

MOBILIZE & Delft University of Technology

Driving States of Mind: A Strategic Framework for Mobility Behaviour in Grand Paris 2040

Illustrated by a first concept /

Riding the Wave: Orchestrating Urban Resonance Through Public Movements

APPENDICES

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APPENDIX A: LIST OF CONTEXT FACTORS

Context factors	Field	Typology	Condition	Source
Habitat selection occurs in three phases: territorial scanning, resource-hazard evaluation, and energy-efficiency optimization.	Evolutionary	Principle	Paris reaching	(Bennett, 2019)
Human beings inherently prefer environments rich in resources and low in survival risk, both spatially and temporally.	Evolutionary	Principle	singularity	(Bennett, 2019)
The design of modern cities prioritizes time-efficiency; yet paradoxically, people lose time commuting creating an illusion of acceleration.	Demographic	State	↓	(Moreno, 2020)
The urban experience provides access to; work, housing, food, health, education, culture and leisure.	Psychological	State		(Moreno, 2020)
The urban paradox: increased proximity often results in emotional or sensory distance from essential sources of sustance.	Biological	State		(van Dijk et al., 2024)
Human movement in cities clusters around a narrow set of high-frequency destinations (homes, schools, shops, transit nodes).	Evolutionary	Principle		(Ellis et al., 2016)
Urbanization drives economic productivity by clustering labor in dense urban centers; cities contribute to ~80% of global GDP.	Economic	Development		(NIC, 2021)
Paris is undergoing a shift toward the 15-minute city model, designed around proximity, solidarity, ecology, and civic participation.	Political	Development		(Antunes, 2021)
A transition to chrono-urbanism emphasizes optimizing city rhythms and infrastructure for time-efficiency and synchronicity.	Socio-cultural	Development		(Lai, Yung, & Mak, 2022)
Natural systems evolve in spatial and temporal configurations (e.g., lungs, deltas, pulses).	Biological	Principle		(Bejan & Lorente, 2010)
Despite covering just 3-4% of the Earth’s surface, cities exert disproportionate ecological footprints on global resources.	Demographic	State		(Moura & Silva, 2020)
Paris and other European cities aim to cut greenhouse gas emissions by at least 90% by 2040.	Political	Development		(European Commission, 2023)
Paris targets climate neutrality and being a ‘smart city’ by 2030 through integrated policy on health, pollution, and inclusion.	Political	Development		(European Commission, 2020)
By 2050, 84% of Europe’s population will reside in urban environments.	Demographic	Development		(European Parliament, 2024)
Paris’ urban core (intra-muros) is among Europe’s most densely populated; about 20,000 people per square kilometer.	Demographic	State		(La Grande Conversation, 2023)
Physical inactivity in urban settings is projected to increase, with adult inactivity expected to reach 35% by 2030.	Socio-cultural	Development		(Zwiebler, 2024)
Urban living is associated with higher prevalence of cardiovascular disease due to environmental stressors and sedentary routines.	Psychological	Development		(World Heart Federation, 2017)
Extreme population density triggers psychological strain, reducing resilience and increasing mental health risks.	Biological	Development		(Hall, 1966)
Urban residents show increased prevalence of mental disorders: neurotic, depressive, and stress-related. (80.6% compared to 48.9% in rural)	Psychological	Trend		(Srivastava, 2009)
Parisian culture is a melting pot of rebelliousness; dense urban living fosters social tension and norm-defying behavior.	Socio-cultural	Trend		(T. Ehrmann, 2024)
Population shifts from inner city to outer suburbs: inner suburbs increase 15%, outer suburbs increase 17%, while central Paris remains stable.	Demographic	Development		(La Grande Conversation, 2023)
Relocation within Grand Paris reflects housing pressure and lifestyle shifts rather than reduced appeal of the region.	Demographic	State		(La Grande Conversation, 2023)
Lower-density suburbs around Paris offer urban expansion potential, contrasting with dense intra-muros conditions.	Demographic	State		(La Grande Conversation, 2023)
In Paris, shared, clean and active modes of transport will be prioritized over personal vehicles.	Political	Development		(City of Paris, 2020)

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Function Urban Areas are defined not only by density and population size, but also consisting of a city and its commuting zone.	Demographic	State	↓	(van Dijk et al., 2024)
The 2030 Grand Paris plan aims to create a polycentric metropolitan region, prioritizing densification near railway stations.	Demographic	Development		(Fauconnet & Lecroart, 2020)
20% of humanity expect to live in degraded suburban conditions by 2050 due to economic and spatial constraints.	Psychological	Development		(CMI, 2024)
In outer suburbs of Grand Paris, 90% of workers commute by car due to limited transport and greater distances.	Demographic	Trend		(Yeung, 2022)
Urban sprawl is associated with greater car dependence, increasing the risk of traffic deaths and injuries due to the increased car numbers.	Demographic	State		(de Nazelle & Cowell, 2024)
Survey data suggests residents leave Paris due to housing costs, lack of green space, and poor air quality.	Psychological	Trend		(IOM, 2020)
Personal measures to deal with consequences of climate change: moving out of Paris, housing renovation & diversifying energy sources.	Psychological	Trend		(IOM, 2020)
Low-emission zone (LEZ) policies are being extended across the Greater Paris Metropolitan Area.	Political	Development		(City of Paris, 2020)
Rurbanisation of our urban areas, decentralization strategies promote more balanced urban distribution and mobility.	Demographic	Development		(National League of Cities, 2023)
74% of people under 35 have experienced hate online and are moving towards smaller, ideologically aligned digital platforms.	Socio-cultural	Trend	Self-sustaining	(UNESCO & Ipsos, 2023)
Political fragmentation is reinforced by ideological division across digital platforms, separating users by worldview, gender norms, and values.	Socio-cultural	Development	micro-realities	(European Parliament et al., 2024)
A consumer shift favors small businesses and local marketplaces, reflecting a backlash against corporate globalization.	Socio-cultural	Trend	↓	(Komonen & Jacobson, 2024)
Local governments increasingly outperform national bodies in crafting flexible, citizen-responsive policies.	Demographic	Development		(National Intelligence Council, 2021)
Localized energy solutions, such as district energy and home solar, are critical to meeting climate targets at the regional scale.	Demographic	Development		(Berg & Rognli, 2021)
Urban design strategies are evolving to include participatory planning and co-design, enhancing legitimacy and engagement.	Socio-cultural	Development		(Puskás, 2021)
Urban agriculture increases access to fresh food, boosts biodiversity, lowers transport emissions, and reduces the urban heat island effect.	Ecological	Development		(Van Veenhuizen, 2006)
Additive manufacturing (AM) and digital technologies reduce reliance on scale economies, encouraging localized and flexible production.	Technological	Development		(National Intelligence Council, 2021)
Public-private partnerships are gaining traction as hybrid governance models, especially when tied to state agendas.	Political	Development		(National Intelligence Council, 2021)
In Paris, 25% of the EU’s climate budget is allocated to support local authority participation in climate goals under the Paris Agreement.	Political	State		(Paumelle & Garat, 2020)
Security concerns drive policy to reduce EU dependency on imported raw materials, particularly in energy and tech sectors.	Political	Development		(ESPAS, 2024)
Residents increasingly value neighborhood-level ties due to rising mental health concerns and the need for daily social interaction.	Socio-cultural	Trend		(Komonen & Jacobson, 2023)
People gravitate to communities of shared identity for belonging and security, including regional, cultural, and transnational affinities.	Socio-cultural	Principle		(National Intelligence Council, 2021)
Augmented reality (AR/VR) reshapes how people experience education, entertainment, and social life, blurring virtual and physical boundaries.	Technological	Development		(Guillen-Hanson et al., 2017)
The Online Disinhibition Effect leads people to behave differently online, detaching them from real-world consequences.	Psychological	Principle		(Suler, 2004)
Social media reinforces echo chambers by aligning users with similar beliefs, polarizing public discourse.	Socio-cultural	Trend		(National Intelligence Council, 2021)
Online trolling, mob dynamics, and disinformation have become more advanced, destabilizing shared understanding.	Socio-cultural	Trend		(NATO, 2020)
Cognitive urban mapping varies across demographic groups; each community reads and navigates the city through distinct perceptual frameworks.	Psychological	Principle	↓	(Appleyard et al., 1965)

