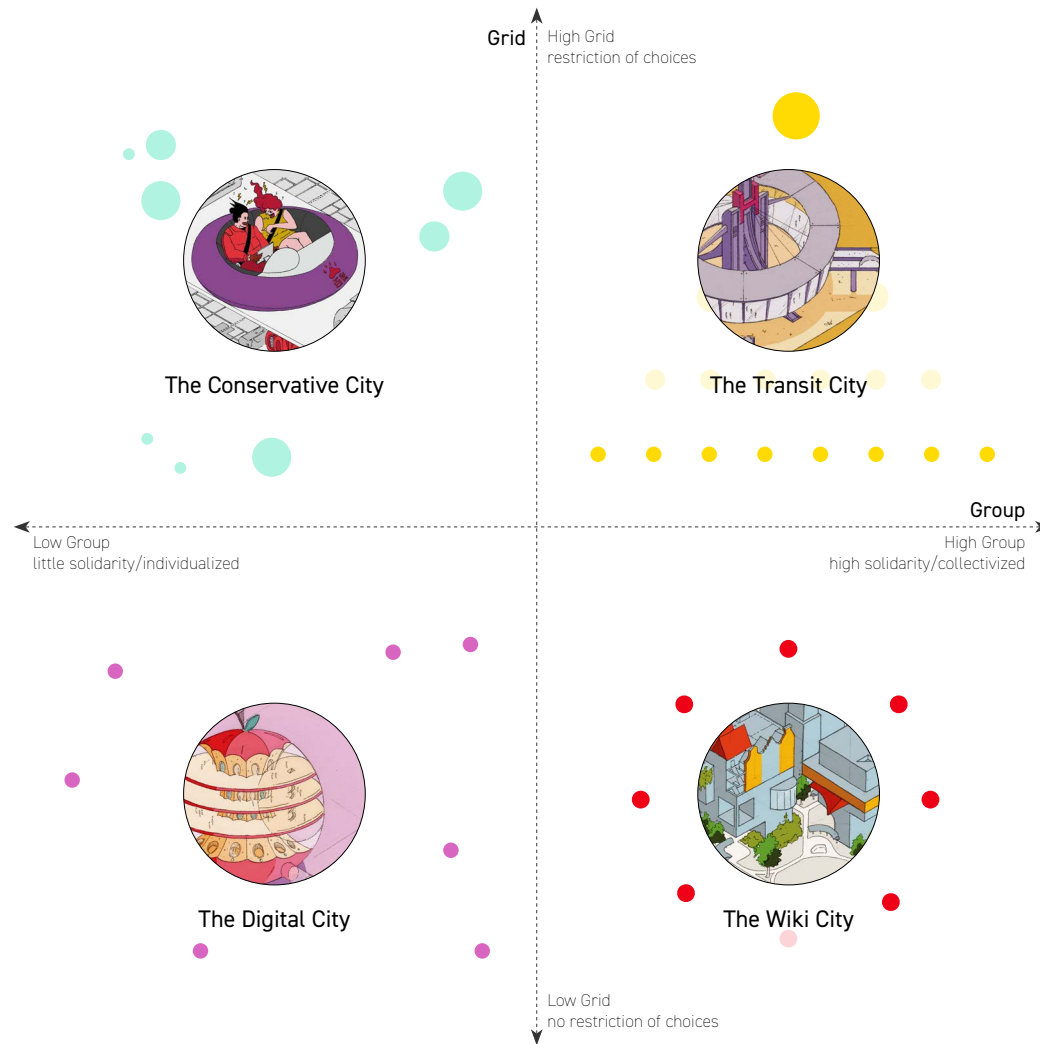
- Governance
- Society
- Economy
- Technology
- Mobility
- Spatial
- Environmental
- Other

Decision Themes  
the 8 themes subdivided in 3 main categories

# THESIS & PRESENTATION STRUCTURE

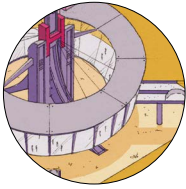








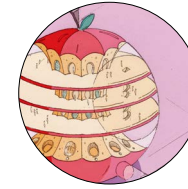
The Conservative City



The Transit City



The Wiki City



The Digital City

2020  
2030  
2050

phase I

critical juncture

phase II

lock-in & phase III

phase I

critical juncture

phase II

lock-in & phase III

phase I

critical juncture

phase II

lock-in & phase III

phase I

critical juncture

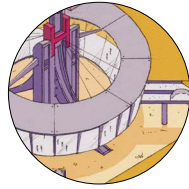
phase II

lock-in & phase III





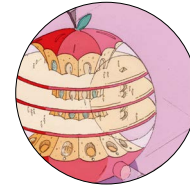
The Conservative City



The Transit City

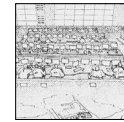


The Wiki City

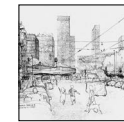
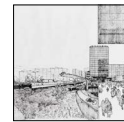
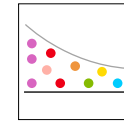
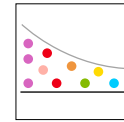
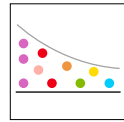
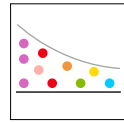


The Digital City

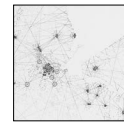
2020



2030

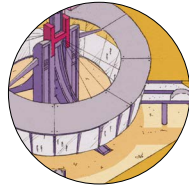


2050





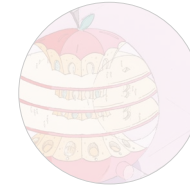
The Conservative City



The Transit City

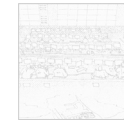


The Wiki City

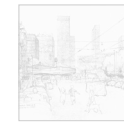
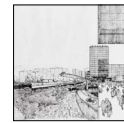
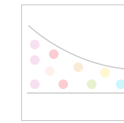
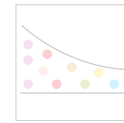
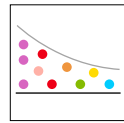
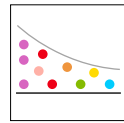


The Digital City

2020

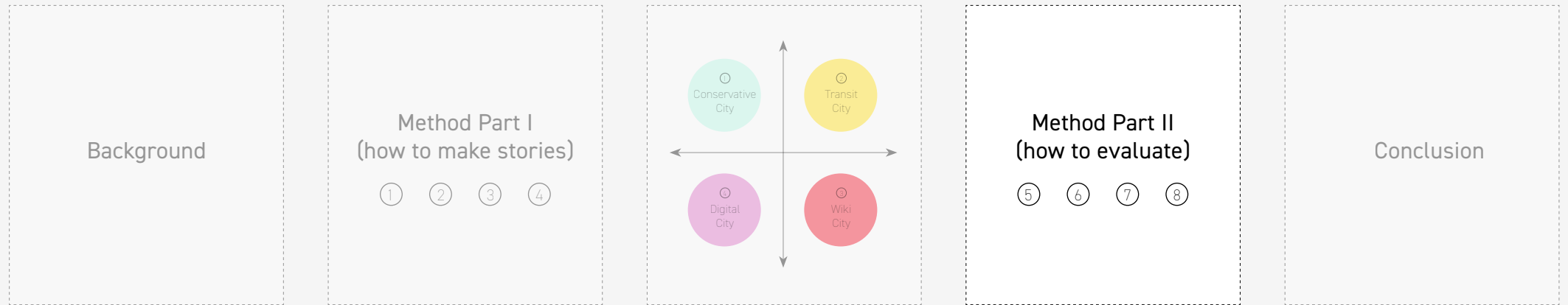


2030



2050

# THESIS & PRESENTATION STRUCTURE



## method part II














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- comparison (5)
- selection and recommendations (6)
  - improvements (7)
  - final recommendations (8)