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An urban neighborhood is determined not only by geographical and economic factors, but also by the image that its inhabitants have of it.	Psychological	State	↓	(Debord, 1958)	The term “spiritual” refers to what which indicates a person’s ultimate concern, first year it is food, and so on.	Psychological	Principle	↓	(Wilber, 2007)
The ability to disseminate useful information will become a new status currency, superseding ownership	Psychological	Trend		(The TrendWatching team, 2024)	Evolutionary success is driven by variation, inheritance, selection, time & adaptation (VISTA) principles that shape natural systems and human behavior.	Evolutionary	Principle		(University of Kansas, 2007)
Climate anxiety is trending, with visible reminders through frequent extreme weather reinforcing a shared sense of global vulnerability.	Psychological	Trend		(Gilder, 2023)	According to constructal law, all systems evolve to improve the flow of people, goods, and energy, affecting urban infrastructure and natural dynamics.	Evolutionary	Principle		(Bejan & Lorente, 2010)
Cybersecurity concerns are increasing as individuals become more aware of threats to their digital identity and online safety.	Psychological	Trend		(Pilat & Krastev, n.d.)	Spiral dynamics shows that individuals and societies evolve over time; survival, tribal, power, order, achievement, community, integration, holistic.	Socio-cultural	Principle		(Beck & Cowan, 1996)
The European middle class is shrinking due to stagnating wages, rising inflation, and higher living costs, fueling economic stress and populist sentiment.	Economic	Development		(Vacas-Soriano, 2024)	Humans are political animals, relying on collective structures to balance individual needs and environmental limitations.	Psychological	Principle		(Aristotle, 1998)
Higher complexity often leads to binary simplification: the more complex a problem becomes, the more individuals resort to black-and-white choices.	Psychnological	Principle		(Wilber, 2007)	A global shift to circular economies, prioritizing waste reduction and resource reuse, shifting away from linear production models.	Economic	Development		(Brugger et al., 2021)
Humans rely on fast and frugal decision-making systems to navigate overwhelming cognitive demands.	Evolutionary	Principle		(The Behavioural Insights Team, 2019)	Moral development shifts from egocentric (“me”) to ethnocentric (“we”) to world-centric (“all of us”), enabling more collective ethical behavior.	Psychological	Principle		(Wilber, 2007)
65% of global consumers say civility and mutual respect are at historic lows, signaling widespread disillusionment and political polarization.	Socio-cultural	Trend		(Edelman, 2023)	Companies increasingly shift from profit-centered models to ecosystemic approaches that focus on shared value creation across stakeholders.	Economic	Development		(Biancuzzi et al., 2023)
Ethnic, religious, and ideological divisions continue to widen, intensified by political rhetoric and polarized interest groups.	Socio-cultural	Trend		(National Intelligence Council, 2021)	Greater awareness of personal carbon footprints shapes sustainable consumer behaviors.	Psychological	Trend		(AXA, 2023)
Maslow’s hierarchy of needs starts with physiological and safety needs, which become dominant under prolonged stress and uncertainty.	Psychological	Principle		(Maslow, 1943)	More individuals actively participate in energy production via shared or self-managed renewable models.	Demographic	Trend		(Brugger et al., 2021)
Cultural preferences for ethnic and national homogeneity are increasing, driving backlash against migration and diversity.	Socio-cultural	Trend	↓	(National Intelligence Council, 2021)	Nature is being granted symbolic citizenship, leading to legal frameworks that recognize ecological rights.	Ecological	Development	↓	(Rodríguez-Garavito, 2023)
Demand for protection, reassurance, and psychological safety is growing in response to terrorism, war, and ecological instability.	Psychological	Trend		(CMI, 2024)	69% of Gen Z and 73% of Millennials in 44 European countries actively minimize environmental impact.	Ecological	Trend		(ESPAS, 2024)
People prefer familiarity and continuity, avoiding change unless absolutely necessary, a tendency reinforced during crises.	Psychological	Principle		(The Behavioural Insights Team, 2019)	Rising inequality reduces willingness to contribute to environmental causes, creating a say-do gap in ecological behavior.	Socio-cultural	Development		(University of Oxford, 2023)
Gamification techniques are increasingly used to simplify complex actions, such as sustainable travel or citizen engagement, into digital experiences.	Technological	Trend		(Bucchiarone et al., 2021)	5G networks can support 1 million devices/km ² (vs. 60k today), moving toward 6G and enabling ambient connectivity.	Technological	Development		(National Intelligence Council, 2021)
Unplugged living is gaining popularity; both voluntary and enforced digital breaks are used to reduce screen fatigue and reconnect socially.	Socio-cultural	Trend		(Nguyen et al., 2023)	Rapid technological change deepens inequality between those who adapt and those excluded by access, literacy, or resistance.	Socio-cultural	Development		(National Intelligence Council, 2021)
Emotionally intense events are better remembered than neutral ones, shaping how individuals perceive and store information.	Psychological	Principle		(Pilat & Krastev, n.d.)	Digital platforms allow people to work, socialize, shop, and learn from home, reducing need for public presence.	Technological	Development		(Komonen & Jacobson, 2023)
61% of Gen Z want brands to help them feel awe and intense emotion, indicating a shift toward affective consumer relationships.	Psychological	Trend		(VML Intelligence, 2023)	By 2040, Gen Z will comprise 40% of the workforce, shaping work expectations and digital-first behaviors.	Demographic	Development		(Version 1, 2023)
49% of Gen Z buy from brands that bring them joy, compared to only 26% from brands that meet expectations, preferring for emotional engagement.	Psychological	Trend		(VML Intelligence, 2023)	74% of Gen Z prefers hybrid or fully remote work, highlighting a generational shift in location-bound routines.	Socio-cultural	Trend		(Version 1, 2023)
78% of people practice digital minimalism, implementing at least one strategy to limit screen time and digital overload.	Psychological	Trend		(Deloitte, 2023)	AI and automation are accelerating transitions to four-day workweeks.	Socio-cultural	Development		(Raconteur, 2023)
Freedom in Europe is largely defined by the ability to live without interference, decoupled from institutional, religious, or governmental control.	Socio-cultural	State		(Mill, 1859)	Aging rural populations are left behind as younger generations migrate to urban centers for jobs and mobility.	Demographic	Development		(Srivastava, 2009)
Individual autonomy is tied to prosperity and the welfare state, where individuals are empowered to make personal choices.	Socio-cultural	State	↓	(van Dijk et al., 2024)	The quality of time spent commuting matters more than duration; experience trumps efficiency.	Psychological	Principle	↓	(Expert ..)
Humans are ultimate ecosystem engineers, continually reshaping the natural world to meet evolving needs.	Ecological	State		(Ellis, 2023)	Humans tend to spend more time with people who are friends and family, making a strong link between physical location and social relationships.	Socio-cultural	Principle		(Meekan et al., 2017)
At current rates, two Earths would be needed by 2030 to supply humanity’s biological resource consumption.	Ecological	Development		(Girardet, 2020)	Hybrid presence creates new “phygital” practices, people now exist across digital and physical environments simultaneously.	Technological	Trend		(van Dijk et al., 2024)
Industrial agriculture, deforestation, and global urbanization are accelerating ecosystem decline and biodiversity loss.	Ecological	Development		(Ellis, 2023)	Interfaces are evolving into Natural User Interfaces (NUIs), intuitive systems based on gesture, voice, or touch.	Technological	Development		(Sharma, 2023)
Due to urbanization and climate change, the likelihood of pandemics is rising over the next decades.	Ecological	Development		(ESPAS, 2024)	Humans maintain a constant travel time budget (~1 hour/day), though they now travel farther with faster modes > Marchetti’s constant	Evolutionary	Principle		(Marchetti, 1994)
Global temperatures are on track to exceed 1.5°C - 2 °C in the next 20 years, leading to biodiversity collapse and disease spread.	Ecological	Development		(National Intelligence Council, 2021)	French residents average 3 trips/day of ~1 hour, but over time, average distance has increased.	Socio-cultural	State		(Bigo, 2020)
Competition over renewable resources (e.g., cobalt, lithium, rare earths) will intensify due to the global energy transition.	Economical	Development		(National Intelligence Council, 2021)	Society is in a state of “social acceleration” more movement, faster response cycles, and less downtime.	Socio-cultural	State		(Rosa, 2015)

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Speed has become a marker of privilege "express lines, fast delivery, high-speed access define elite experiences.	Socio-cultural	Development	↓	(van Dijk et al., 2024)	Unprecedented data availability is reshaping access, privacy, and ownership, becoming a source of both opportunity and tension.	Technological	Trend	Humanity	(National Intelligence Council, 2021)
Consumers' relationship with ownership is shifting as rental and sharing models replace possession.	Psychological	Trend		(The TrendWatching team, 2024)	Omnipresent tracking systems require users to share increasingly personal data to access services and functionality.	Psychological	Development	in an	(National Intelligence Council, 2021)
Experiential purchases produce more happiness than material ones.	Psychological	Principle		(Gutierrez, 2022)	Big data and digital twin technologies integrate the physical and digital layers of urban environments.	Technological	Development	augmented	(van Dijk et al., p218, 2024)
Customers increasingly expect brands to deliver exceptional, memorable experiences.	Psychological	Trend		(Deloitte, 2024)	Synthetic data improves data safety and ethics, enabling adaptive smart city systems while protecting user privacy.	Technological	Development	world	(Spiceworks, 2023)
People are more focused on experiences & use rather than ownership, almost going towards dematerialization.	Psychological	Trend		(Visser, 2020)	Sensors in mobility systems are used to monitor environmental conditions, such as air quality and traffic emissions.	Technological	Development	↓	(Biancuzzi et al., 2024)
Private car ownership is declining in suburban Paris since the 1990s, especially among younger people.	Socio-cultural	Trend		(Apur, 2021)	Power grids are transitioning into cyber-physical systems, using data layers to optimize energy flow and complexity handling.	Technological	Development		(ENTSO-E, 2020)
The car, once a symbol of autonomy, is now seen as outdated, unaffordable, and environmentally damaging.	Socio-cultural	Trend		(Yeung, 2022)	Technological convergence (mobility, energy, AI, IoT) is enhanced by behavioral science to enable user-centric applications.	Psychological	Development		(National Intelligence Council, 2021)
Gen Z values access over ownership, preferring flexible, shared, and sustainable modes.	Socio-cultural	Trend		(Auddy, 2024)	Tech acceleration could be driven not just by human intelligence but increasingly by AI systems.	Technological	Development		(Roser, 2023)
Greater Paris expects to grow from 38M tourists in 2018 to 50M by 2040.	Demographic	Development		(Dergano, 2024)	Quantum computing and AI will begin to guide action in physical space, not just interpret or predict it.	Technological	Development		(van Dijk et al., p243, 2024)
Tourists and residents increasingly favor shared, efficient, and sustainable transport over private vehicles.	Socio-cultural	Trend		(Biancuzzi et al., 2023)	AI and autonomous systems will redefine mobility and logistics, allowing for scale-efficient automation.	Technological	Development		(NATO, 2020)
"Flow" states occur when challenge matches skill, offering joy, purpose, and immersion.	Psychological	Principle		(Csikszentmihalyi, 1990)	AI processing is moving from cloud-based systems to edge computing (e.g., smartwatches, phones), increasing responsiveness and privacy.	Technological	Development		(CMI, 2024)
The "pain of loss" outweighs pleasure from gain, leading to risk-aversion and emphasis on reward certainty.	Psychological	Principle		(Freud, 1920)	Gaining experience can make people less dependent on technology, but frequent exposure can also make them less aware of its influence.	Psychological	Trend		(Grissinger, 2019)
The "peak-end rule" shapes memory: experiences are remembered by their emotional peak and conclusion.	Psychological	Principle		(Pilat & Krastev, n.d.)	Consumers increasingly expect hyper-personalized, customizable solutions, 73% expect tailored services from advancing technology.	Psychological	Trend		(Salesforce, 2023)
Curiosity and mystery during exploration boost engagement, people are motivated by the unknown.	Psychological	Principle		(Bennett, 2019)	Despite technological growth, humans remain biologically and physically limited (e.g., terrain, fatigue, cognition).	Biological	Principle		(van Dijk et al., p265, 2024)
Aging populations in Europe increase demand for foreign labor, creating political and cultural shifts through expanded visa programs.	Socio-cultural	Development	↓	(National Intelligence Council, 2021)	Human movement patterns align with Levy flight distribution, optimizing exploration through both short and long displacements.	Evolutionary	Principle		(Meekan et al., 2024)
By 2040, Europe's old-age dependency ratio is expected to rise from 33% to 50%, intensifying labor shortages.	Demographic	Development		(ESPAS, 2024)	AI assistants and digital mentors provide custom guidance across life domains, health, education, governance, well-being.	Technological	Development		(De Laurentiis, 2021)
Longevity technologies are adopted by elites seeking to delay illness, aging, and mortality.	Technological	Trend		(Kaminskiy, 2023)	Post-humanist technology is emerging, humans increasingly augment their bodies with machines and neuro-integrative tools (e.g., Neuralink).	Technological	Development		(CMI, 2024)
An aging EU population will strain healthcare systems and require new organizational models of care.	Economic	Development		(ESPAS, 2024)	A healthy ecosystem relies on four components: biotic and abiotic elements, energy flow (e.g. food chains), and nutrient cycling via decomposition.	Ecological	Principle	Unlocking	(Chapin, Matson, & Vitousek, 2011)
Dementia prevalence is projected to double in developed countries between 2001 and 2040.	Psychological	Development		(Trivedi et al., 2008)	Autopoiesis describes how living systems (e.g. cells, societies) maintain and reproduce themselves through structured, self-sustaining organization.	Biological	Principle	natural	(Maturana & Varela, 1980)
Migration to Paris is driven by family reunification, economic opportunity, education, and humanitarian asylum, often linked to climate disasters.	Demographic	Development		(IOM, 2020)	Hierarchies exist in natural and human systems: tree canopies, deltas, organizations, highlighting recurring structural logic.	Evolutionary	Principle	intelligence	(van Dijk et al., p81, 2024)
More than 150 million people globally will be displaced inland by 2050 due to rising sea levels.	Demographic	Development		(NATO, 2020)	Biomimicry is positioned as a key innovation strategy in France, linking ecological systems with industrial and social responsibility.	Socio-cultural	Development	↓	(Ceebios, n.d.)
International migration to Paris is projected to rise by 28-34% by 2050, largely due to temperature increases.	Demographic	Development		(IOM, 2020)	Tribal communities, often seen as primitive, embody advanced systemic thinking through deep symbiosis with natural environments.	Ecological	Principle		(Watson, 2019)
Diaspora communities are strengthening transnational ties, bringing cultural, religious, and economic exchange into host societies.	Socio-cultural	Trend		(CMI, 2024)	Resilient societies adapt to change through flexible strategies that sustain them through long-term transformations.	Socio-cultural	Principle		(Aktaş & Dönmez, 2021)
Urban and online environments increasingly suffer from visual monotony as global design trends overshadow local identity.	Psychological	Development		(Murrell, 2023)	Cities are embracing nature-based solutions to address climate and health issues simultaneously.	Ecological	Development		(Hamill-Stewart, 2023)
The global economy is shifting eastward, with Asia gaining influence through faster growth, lower poverty, and demographic weight.	Economic	Development		(National Intelligence Council, 2021)	Increased understanding of regenerative cities (+) that focus on the resilient linkages between urban systems and the world's ecosystems.	Ecological	Development		(Girardet, 2020)
We now live in a multi-polar world, where cultures increasingly blend across geographies, ending the Western's cultural dominance.	Socio-cultural	State		(CMI, 2024)	The "sponge city" model integrates green roofs, wetlands, permeable pavements, and rain gardens to absorb and reuse rainwater.	Ecological	Development		(Rau, 2022)
Mental and physical well-being are now equally prioritized, fueling holistic approaches to lifestyle, healthcare, and work.	Psychological	Trend		(Komonen & Jacobson, 2024)	Paris is allocating 50% of urban surface area to green spaces (from 9.5%) to mitigate heat island effects.	Ecological	Development		(Paumelle & Garat, 2020)