## method part II

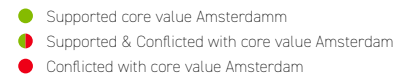
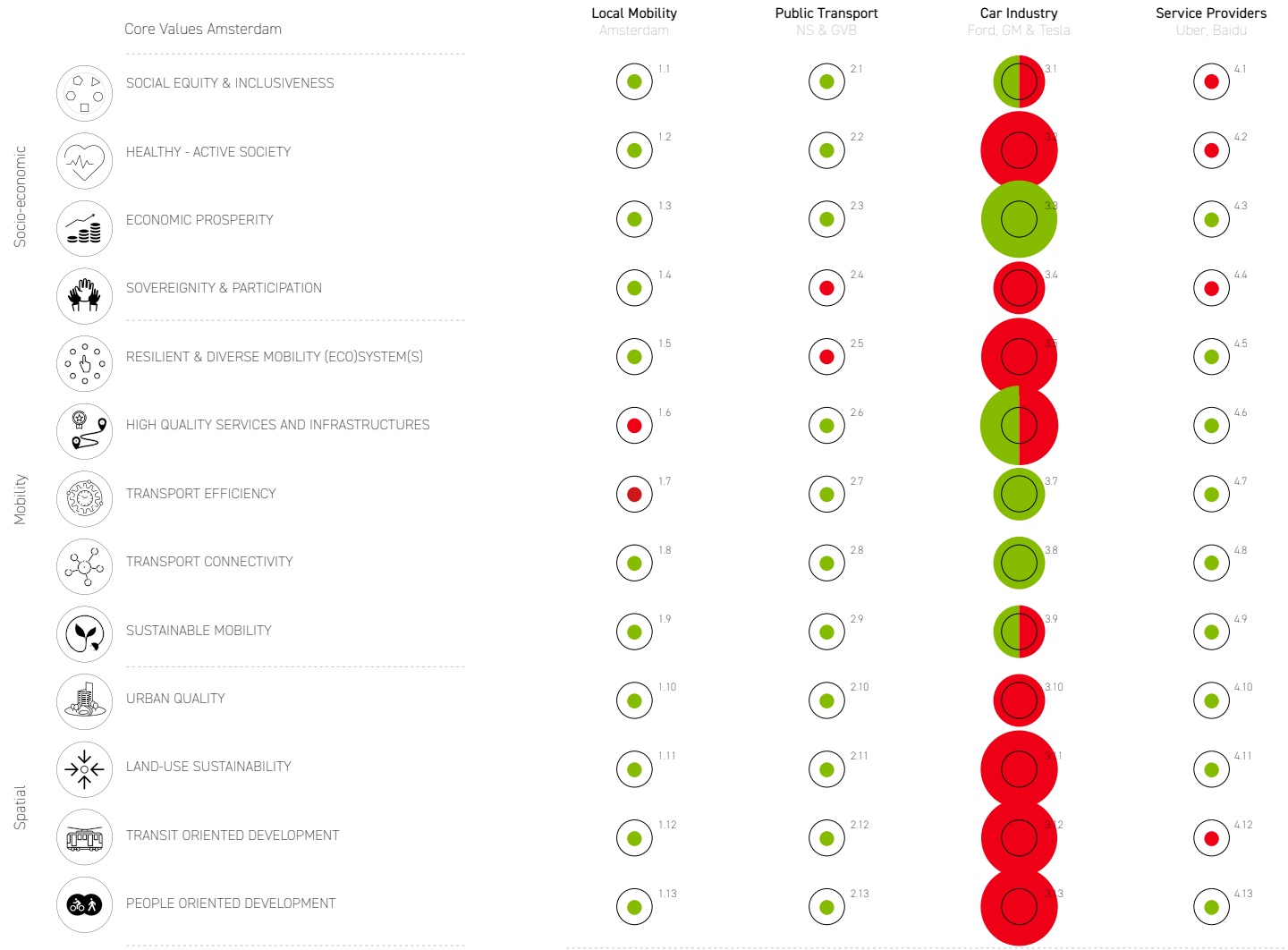
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- **comparison (5)**
- selection and recommendations (6)
  - improvements (7)
  - final recommendations (8)

	Core Values Amsterdam	Local Mobility Amsterdam	Public Transport NS & GVB	Car Industry Ford, GM & Tesla	Service Providers Uber, Baidu
Socio-economic	 SOCIAL EQUITY & INCLUSIVENESS	1.1	2.1	3.1	4.1
	 HEALTHY - ACTIVE SOCIETY	1.2	2.2	3.2	4.2
	 ECONOMIC PROSPERITY	1.3	2.3	3.3	4.3
	 SOVEREIGNTY & PARTICIPATION	1.4	2.4	3.4	4.4
Mobility	 RESILIENT & DIVERSE MOBILITY (ECO)SYSTEM(S)	1.5	2.5	3.5	4.5
	 HIGH QUALITY SERVICES AND INFRASTRUCTURES	1.6	2.6	3.6	4.6
	 TRANSPORT EFFICIENCY	1.7	2.7	3.7	4.7
	 TRANSPORT CONNECTIVITY	1.8	2.8	3.8	4.8
	 SUSTAINABLE MOBILITY	1.9	2.9	3.9	4.9
Spatial	 URBAN QUALITY	1.10	2.10	3.10	4.10
	 LAND-USE SUSTAINABILITY	1.11	2.11	3.11	4.11
	 TRANSIT ORIENTED DEVELOPMENT	1.12	2.12	3.12	4.12
	 PEOPLE ORIENTED DEVELOPMENT	1.13	2.13	3.13	4.13