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Green infrastructure enhances climate resilience by reducing heat, filtering air, managing floods, and improving biodiversity.	Ecological	Principle	↓	(Wilber, 2007)	Electricity demand is expected to rise by nearly 20% by 2030, driven by EVs and heat pumps, despite major energy efficiency improvements.	Economic	Development	Precious	(ENTSO-E, 2020)
Multi-crises have led to a renewed spiritual and emotional connection with nature.	Psychological	Principle		(de Nazelle & Cowell, 2024)	The Jevons paradox: smarter tech may increase overall energy use due to efficiency-induced consumption growth.	Technological	Principle	energies	(Alcott, 2005)
Beyond waking/sleeping states, peak experiences (love, music, awe) and meditative states influence how we relate to the world.	Psychological	Principle		(de Nazelle & Cowell, 2024)	Wind (300GW) and solar (500GW) will dominate the renewable energy mix by 2030, though variability of supply will also rise.	Technological	Development	↓	(ENTSO-E, 2020)
Urban green areas reduce cardiovascular disease, lower crime, improve sleep, and support community activity.	Biological	Principle		(Oppezzo & Schwartz, 2014)	Affordable renewable technologies (e.g., perovskite solar) are set to disrupt current energy markets within two decades.	Technological	Development		(National Intelligence Council, 2021)
Walking and biking improve vitality, mental health, and social connection, self-reinforcing well-being habits.	Psychological	Development		(Komonen & Jacobson, 2024)	Decentralized energy grids will rely more heavily on batteries, renewable sources, and electrified mobility.	Technological	Development		(National Intelligence Council, 2021)
Creative thinking increases directly after low-impact physical activities like walking.	Psychological	State		(de Nazelle & Cowell, 2024)	Consumers are shifting from passive energy use to active energy management (e.g., prosumers, aggregators).	Psychological	Trend		(ENTSO-E, 2020)
Community gardens and green co-living spaces enhance environmental awareness and participation.	Psychological	Development	↓	(Pojani, 2017)	Energy demand in the transportation sector shows persistent increases, due to rising vehicle use and preferences for larger vehicles.	Socio-cultural	Trend	↓	(Brugger & et al, 2021)
Motorized transport is up to 11% more stressful than cycling, and 6% more than walking, especially in dense cities.	Psychological	Development		(La Grande Conversation, 2024)	Urban areas that developed rapidly in recent years have some of the highest carbon footprints per capita.	Ecological	Development		(GGMCF, n.d)
Cities are shifting space from cars to people, prioritizing compactness, efficiency, and human-centered design.	Demographic	Development		(Bauer, Funk, & Rochford, 2023)	By 2025-2030, single-person households will make up 40% or more of households in France, favoring vertical over horizontal family structures.	Demographic	Development		(CSCP, 2018)
Paris aims to transform vacant industrial buildings and retail spaces into affordable housing, preferring renovation over demolition.	Political	Development		(Komonen & Jacobson, 2024)	48% of individuals now plan less than 12 months ahead or not at all, reflecting short-termism in daily life.	Psychological	Trend		(Accenture, 2023)
Pedestrian zones are becoming permanent, reclaiming space from vehicles to support public life and cultural activity.	Demographic	Development		(Allam et al., 2024)	Co-living and shared housing models offer affordability and community in response to urban cost pressures.	Socio-cultural	Development		(Ginani, 2023)
Multi-use, modular infrastructure enables dynamic urban responses to environmental, social, or economic change.	Demographic	Trend	↓	(European Commission, 2020)	Paris' average household size dropped from 2.35 (1954) to 1.87 (1999), and remains low today.	Demographic	State	↓	(La Grande Conversation, 2023)
Policy initiatives in Paris encourage a shift toward electric, public, and shared transportation.	Political	Trend		(van Dijk et al. p252, 2024)	More than 50% of Parisian homes have only one or two rooms, versus one in four homes in wider Ile-de-France.	Demographic	State		(La Grande Conversation, 2023)
People are willing to adopt sustainable modes in their daily mobility; cost, speed, and availability are the deciding factors.	Psychological	Development		(Biancuzzi et al., 2024)	Paris targets 40% affordable housing by 2035, up from 22% in 2021, to ensure city workers can live in the city.	Demographic	Development		(Chocron, 2022)
Multi-modality, using a range of vehicles, is becoming standard, especially in urban environments.	Socio-cultural	State		(Breteau, 2023)	One-person households consume 38% more products, 42% more packaging, and 55% more electricity per capita than four-person households.	Ecological	State		(Euromonitor International, 2018)
Modular vehicle design enables situational capacity adjustments, reducing energy waste.	Technological	Development		(Allam et al., 2024)					
In urban areas, 9% of motorized trips in could be made on foot and slightly less than half (43%) by bicycle. For suburban areas this reaches one-third.	Demographic	Development	↓	(Dominguez, 2024)					
Larger vehicles are favored by car manufacturers due to higher margins, fueling SUV growth despite urban inefficiency.	Economic	Principle		(van Dijk et al. p82, 2024)					
9% of Paris homes are vacant, with 10% classified as second homes. This increases by ~7,000 properties/year.	Demographic	State		(Rai & Shah, 2023)					
There's a linear biological relationship between speed and mass: larger organisms dominate smaller ones.	Evolutionary	State		(Kaufmann, 2016)					
Urban productivity is closely linked to the efficiency of internal mobility, economic and logistical performance hinge on it.	Economic	State		(Kaufmann, 2016)					
Mobility is inherently social; it enables people to engage in diverse activities and take on different societal roles.	Socio-cultural	State	Multi-dimensional	(Kaufmann, 2016)					
Mobility can be deconstructed into three parts: physical movement, symbolic meaning (e.g. freedom), and embedded routines Not all trips carry the same symbolic or emotional value, mobility shapes identity and reflects privilege.	Socio-cultural	State	mobilities	(Kaufmann, 2016)					
Long-distance and high-frequency travelers are labeled as “highly mobile” which often reflects a status distinction.	Psychological	Development		(van Dijk et al. p144, 2024)					
The discourse around “mobility justice” reflects growing awareness of unequal access, governance, and infrastructure.	Socio-cultural	State		(Hamill-Stewart, 2023)					
Major roads and highways reinforce spatial inequality, often separating communities by class or ethnicity.	Socio-cultural	Development		(ENTSO-E, 2020)					
	Demographic	Principle		(Alcott, 2005)					

APPENDIX B: INTERVIEW GUIDE AND INTERVIEWEES

Your insights on these topics will be invaluable for anticipating the trends and challenges that lie ahead. Thank you for contributing your expertise.

-
Welcome, and introduction. (5 min)

- What is your specific field of expertise?
- Could you tell me about work you did related to urban mobility?

Past & Present Paris (2010-now):

- Based on your experience living and working in Grand Paris, what has changed in the past 10-15 years? Could you give any specific examples?
- What do you believe are drivers of change in Grand Paris, what makes Parisian society change habits and opinions? E.g. political / technological / societal / environmental drivers?

- How do you see the relation between Paris and its suburbs (Grand Paris)?

Now that we’ve discussed the present, let’s move on to how you see the future of Paris evolving.

Future, Grand Paris (now – 2040):

1. (I) How will people perceive living and moving in Grand Paris in the upcoming years?

2. (I) How will personal values regarding urban living change over time (sustainability, efficiency, etc)? Are there principal values that will stay the same?

3. (I) What are the psychological and emotional needs of individuals in a future urban society (safety, community, etc), such as Grand Paris?

4. (WE) How is urban culture likely to change in Grand Paris as a result of migration in-and-out of the city?

5. (WE) What challenges do you foresee in achieving social equity, fulfillingthe needs of diverse populations and reaching carbon-neutral mobility systems?

6. (WE) How will society’s relations to movement & urban mobility change as we move away from a car-centric approach?

7. (IT) What technological advancements will be present and have a large influence on future urban living & mobility?

8. (IT) What physical infrastructure (e.g., roads, bike lanes, transit hubs) will be present in Grand Paris by 2040?

9. (IT) What are the key physical characteristics of the Grand Paris population in 2040 (e.g. age

distribution, disability prevalence,)?

10. (ITS) What governance and societal frameworks (e.g., urban planning, subsidies for sustainable mobility) will influence and enable mobility in future urban areas?

11. (ITS) How will socio-economic factors change (e.g., increasing income inequality, access to services) affect future urban societies?

12. (ITS) What role does our relation / connection to our world (e.g., climate neutrality, urban greenery) play in the future of metropolitan areas? Will it change?

Dream (2040 and beyond)

- If you could make any changes to Paris by 2040, what would they be and why?
- What do you see as the actors of resistance for this desired world?

Final

- Do you like to add anything in specific to this interview?

Thank you, it was a pleasure talking to you.

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Interviewee expertise

Anthropologist

Mobility Research Expert

Counselor Transport and Environment

Design Director

Futurologist

Mobility Research Expert

Design fiction & prospectives

Urban mobility policies expert

Lead UX designer Mobility services

Lead UX designer Energy services

Biomimicry researcher

Chief Design Officer

Subject

Paris dynamics, social mobility

Future Paris, Customer trends

Urban resilience, Paris mobility policies

Mobilize, strategy / Paris future

Emergent technologies / forecasting

Future mobility needs

Future demographics / societal dynamics

Future urban policies regarding mobility

Future user needs mobility services

Future user needs energy services

Biomimicry practices in Mobility

Future mobility trends and developments

APPENDIX C: EMERGING CONDITIONS

HUMANITY IN AN AUGMENTED WORLD

In an augmented world where technology becomes omnipresent and sentient, the boundaries of what it means to be “human” are shifting. As AI and digital systems increasingly guide our decisions, behaviors, and interactions, we grow both empowered and dependent—losing traditional expertise while gaining new cognitive extensions. While this transformation challenges our autonomy, it also offers opportunities to redefine human agency.

By 2040, the fusion of artificial intelligence, digital twins, and quantum computing will enable technology to not only understand but also anticipate and influence human behavior. The once-passive role of machines will transform into that of active actors—shaping decisions through real-time data and predictive analytics. As we become increasingly accustomed to on-demand personalization, we risk overlooking the subtle but profound impact these technologies have on our cognition and autonomy.

This shift raises a fundamental question: In a world where external intelligence augments our decisions, do we retain our agency, or do we unconsciously surrender it? Studies indicate that reliance on digital mentors and AI-driven assistance can weaken problem-solving skills and intuitive reasoning, subtly eroding our expertise. At the same time, advancements in neural interfaces and bio-digital augmentation promise to enhance human cognition, potentially restoring lost instincts and refining our focus.

Ultimately, defining “human” in this augmented era hinges on how we navigate the interplay between dependence and empowerment. Will we shape technology as a tool for deeper self-awareness, or will we let it redefine us? The answer may lie in how consciously we integrate these systems into our lives, ensuring they serve as extensions of our humanity rather than replacements for it.

PARIS REACHING SINGULARITY

By 2040, Paris will intensify as a hyper-local urban core, compressing resources, mobility, and human activity into a tightly optimized system. The city’s gravitational pull will extend far beyond its borders, clustering populations in expanding peripheries while limiting movement in its core. However, high density and urban stress will challenge vitality, raising questions about the balance between efficiency and human well-being.

Throughout history, human movement has been dictated by the search for resources, safety, and opportunity. This instinct, deeply rooted in evolutionary survival mechanisms, has shaped the way societies expand and relocate. Yet, by 2040, Paris disrupts this paradigm by becoming a self-contained singularity, an environment so dense and resource-rich that it minimizes the necessity for outward expansion for the people that can afford to live in it. The city’s infrastructure optimizes accessibility within a short radius, creating a paradox of hyper-connectivity and restriction, decreasing distance and therefore movement as you move closer to the city center.

This is reinforced by the principle of chrono-urbanism, which restructures mobility through the lens of time rather than distance. The 15-minute city model, designed around proximity and accessibility, dictates how Parisians interact with their urban environment, reinforcing movement patterns that are cyclical and local rather than expansive.

However, while density provides efficiency, it also comes at a cost. High-density environments have been shown to increase stress levels, decrease vitality, and contribute to a rise in both physical inactivity and mental health disorders. With Paris ranking among the densest cities in the world, the concentration of urban stimuli heightens cognitive load, triggering a collective exhaustion and psychological strain. At the same time, this density does not remain contained—it radiates outward. The gravitational pull of Paris extends beyond its core, forcing urban expansion into surrounding suburban zones. The suburbs, initially perceived as areas of lower density, are undergoing densification as population pressure pushes lower-income residents further out, yet still keeping them tethered to the city through the need of resources, while not having access to the benefits.

Paris becomes an urban entity that compresses and expands, shaping movement not just within its limits, but also in the broader metropolitan ecosystem. As it reaches singularity, it redefines mobility, not through freedom of movement, but through an intricate web of accessibility, efficiency, and constraint.

SPIRAL OF SIMPLIFICATION

By 2040, in an increasingly complex world, people seek simplicity, craving powerful emotional experiences while struggling with overwhelming global issues. This mental overload fuels binary decision-making, paving the way for populist leaders who exploit uncertainty by offering seemingly simple solutions. As fear and instability rise, the promise of protection, safety, and belonging strengthens nationalist sentiments, reinforcing polarization.

By 2040, rising global complexity will overwhelm individuals, leading to a widespread craving for simplification and emotional clarity. As people struggle to process vast, interconnected crises—climate change, economic instability, and digital surveillance—they turn to binary decision-making, filtering the world into “us vs. them” narratives. The speed of technological advancement and the fragmentation of information further erode trust in institutions, leaving people desperate for strong, decisive leadership.

Populist figures will exploit this cognitive overload, offering simple solutions to complex problems. They position themselves as protectors, promising security, stability, and a sense of belonging in an increasingly chaotic world. Through emotional storytelling, they frame issues in stark contrasts—good vs. evil, tradition vs. decay—minimizing complexity and appealing to deep-seated psychological needs of future Grand-Parisian inhabitants.

This simplification does not lead to clarity but rather to entrenchment and division, as nuance is sacrificed in favor of emotionally charged rhetoric. As people prioritize certainty over complexity, decision-making becomes more reactionary and emotional, leaving societies vulnerable to manipulation and resistant to progress. The paradox of the spiral of simplification is that in trying to regain control, individuals surrender it—ceding power to those who capitalize on fear rather than fostering the resilience needed to navigate an uncertain future..

A NEW CULTURAL ORDER IN EUROPE

By 2040, Europe’s aging population creates labor shortages and climate-induced migration rises. Asian and African workers bring not only economic contributions but also cultural and spiritual influences. This will clash with European values, fostering a new spiritual and religious order. Meanwhile, Eastern nations like India and China extend their soft power, shaping Europe’s evolving identity through cultural and philosophical exchange.

By 2040, Europe’s aging population will significantly increase labor shortages, prompting a growing pull of workers from younger continents like Asia and Africa. Migration is driven not only by economic opportunities but also by climate-induced displacement, with millions relocating due to environmental degradation and extreme weather events.

As migrant populations establish their roots, they bring profound economic, cultural, and religious ties to their countries of origin. Diasporas significantly influence the evolving European identity, merging the values of their homelands with those of their new environments. This dynamic interplay leads to a redefinition of European values, as traditionally dominant Western ideologies blend with diverse external influences. However, this transformation also generates tensions and resistance, challenging the process of integration while reshaping the social and cultural fabric of the Grand Paris region.

A key aspect of this transformation is the rise of Eastern philosophies and holistic well-being practices in Europe. As societies seek balance in a rapidly shifting world, concepts like mindfulness, meditation, and integrative health gain traction, redefining how Europeans approach body, mind, and spirit.

Simultaneously, this cultural exchange bolsters the soft power of Eastern nations. Countries like India and China, already economic powerhouses, further extend their influence through the global spread of cultural traditions, philosophies, and spiritual frameworks. In a multipolar world where Western dominance fades, these nations shape the future of global identity, with Europe increasingly adopting their values and practices.

PRECIOUS ENERGIES

As energy efficiency increases, paradoxically, so does demand, following Jevons paradox. Meanwhile, the shift from fossil fuels to renewables introduces greater variability in energy supply. This forces us to rethink energy storage and management, seeking both high-tech and low-tech solutions while transforming users into energy managers rather than mere consumers.

By 2040, advancements in energy efficiency, instead of reducing overall consumption, will have led to increased demand, a phenomenon known as Jevons paradox. The widespread adoption of electric vehicles, smart devices, and automated systems will make energy use more efficient, yet overall consumption will continue to rise. Simultaneously, the transition away from fossil fuels toward renewables such as wind, solar, and hydrogen will introduce greater variability in energy supply, making energy management more complex and decentralized.