The Conservative City





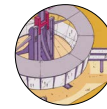
## The Conservative City

	Main positive/negative implications	Elaboration
Economic Prosperity	 	<p><b>Growth Before All Else</b></p> <p>The car manufacturers have found in the Netherlands/AMA the perfect place to test and release their latest models. Additionally, large investments are made to ensure accessibility of important economic hubs and to ensure efficient flows of platooning AVs.</p>
High Quality Services and Infrastructures	 	<p><b>The Highway of the Future</b></p> <p>On the one hand, the large investments by the public sector and by the car manufacturers lead to a truly state-of-the-art road-system of AV-ready highways and facilities. On the other, formerly important public transport infrastructures and services are deteriorating due to decreasing number of passengers and lacking investments.</p>
Resilient & Diverse Mobility Systems	 	<p><b>A Viscious Cycle of PAV Dependency</b></p> <p>A vicious cycle of personal AVs, which lead to more complex mobility patterns and longer journeys, AV-oriented planning and AV-dependent lifestyles makes all other modes of transport fall short - public transport and active forms of travelling are losing their relevance.</p>
Land-use Sustainability	 	<p><b>Suburban Sprawl</b></p> <p>The freedom that is given by the personal AV makes it for more and more citizens possible to move further from work and facilities: the focus shifts from inner-city transformations towards suburban developments sprawling out into the open land.</p>
Transit Oriented Development	 	<p><b>The Downfall of Public Transport</b></p> <p>Within the city, the partnership with Ford ties in with the city's TOD values. However, outside the ring, the personal AV is the main mode of transport, and renders public transport obsolete. In new development, low density and AV-oriented planning make PT inefficient and costly.</p>
People Oriented Development	 	<p><b>Make Way for the AV!</b></p> <p>The comfort, speed and efficiency of the PAV are more important than the walkability or bikeability of the city. Streets are traffic corridors, first and foremost, other activities and functions need to make way.</p>