This shift will require a fundamental rethinking of energy storage and distribution. By 2040, decentralized storage solutions, including advanced battery networks, vehicle-to-grid systems, and community-based energy hubs, will play a crucial role in stabilizing fluctuating supplies. Additionally, low-tech, passive energy storage and conservation strategies—such as thermal mass storage in buildings, kinetic energy solutions, and gravity-based energy storage—will gain prominence for their resilience and efficiency.

As a result, energy perception will transform. Instead of (sub)urban inhabitants being passive consumers, individuals and businesses will become active energy managers, actively being aware of and optimizing energy use. The rise of prosumers—people who both generate and consume energy—will reshape energy markets, with localized microgrids and peer-to-peer energy trading becoming commonplace. Managing energy will no longer be about unlimited access but about strategic, adaptive use, ensuring sustainability in a world where energy remains both precious and powerful.

MIULTI-DIMENSIONAL MOBILITIES

Mobility is more than just spatial movement—it shapes our economic productivity, social roles, and urban dynamics. While historically defined by speed and distance, mobility must be reconsidered as an enabler of participation, identity, and inclusion. By 2040, urban mobility could either serve as a tool for social integration or reinforce segregation, requiring a shift toward accessibility, equity, and diverse mobility experiences.

Mobility has always been woven into the fabric of society, not merely as a means of transport but as a fundamental enabler of human activity and economic productivity. It allows individuals to participate in various aspects of social life, shaping transitions between roles, identities, and opportunities. Yet, our current paradigm—centered on speed and distance—fails to capture the broader socio-cultural dimensions of movement. By 2040, mobility will evolve beyond efficiency-driven models toward systems that foster accessibility and inclusion, ensuring that transport is not a barrier but a bridge for communities.

The future of mobility will be deeply intertwined with justice and equity, as infrastructure choices either connect or divide urban populations. Major roadways, for example, have historically acted as physical barriers reinforcing racial and economic segregation. In response, city planning will prioritize mobility solutions that integrate communities rather than isolate them, considering not just physical movement but also the psychological and cultural dimensions of travel.

As urban mobility ecosystems in the Grand Paris region transform under climate-neutral policies and technological advancements, the role of transport in shaping social structures will become more pronounced. A redefined mobility landscape will not just be about reaching destinations but about fostering meaningful connections, reshaping public spaces, and ensuring that movement enhances rather than limits human potential.

EVERYWHERE VS SOMEWHERE

As digitalization accelerates, a divide emerges between those who can seamlessly navigate a hyperconnected world and those who are bound by material, generational, or socioeconomic constraints. This gap manifests in mobility, lifestyle, and access to opportunities—favoring those who can exist “everywhere” while others remain tethered to physical and financial limitations.

By 2040, the increasing digitalization of life will amplify the divide between those who have the means, skills, and willingness to adapt to a hyperconnected world and those who remain constrained by physical, economic, or generational barriers. This separation extends beyond wealth; it reflects a transformation in how the spirit of the individual exists in space. Younger and wealthier generations will prioritize flexibility, choosing hybrid or remote work, allowing them to be “everywhere” rather than physically bound to a single location. Meanwhile, traditional workers and older generations will remain tethered to fixed places, deepening disparities in access to opportunity.

Advancements in AI and automation will contribute to abbreviated workweeks, reinforcing a lifestyle where those with access to digital platforms and efficient mobility solutions can optimize their time. Conversely, physical presence and ownership—once considered markers of success—will be viewed as restrictive, inefficient, and even environmentally indefensible by the wealthier population. The shift away from material possessions towards experiential consumption will further distinguish those who can afford to prioritize time and experiences over physical assets.

As the boundaries between physical and virtual spaces blur, hybrid environments will emerge, redefining movement and social interactions. Optimizing time for those who can afford, while others remain bound by logistical and financial constraints.

Ultimately, we’re living in a social acceleration which prioritizes speed, convenience, and flexibility. In this society the ability to “control” time will become the defining privilege of the elite, disproportionately benefiting those with access to premium mobility services, high-speed networks, and on-demand solutions. This evolving hierarchy, shaped by digital capability and spatial autonomy, will redefine mobility, work, and social equity in Grand Paris region.

TRANSCENSION OF FREEDOM

The modern western notion of freedom and autonomy has shaped consumer behavior, but as planetary boundaries are reached in 2040, environmental pressures begin to constrain personal choices. This forces a shift in fundamental beliefs, redefining freedom beyond material consumption towards a more world-centric consciousness. However, economic disparities challenge these ethical commitments.

By 2040, the concept of freedom will no longer be defined by limitless consumption and individual autonomy. As planetary boundaries tighten, climate crises intensify, and economic disparities widen, the pursuit of personal freedom will collide with the realities of a constrained world. The once-prevailing model of expansion and material choice will be replaced by a deeper, collective reckoning—forcing western societies to redefine what it means to be truly free.

A shift toward world-centric thinking is already underway. The rise of circular economies, decentralized energy systems, and legal recognition of nature signal a move from ownership to stewardship. People are questioning the foundations of economic systems that prioritize profit over planetary survival, demanding models that balance autonomy with responsibility and constraint.

Yet, this evolution will not be seamless. The “say-do” gap—where ethical awareness clashes with economic constraints—will test Grand Paris’s ability to act on its new values. Will we embrace a future where freedom is measured not by what we consume, but by our ability to sustain life collectively? By 2040, the answer will shape not just economies, but the very fabric of human existence on this planet.

DECONSTRUCTED WAYS OF LIVING

Traditional milestones such as marriage, homeownership, and stable careers are increasingly neglected, leading to new, deconstructed ways of living. Rising housing costs and shifting social norms drive people into shared households, forming “lego families” that prioritize flexibility and affordability. This transformation allows individuals to redefine their lifestyles, emphasizing personal choice and self-expression.

By 2040, traditional life trajectories—settling down with a spouse, buying a home, and pursuing lifelong careers—will no longer be the norm, with single-person households making up a significant share of society. Instead, individuals are opting for more flexible, short-term lifestyles, with nearly half making plans less than a year ahead or not planning at all. The urban housing crisis and affordability challenges are accelerating the shift toward shared living arrangements, where cohabiting individuals distribute costs, forming “lego families” built on economic pragmatism rather than conventional familial structures.

Paris, for example, has seen a long-term decline in household size, dropping from 2.35 people per household in 1954 to 1.87 in 1999, with this trend persisting into 2040. The majority of Parisian homes now consist of one or two rooms, reinforcing the push toward compact, co-living models that drive larger families to surrounding suburban areas. In response, the city aims to reach 40% affordable housing by 2035 to ensure that essential workers can still reside in urban areas.

As traditional family models dissolve, the rise of single-person households introduces a new challenge: higher individual consumption. On average, single-person households use 38% more products, 42% more packaging, and 55% more electricity per person than four-person households. However, this shift also fosters greater personal autonomy and self-expression, with evolving societal values emphasizing adaptability and individual fulfillment.

The result is a landscape of “deconstructed normalities,” where diverse living arrangements replace rigid milestones, empowering people to shape their own paths for better or worse.

SELF-SUSTAINING MICRO-REALITIES

By 2040, society will transition from mass platforms to self-sustaining niche communities, decentralizing power, energy, and production. Digital technologies will reinforce ideological fragmentation, leading to closed communities that construct their own realities. As shared narratives disappear, truth becomes relative, fueling social conflict while finding useful information supersedes ownership.

By 2040, there will be a fundamental shift away from centralized mass platforms towards localized, self-sustaining niche communities. These communities will organize around shared values and worldviews, reinforcing cultural and ideological divisions. A rise in decentralized governance, power and production will allow these communities to increasingly be able to sustain themselves. Technological advances such as microgrids, automation, and additive manufacturing will enable these groups to function autonomously, reducing reliance on global supply chains and interdependence on other communities (8). This shift will lead to a Grand Paris that is more fragmented, each community functioning as an independent entity.

As VR, AR, and social media deepen digital immersion, the inhabitants of Grand Paris will simultaneously inhabit parallel realities, reinforcing belief systems shaped by their own communities. The rise of customized digital environments will allow individuals to live in a world tailored to their preferences, making it increasingly difficult to engage with, and accept differing perspectives.

With the decline of shared narratives, each group will construct its own version of reality, making consensus nearly impossible. This will amplify misinformation, tribalism, and ideological conflicts, leading to an increase in social and political fragmentation. As a result, (sub)urban spaces may become more exclusive, with access to certain areas being determined by digital identity, social standing, or membership within specific micro-realities.

Traditional concepts of ownership of information will completely diminish in importance, replaced by the ability to control and disseminate knowledge. Influence will no longer be tied to material wealth but to credibility and the ability to navigate digital and social ecosystems effectively in a hyper-connected, yet deeply divided world.

UBIQUITY OF COMPACT CITIES

Urban centers are redefining space as a shared, flexible resource, prioritizing people over vehicles. This shift makes space more fluid, reducing individual control as public and private boundaries blur. While sustainable, multi-modal transport expands, wealthier groups resist by holding onto oversized vehicles and underutilized properties.

By 2040, urban centers will be forced to maximize space efficiency, leading to a shift away from car-centric infrastructure toward compact, resource-efficient urban design. Pedestrian zones will dominate the Grand Parisian landscapes, fostering social interaction and reclaiming space once occupied by vehicles. The conversion of vacant buildings into cost-efficient housing will further reshape urban density, replacing demolition with rehabilitation.

Flexible, multi-use spaces will become standard, allowing urban environments to dynamically adapt to changing needs, but this will also blur distinctions between public and private spaces, reducing individual control over territory. Mobility will shift towards smaller, more efficient, electric, and active transport solutions, supported by policy-driven interventions. Public willingness to transition to sustainable transport will be determined by affordability, availability, and speed, reinforcing the need for accessible alternatives.

Multi-modal transport ecosystems will emerge, enabling seamless transitions between different mobility solutions. Mobility objects will be designed with modularity in mind, optimizing capacity and energy efficiency based on situational needs. Urban centers will naturally encourage this shift, as a growing share of trips will be made on foot or by bicycle, particularly in denser urban cores.

Despite these transformations, resistance from wealthier groups will persist. Large vehicles will remain symbols of status, consuming excessive urban space and limiting the effectiveness of compact city planning. The rise of second homes and vacant properties will exacerbate spatial inequalities, with thousands of addresses sitting empty while housing demand grows. This trend reflects a broader evolutionary behavior—those with greater resources securing space at the expense of shared urban access.