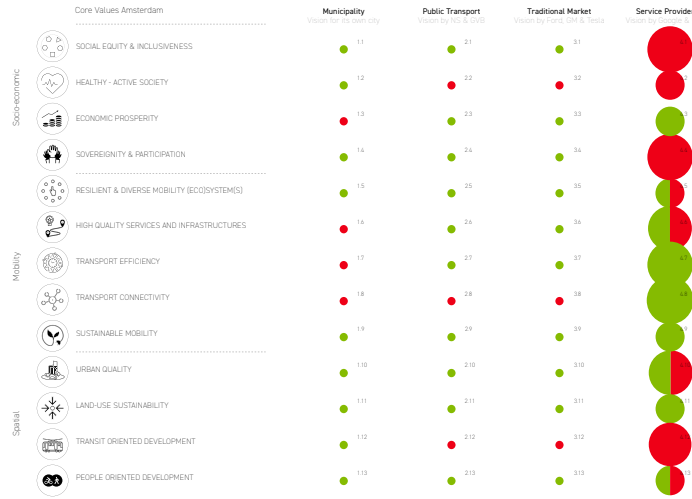
The Conservative City



The Transit City

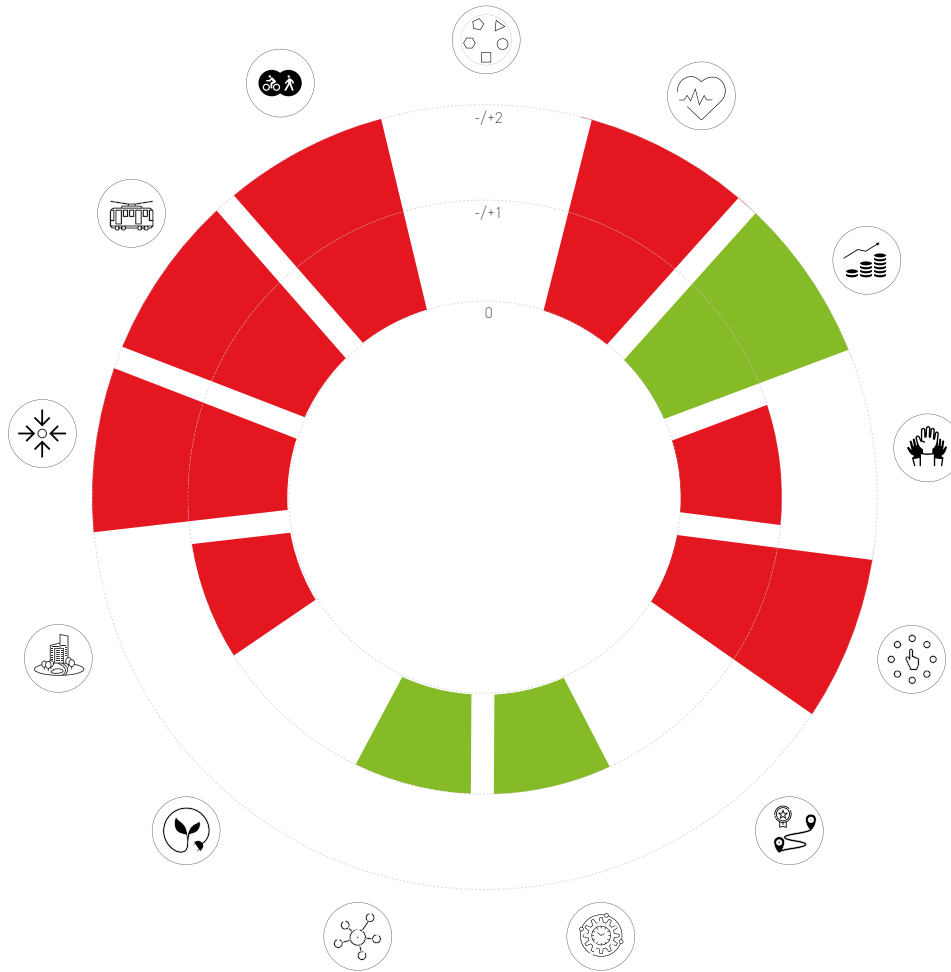


The Digital City

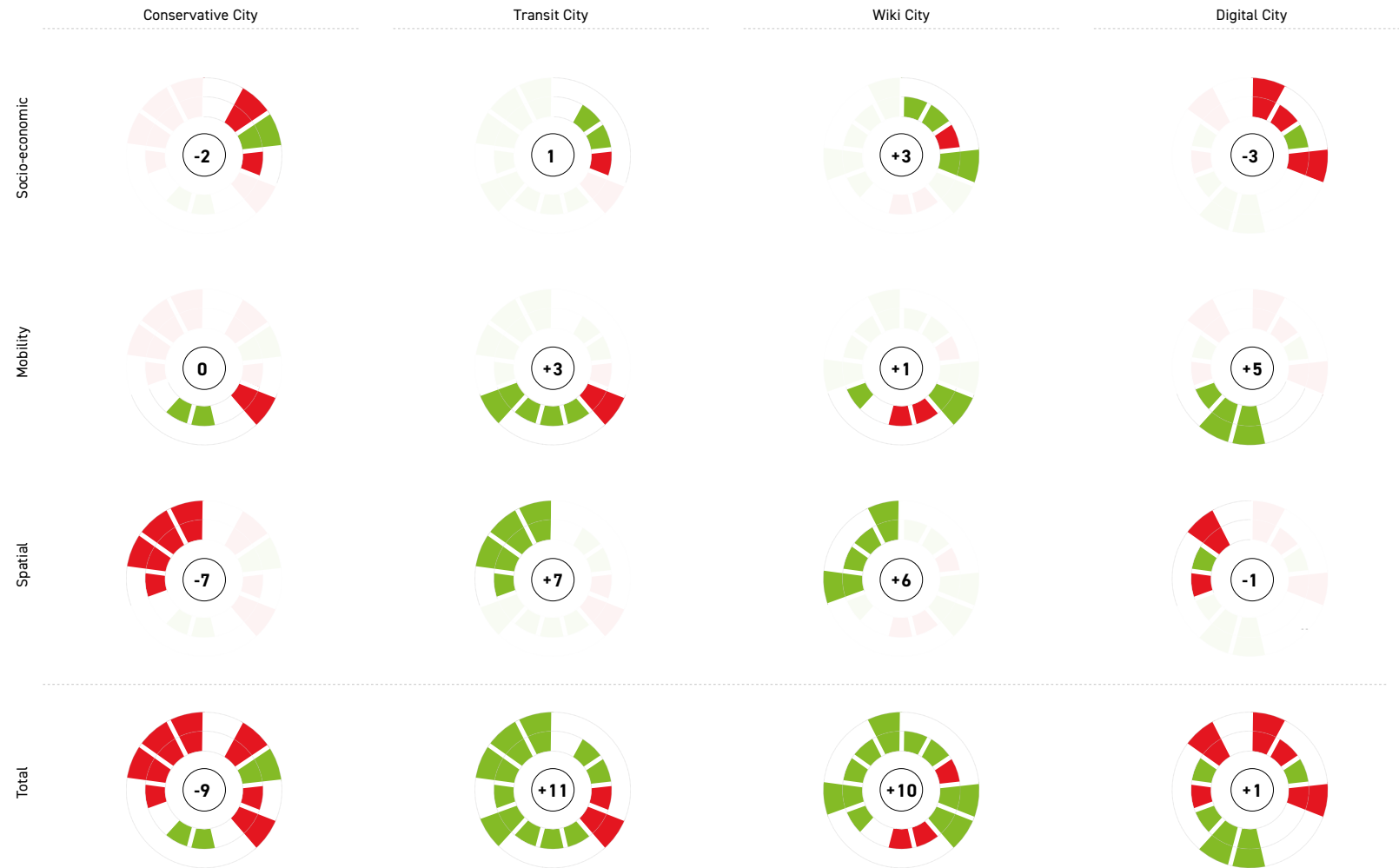


The Wiki City





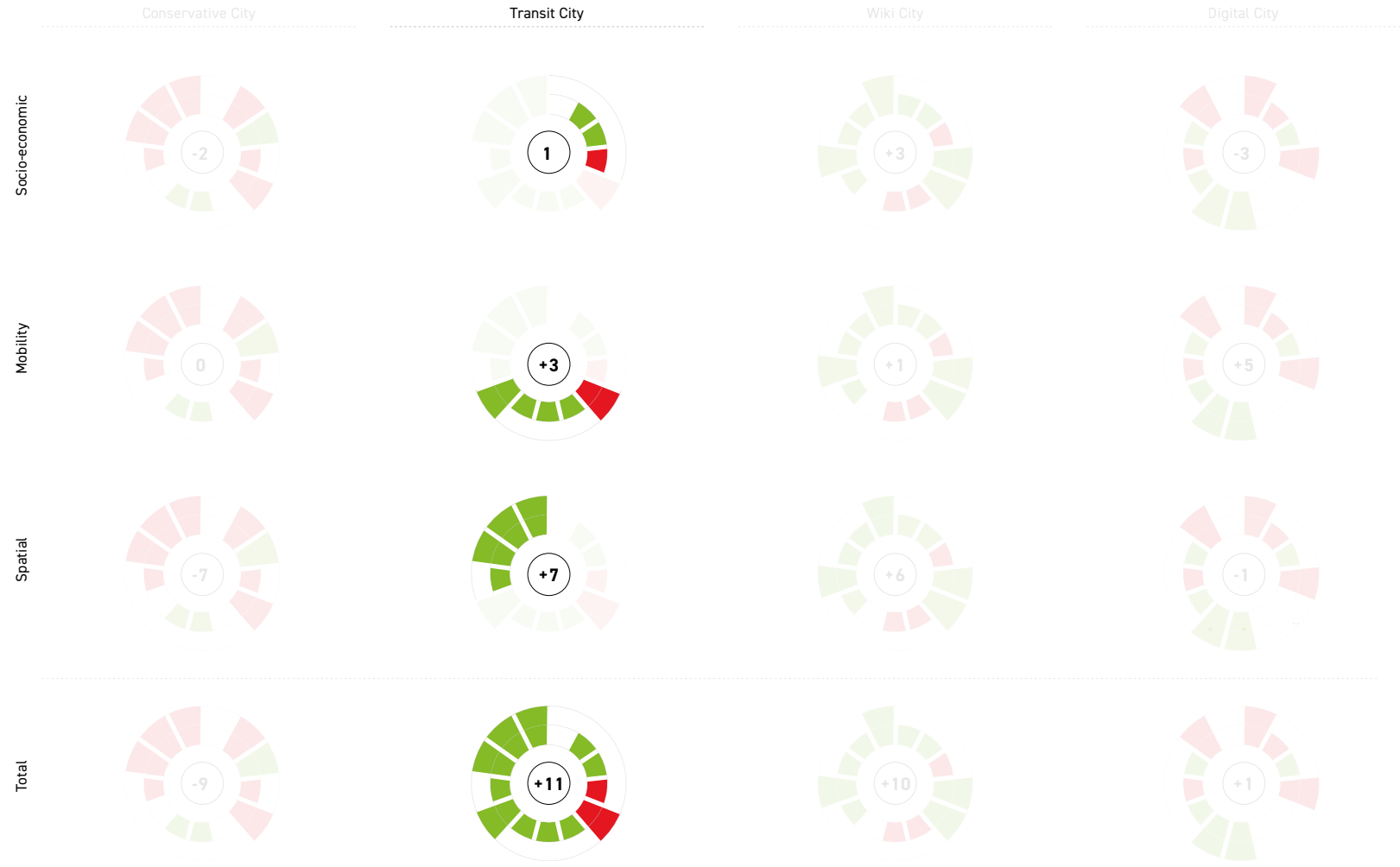
# METHOD STEP 5: COMPARISON






## method part II

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- comparison (5)
- **selection and recommendations (6)**
  - improvements (7)
  - final recommendations (8)



# METHOD STEP 6: SELECTION & RECOMMENDATIONS

strenghts what to ensure?	no-regret decisions which actions to take (2020-2025)
 transit-oriented development	<ul style="list-style-type: none"> <li>● Zoning measures; prioritizing public transport</li> <li>● Discourage PAVs in cities; stimulate SAV experimentation</li> <li>● Expand PT options: individual transit, micromobility</li> <li>● Expand role of NS: partnerships with local &amp; private actors operating in cities</li> <li>● Transit priority lanes (in anticipation of AV bus/AV shuttles)</li> <li>● Transfer points (hubs/stations): variety of transport options (services)</li> </ul>
 land-use sustainability	<ul style="list-style-type: none"> <li>● Provide a long-term national planning vision (public transport network)</li> <li>● Reclaim a more steering role as national government (chosing locations)</li> <li>● TOD and car free developments around public transport network</li> <li>● Prioritize inner-city transformations/expand only in high density-mixed use</li> </ul>
 sustainable mobility	<ul style="list-style-type: none"> <li>● Zero-emission and no-car/no-PAV zones.</li> <li>● High parking rates (lower for SAVs, shared cars, green micromobility)</li> <li>● Prioritization of SAV/pedestrian&amp;cyclist over individual transport</li> <li>● Form partnerships with green/sustainable frontrunners from the market</li> <li>● 'Superblock' division of 'transit avenues' and cycling/pedestrian roads</li> <li>● Develop electricity/recharging grid of stations/docks</li> </ul>

- Policies
- Actions
- Spatial Interventions

## method part II

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- comparison (5)
- selection and recommendations (6)
  - **improvements (7)**
  - final recommendations (8)

# METHOD STEP 7: IMPROVEMENTS





# METHOD STEP 7: IMPROVEMENTS

## improvements

what to ensure?



sovereignty & participation



resilience & diversity



social equity & inclusiveness

## no-regret decisions

which actions to take (2020-2025)

- Keep local mobility market open for small companies/local innovations
- Enforce 'open innovation' (e.g. data sharing)
- Set out 'standardization rules' (for services and for knowledge sharing)
- Allow and preserve small scale trial-and-error/living lab pilots
- Decentralize some responsibilities to district levels (eg. types of vehicles at hub)
- Allow (temporary) neighbourhood/campus/businesspark hubs
- Incentivize (radical) innovation over incremental/technical updates of the existing
- Establish clear hierarchy (structural framework and what is left for bottom-up)
- Wikipedia-like platform for feedback between citizens and city
- Modular hubs/mixed traffic experiments/lanes for micromobility
- Enforce equal access/evenly spread mobility services
- Mobility as a Commons instead of Mobility as a Service
- Invest in walking/cycling/micromobility networks

- Policies
- Actions
- Spatial Interventions

## method part II

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- comparison (5)
- selection and recommendations (6)
  - improvements (7)
  - **final recommendations (8)**