UNLOCKING NATURAL INTELLIGENCE

By 2040, while harnessing nature’s intelligence, societies can build resilience through self-sustaining systems that regenerate and adapt to environmental and societal changes. Learning from nature and the use of traditional low-tech solutions foster long-term survival, while integrating nature-based solutions through biomimicry strengthens climate adaptation and citizen well-being.

Throughout history, societies have thrived by adapting to their environments, drawing from ancestral intelligence to create resilient, self-sustaining systems. By 2040, urban environments will increasingly embrace principles from natural ecosystems, where cyclical processes of regeneration and adaptation ensure long-term viability. Cities will integrate biomimicry, learning from nature to develop climate-adaptive infrastructure that enhances urban resilience.

Traditional, low-tech solutions will gain prominence as communities recognize the efficiency of self-regulating systems in maintaining ecological balance. Indigenous and ancestral knowledge, once overlooked, will become central in designing symbiotic urban systems that optimize resource cycles and minimize waste. Societies will shift towards regenerative cities that strengthen the link between human settlements and the natural world, fostering adaptive strategies for future challenges.

In response to climate change, (sub)urban areas as Grand Paris will implement solutions such as sponge cities, green corridors, and urban forests, mitigating urban heat and improving air quality. These initiatives will not only tackle environmental crises but also enhance public well-being, reinforcing the psychological and physiological benefits of reconnecting with nature.

Simultaneously, mobility patterns will shift towards active and shared modes of transport, reducing reliance on motorized travel. Walkable cities and expanded green spaces will cultivate stronger social bonds, reinforcing local resilience and fostering shared responsibility for urban sustainability. As a result, future societies will be more interconnected, resilient, and symbiotic with their natural surroundings, ensuring long-term survival amid global uncertainties.

APPENDIX D: VISION STATEMENTS

MOBILIZE AND I WANT

EXPRESSING
my mobility

".. individuals to express their identity through mobility, shaping public space in a way that aligns with social responsibility and ecological consciousness."

CONFORMING
our mobility

".. groups to cultivate a shared identity through mobility, strengthening their sense of belonging while contributing to sustainable movement."

GLOBALIZING
all mobility

“.. people to recalibrate their perspective through the beauty of reality—grounding their greater sense of belonging and reconnecting with what they are part of.”

CONTROLLING my mobility

“.. individuals to feel in constant control of their journeys, making mobility choices that align with their personal needs, priorities, and lifestyle.”

COOPERATING
our mobility

“.. groups to co-create the perfect journey by aligning their mobility choices, ensuring that each of them benefits from a seamless, efficient, and cooperative mobility experience.”

RESONATING
all mobility

“.. people to become aware of, and align their movements with, the city’s collective rhythms—managing resources in sync with others, so that together they create greater societal benefit.”

ENERGIZING
my mobility

“.. individuals to gain energy from their mobility, feeling revitalized and inspired as they move through the city.”

SHARING
our mobility

".. groups to embrace shared mobility to strengthen social bonds, foster collective experiences, and emotionally enrich public space interactions beyond traditional transportation."

EXPLORING
all mobility

“.. people to reimagine everyday spaces, making exploration a reciprocal act of participatio, and creating a collective spirit across the Métropole du Grand Paris.”

SIMPLIFYING
my mobility

".. individuals to navigate urban mobility effortlessly, experiencing seamless, user-friendly transportation that integrates smoothly into their daily lives without friction or complexity."

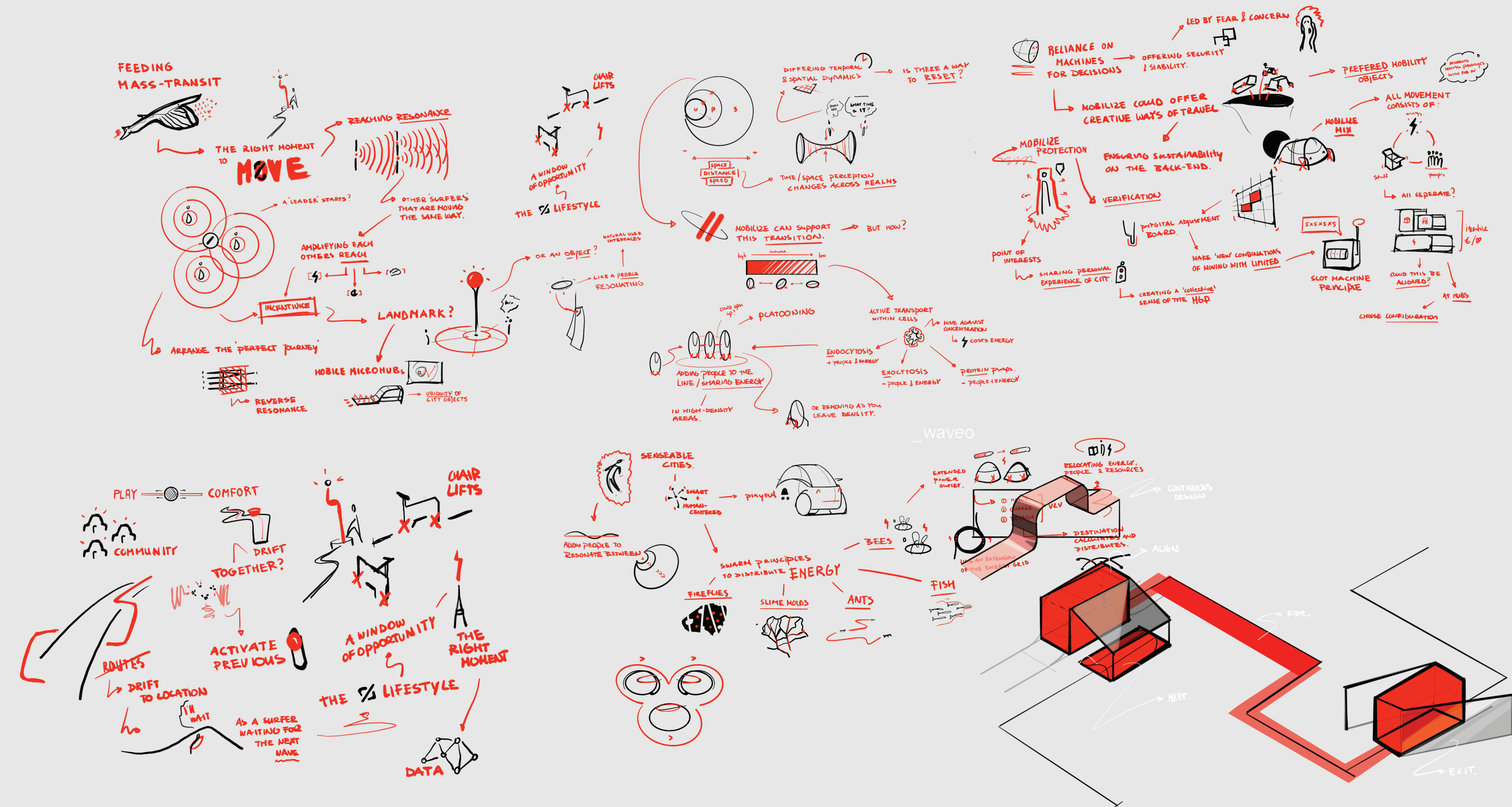
DEFENDING
our mobility

“.. groups to ensure equitable access to mobility, connecting suburban and remote communities with urban centers to foster inclusion and create new opportunities for all.”