# METHOD STEP 8: FINAL RECOMMENDATIONS



transit-oriented development



land-use sustainability



sustainable mobility

- **TOD zoning**, prioritizing public transport
- Discourage PAVs in cities; stimulate **inner-city SAV experimentation**
- Expand PT options: **individual transit, micromobility**
- Expand role of NS: partnerships with local & private actors
- **Transit priority lanes** (in anticipation of AV bus/AV shuttles)
- **Transfer points** (hubs/stations): variety of transport options (services)
- Provide a **long-term national planning vision**
- **Steer** in planning as national government (choosing locations)
- **TOD and car free developments** around public transport network
- Prioritize **inner-city transformations**
- Zero-emission and **no-car/no-PAV zones**
- **High parking rates** (lower for SAVs, shared cars, green micromobility)
- **Prioritization** of SAV/pedestrian&cyclist over individual transport
- Form partnerships with sustainable frontrunners from the **market**
- **'Superblock' division** of 'transit avenues' and cycling/pedestrian roads
- Develop electricity/**recharging grid** of stations/docks



- Keep local mobility market open for **small companies/local innovations**
- Enforce **'open innovation'** (e.g. data sharing)
- Set out **'standardization'** rules' (for services and for knowledge sharing)
- Allow and preserve small scale trial-and-error/**living lab** pilots
- Decentralize some responsibilities to district levels
- Allow **temporal** neighbourhood/campus/businesspark **hubs**
- Incentivize **radical innovation** next to incremental updates of the existing
- Establish clear **hierarchy** (what is left for bottom-up)
- **Wikipedia-like** platform for feedback between citizens and city
- **Modular hubs/mixed traffic** experiments/lanes for micromobility
- Enforce **equal access**/evenly spread mobility services
- **Mobility as a Commons** instead of Mobility as a Service
- Invest in **walking/cycling/micromobility** networks



sovereignty & participation



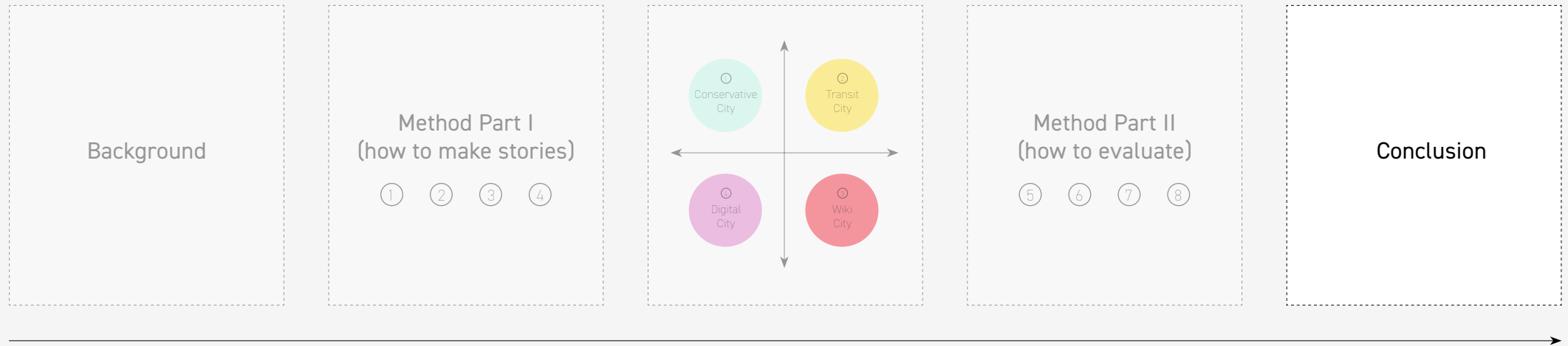
resilience & diversity



social equity & inclusiveness

- Policies
- Actions
- Spatial Interventions

# THESIS & PRESENTATION STRUCTURE



## main research question

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“How can a storytelling-scenario method provide Amsterdam with important insight to inform decision-making regarding autonomous vehicles?”

## main research question

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By providing a **variety of speculative stories**, which offer insight/transparency in how **early decision-making regarding autonomous vehicles** might lead to a certain future, Amsterdam can **evaluate possibilities** and **derive important decisions** from the option they find desirable.

## discussion & future research

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- incorporating storytelling, scenarios and systems theory
  - workshops setting
  - transferability/patchwork of 'worldviews'

ROOM FOR QUESTIONS