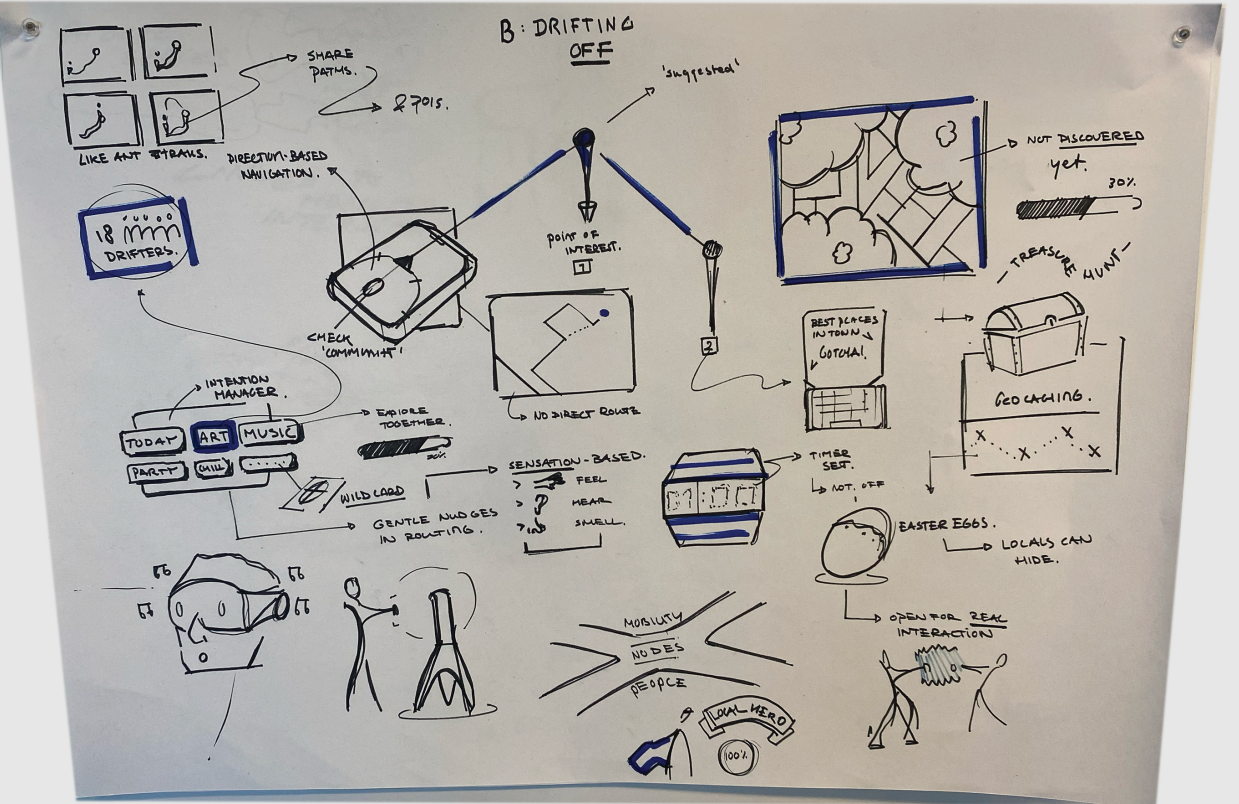
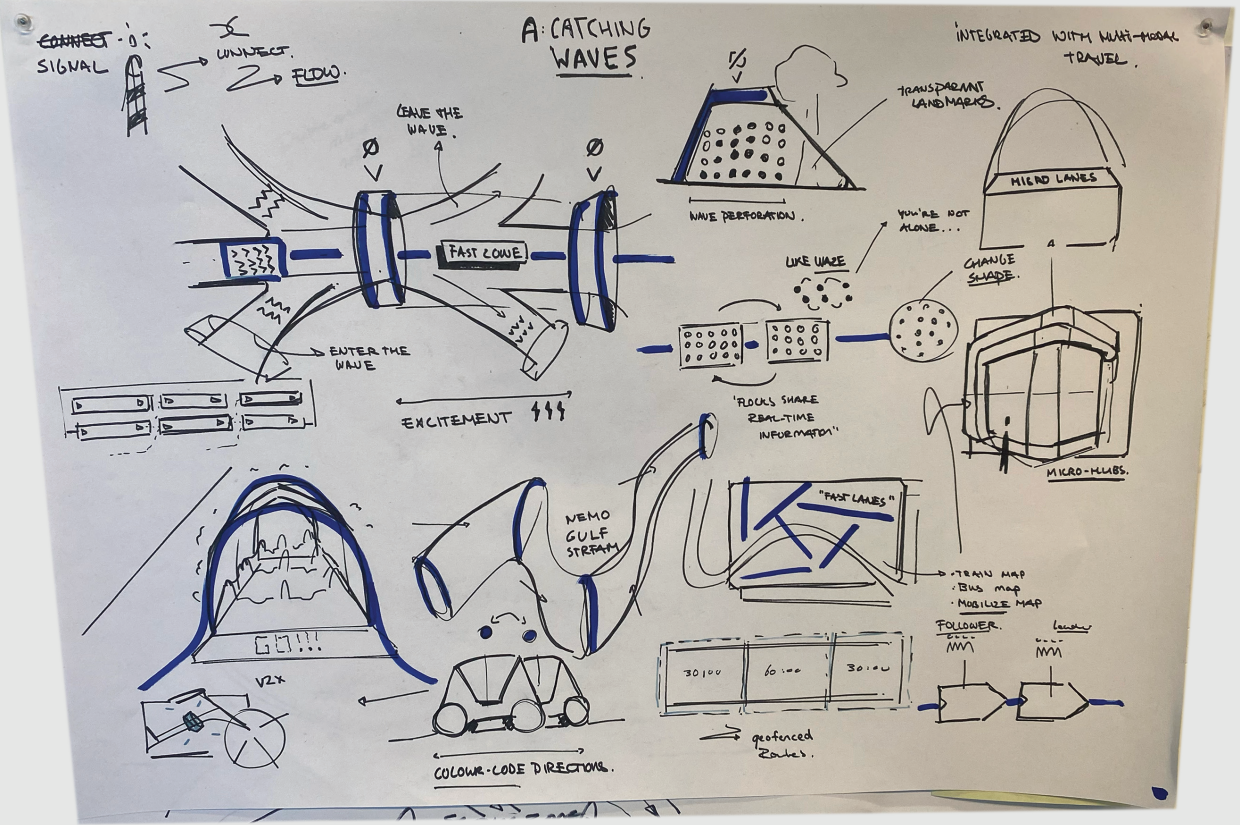
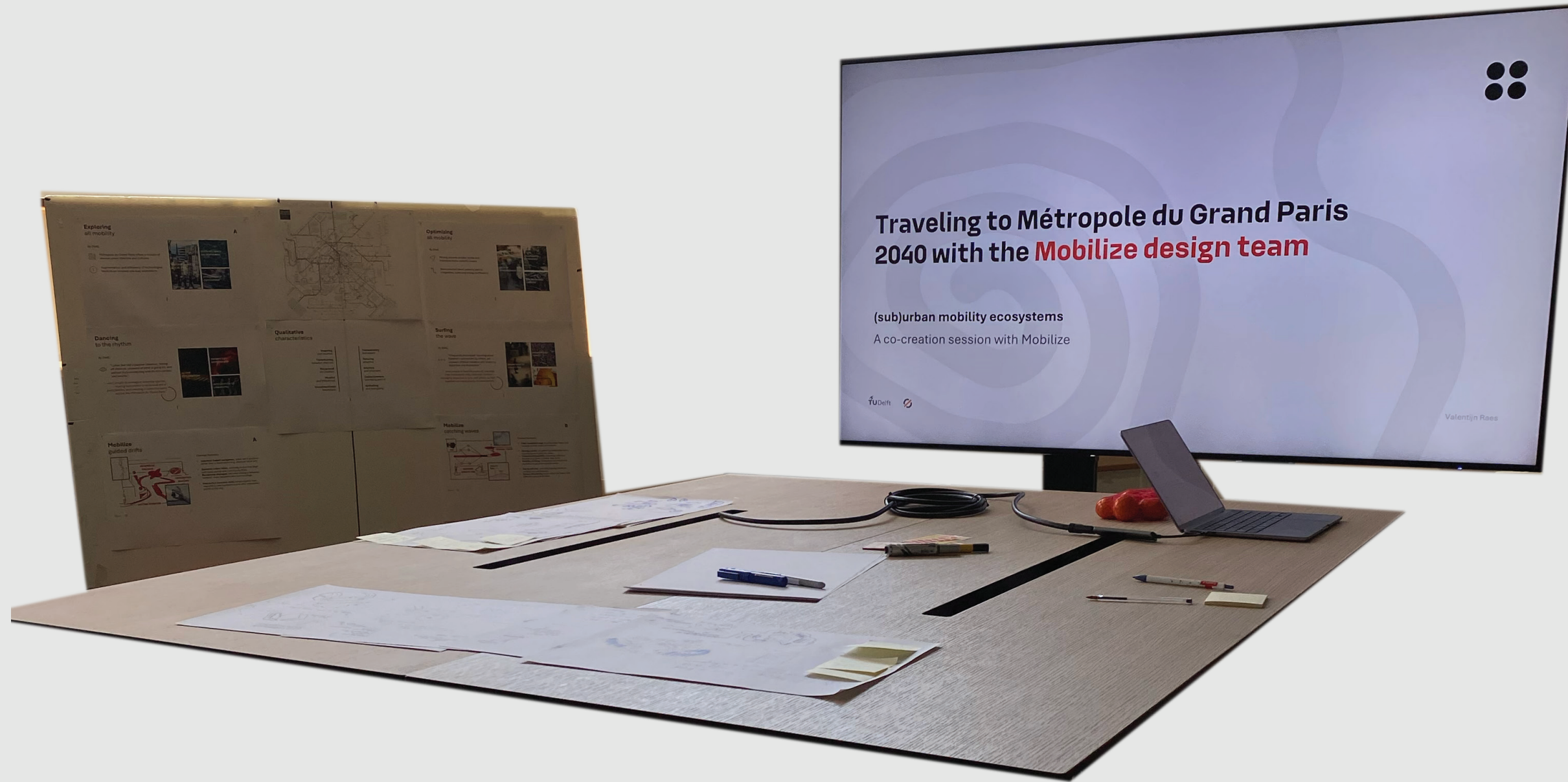
SACRIFICING
all mobility

“.. people to embrace collective mobility constraints as opportunities for mastery, minimalism, and meaningful movement—crafting each journey with intention”

APPENDIX E: IDEATION SKETCHES



APPENDIX F: CO-CREATION WORKSHOP & OUTCOMES



APPENDIX G: EXTENDED FLO FEATURES

1. FLOCK CONNECT

What: Syncs the user’s device with their micro-vehicle to activate the FLO session.

Why: Initiates participation with clear user intent and integrates them into the FLO system.

How: BLE/NFC handshake connects the user as a node in the FLO system layer.

2. WAVE MATCH

What: Suggests the optimal wave based on vehicle type and destination.

Why: Reduces choice fatigue and supports intentional alignment.

How: Uses contextual logic filtering user data (% energy, vehicle type, time, ride history) to recommend a wave.

3. WAVE ALERT

What: Notifies the user when and where waves are forming.

Why: Builds trust, anticipates movement, and enables the user to catch the wave, even if it is a last-minute rush.

How: ML-based rhythm detection triggers anticipatory notifications.

4. FLOW MAP

What: Visualises live and upcoming public movements across the region.

Why: Creates spatial awareness of ongoing public movements.

How: Combines user telemetry and predictive overlays to generate real-time visuals.

5. TAP TO SURF

What: Simple interaction to confirm wave participation.

Why: Reduces friction, turns intent into action.

How: Starts the session timer and signals participation to the system engine.

6. FLOCK SYNC

What: Makes sync-in and sync-out landmarks visible to users.

Why: Provides clear gathering points to anchor collective sync-in and sync-out.

How: System chooses suitable landmark, geofencing API triggers visibility based on the user’s location.

7. FLOCK SCAN

What: Detects nearby resonating riders and highlights density at the sync landmark.

Why: Creates “group feel” before official sync, helping the user assess participatory energy around sync point.

How: BLE/WiFi sensing maps the proximity of other riders.

8. FAMILIAR WAVE

What: Surfaces familiar co-riders based on past shared journeys.

Why: Strengthens social comfort and belonging, nudging toward positive, recurring participation.

How: Local engine clusters familiar users and subtly displays them near sync points.

9. FLOCK GUIDE

What: Provides spatial and timing cues to align users with their wave.

Why: Ensures smooth, collective movement without disrupting the group flow.

How: Uses UWB/V2V signals to deliver haptic and visual prompts for spacing, pa1cing, and graceful exits.

10. FLOW PATH

What: Dynamically adapts the wave’s route & infrastructure to fit real-time urban conditions.

Why: Ensures smooth, safe, and context-aware movement through the city.

How: Uses traffic, lane, and road context data to continuously adjust the wave’s route and shape.

11. FLOW COORDINATOR

What: Real-time coordination engine that manages wave route and collective timing.

Why: Ensures smooth, synchronised travel without collisions or sudden stops — keeps the flock intact and in shape across different contexts.

How: Cloud-based orchestration engine aggregates live user telemetry. Continuously adjusts wave shape, speed, and cluster splits and merges.

12. FLOW RHYTHM

What: Temporal coordination engine that harmonises velocity with city infrastructure and traffic dynamics.

Why: Avoids unnecessary stops, congestion, and maximises the “flow feel” across the city.

How: Predicts and times wave movement possibility according to traffic lights, public transit rhythms and traffic peaks.

13. FLOCK SCORE

What: Real-time feedback on collective ride performance based on sync and flow adherence.

Why: Encourages personal reflection and builds emotional engagement with flock flow.

How: Analyses time spent in sync, rhythm precision, and spatial alignment. This includes performance feedback available post-ride in the FLO app.

14. FLOW IMPACT

What: Calculates system-wide benefits from user participation and updates city-level mobility stats.

Why: Makes the user feel part of something bigger — reinforcing the idea that their small actions have collective meaning.

How: Aggregates ride contribution (e.g., CO₂ saved, congestion avoided, average flow harmony).

15. WAVE STREAKS

What: Tracks habitual participation, rewarding users for consistent engagement over time (badges, milestones, etc).

Why: Builds motivation, loyalty, and a rhythm of shared movement through positive reinforcement.

How: Backend logic monitors ride participation frequency, rhythm consistency, and “streaks” over days/weeks.

APPENDIX H: APPROVED PROJECT BRIEF

DESIGN
FOR our
future

TU Delft

Personal Project Brief – IDE Master Graduation Project

Name student

Tijn Raes

Student number

4,851,749

PROJECT TITLE, INTRODUCTION, PROBLEM DEFINITION and ASSIGNMENT

Complete all fields, keep information clear, specific and concise

Project title

Urban Mobility Ecosystems in Grand Paris by 2040

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

Introduction

Describe the context of your project here; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

This project explores the domain of "urban mobility ecosystems in Grand Paris by 2040". The research focuses on the forces shaping future urban mobility, including the built environment, human nature, and societal dynamics by 2040.

Key stakeholders are the TU Delft, where this research contributes to academic knowledge, and Mobilize. Mobilize, as part of Renault Group and launched as part of the Renaulution strategy (2021), seeks to imagine new mobility by innovating services and products in between the car and the pedestrian, positioning Renault as a next-generation mobility leader.

Paris's commitments to climate neutrality, aligned with the Paris Climate Act, mandates a 90% reduction in greenhouse gas emissions by 2040 (European Commission, 2023). Transportation, responsible for 24% of urban emissions, is a critical focal point. Mayor Anne Hidalgo's vision for a carbon-neutral, healthy and vibrant Paris emphasizes shared, clean and active mobility development. In line with this vision, transformative projects such as the Grand Paris Express and aggressive increase in biking lanes are reshaping Grand Paris into a polycentric metropolis.

These developments will change behaviors and attitudes of the city, and its people, and thereby offer opportunities for Mobilize to cater future needs and take position within this changing region.

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DESIGN
FOR our
future

TU Delft

Personal Project Brief – IDE Master Graduation Project

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice. (max 200 words)

As a young and evolving brand, Mobilize is still in the process of establishing a core focus market. The value for Mobilize lies in gaining novel insights into the future context of Paris and a vision-driven concept that aligns with future needs. This can support the brand in establishing its strategic direction and identifying its role in shaping future urban mobility.

The future of mobility encompasses three theoretical dimensions, as defined by Cresswell (2012) that will be influenced in the upcoming years: 1) physical movement, how do people move from A to B, and what infrastructure & technologies are present in Paris by 2040? 2) Ideas of mobility, how do people relate to mobility and why do they move the way they move in the future of Paris? 3) embodied practices, what societal structures will be present? and how will they influence the way people move? (e.g. commuting, school runs, business activities).

In addition, biomimicry, exemplified by Singapore's urban innovations (Bloomberg, 2016), demonstrate the benefits of seeking solutions in nature. What could a nature-inspired mobility systems and means look like in the future?

This project aims to envision these future conditions and propose a valuable proposition and tangible concept for Mobilize. By addressing urban needs and conditions, the project will define a strategic role for Mobilize within Paris' mobility system.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project. (1 sentence) As you graduate as an industrial design engineer, your assignment will start with a verb (Design/Investigate/Validate/Create), and you may use the green text format:

Design a vision-driven mobility concept for urban mobility ecosystems in Paris by 2040

Then explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words)

During the project, I will use the Vision in Product (VIP) approach by Hekkert & van Dijk (2011) as guiding method to develop a responsible and authentic design vision that steers ideation and conceptualization.

The main phases, including steps for each phase, will be (see Project planning):
0. project outline (project brief, defining domain)
1. deconstruction (deconstruction of current context (urban areas, mobility & nature), internal analysis Mobilize)
2. future framing (literature research, internal & external expert interviews, clustering, set up future framework)
3. positioning and interaction (define positioning, define desired interaction)
4. future ideation and conceptualization (ideation, evaluation, conceptualization, concept selection, detailing)
5. transition (define transition path, align with Mobilize strategy)
6. delivery (reporting, visualizing, presenting)

Mobilize / TU Delft

Project planning and key moments

To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include a kick-off meeting, mid-term evaluation meeting, green light meeting and graduation ceremony. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities).

Make sure to attach the full plan to this project brief. The four key moment dates must be filled in below

Kick off meeting

4 Dec 2024

Mid-term evaluation

19 Feb 2025

Green light meeting

16 Apr 2025

Graduation ceremony

23 May 2025

In exceptional cases (part of) the Graduation Project may need to be scheduled part-time. Indicate here if such applies to your project

Part of project scheduled part-time

For how many project weeks

Number of project days per week

Comments:

Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other).

Optionally, describe whether you have some personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology. Personal learning ambitions are limited to a maximum number of five. (200 words max)

In this graduation project, I want to deepen my knowledge further and connect personal topics that give me energy and inspire me day-to-day. A future-focused project in a professional setting, that has my signature and combines the two elements of this world that seemingly look unrelated: nature and mobility. Working in the design department of Mobilize in Paris, which shares the room with the other Renault Group brands, will greatly enhance my ability to learn and be proactive in a creative environment. I've set the following personal learning goals

1. Communicating my personal vision; Being able to effectively communicate my personal vision & style as young designer, project leader & strategist in a creative, yet professional setting.

2. Develop a recipe for future success; Acquire deeper knowledge and skills necessary for the mobility industry and its future. Understanding if, and in which part of the industry I can further develop professionally.

3. Apply and practice Vision in Product; As the VIP method, and its Darwinist approach fascinates me, I wish to practice this method in a professional environment, while making sure everyone stays on board.

4. Enjoy and trust the journey; Living in Paris, working in a mobility design studio and enjoying the city are all part of this graduation journey. Build further trust in my professional capabilities as a designer.

Master thesis - Valentijn Raes

Planning graduation timeline		Mobile	
Phase	Start	End	Duration
0. Project outline	2-Dec	2-Dec	1 day
1. Deconstruction	2-Dec	16-Dec	15 days
2. Future framing	16-Dec	23-Dec	7 days
3. Positioning and interaction	23-Dec	30-Dec	7 days
4. Future ideation and conceptualization	30-Dec	6-Jan	7 days
5. Transition	6-Jan	13-Jan	7 days
6. Delivery	13-Jan	20-Jan	7 days
7. Reporting & visualization	20-Jan	27-Jan	7 days
8. Presentation	27-Jan	3-Feb	6 days
9. Evaluation	3-Feb	10-Feb	7 days
10. Reflection	10-Feb	17-Feb	7 days
11. Mid-term evaluation	17-Feb	24-Feb	7 days
12. Green light meeting	24-Feb	3-Mar	7 days
13. Mid-term evaluation	3-Mar	10-Mar	7 days
14. Green light meeting	10-Mar	17-Mar	7 days
15. Mid-term evaluation	17-Mar	24-Mar	7 days
16. Green light meeting	24-Mar	31-Mar	7 days
17. Mid-term evaluation	31-Mar	7-Apr	7 days
18. Green light meeting	7-Apr	14-Apr	7 days
19. Mid-term evaluation	14-Apr	21-Apr	7 days
20. Green light meeting	21-Apr	28-Apr	7 days
21. Mid-term evaluation	28-Apr	5-May	7 days
22. Green light meeting	5-May	12-May	7 days
23. Mid-term evaluation	12-May	19-May	7 days
24. Green light meeting	19-May	26-May	7 days
25. Mid-term evaluation	26-May	2-Jun	7 days
26. Green light meeting	2-Jun	9-Jun	7 days
27. Mid-term evaluation	9-Jun	16-Jun	7 days
28. Green light meeting	16-Jun	23-Jun	7 days
29. Mid-term evaluation	23-Jun	30-Jun	7 days
30. Green light meeting	30-Jun	7-Jul	7 days
31. Mid-term evaluation	7-Jul	14-Jul	7 days
32. Green light meeting	14-Jul	21-Jul	7 days
33. Mid-term evaluation	21-Jul	28-Jul	7 days
34. Green light meeting	28-Jul	4-Aug	7 days
35. Mid-term evaluation	4-Aug	11-Aug	7 days
36. Green light meeting	11-Aug	18-Aug	7 days
37. Mid-term evaluation	18-Aug	25-Aug	7 days
38. Green light meeting	25-Aug	1-Sep	7 days
39. Mid-term evaluation	1-Sep	8-Sep	7 days
40. Green light meeting	8-Sep	15-Sep	7 days
41. Mid-term evaluation	15-Sep	22-Sep	7 days
42. Green light meeting	22-Sep	29-Sep	7 days
43. Mid-term evaluation	29-Sep	6-Oct	7 days
44. Green light meeting	6-Oct	13-Oct	7 days
45. Mid-term evaluation	13-Oct	20-Oct	7 days
46. Green light meeting	20-Oct	27-Oct	7 days
47. Mid-term evaluation	27-Oct	3-Nov	7 days
48. Green light meeting	3-Nov	10-Nov	7 days
49. Mid-term evaluation	10-Nov	17-Nov	7 days
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