T-SUM Lexicon

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Content

Accelerating sustainability transitions

Car-dependent urban development results in strong negative externalities such as air pollution, congestion, road collisions, urban sprawl, social exclusion, and spatial segregation and leads to poor accessibility and inequalities that affect socio-economic development. Research undertaken in Europe identified three distinct policy perspectives or dominant policy mindsets that influence private car use levels and how they have evolved over time (see Figure 1). There is also evidence internationally of the positive association between an increase in GDP per capita, urban population growth, and car use in cities (Teoh et al., 2020). T-SUM seeks to challenge the traditionally assumed links between economic growth and car-dependent urban development, identifying the base conditions under which the transition to sustainable urban mobility can be accelerated in sub-Saharan African cities with low-but-rising levels of motorisation (Figures 2 and 3; see Cavoli, 2021; Oviedo et al., 2022 for further elaboration).

Here, the use of the word *accelerating* refers to not just making something happen more quickly than historical data suggest but also 'short-circuiting' or 'leapfrogging' a city's development trajectory by bypassing the car-oriented policy phase.

Figure 1 Typical policy perspectives that influence levels of private car use (Source: Jones et al., 2018)

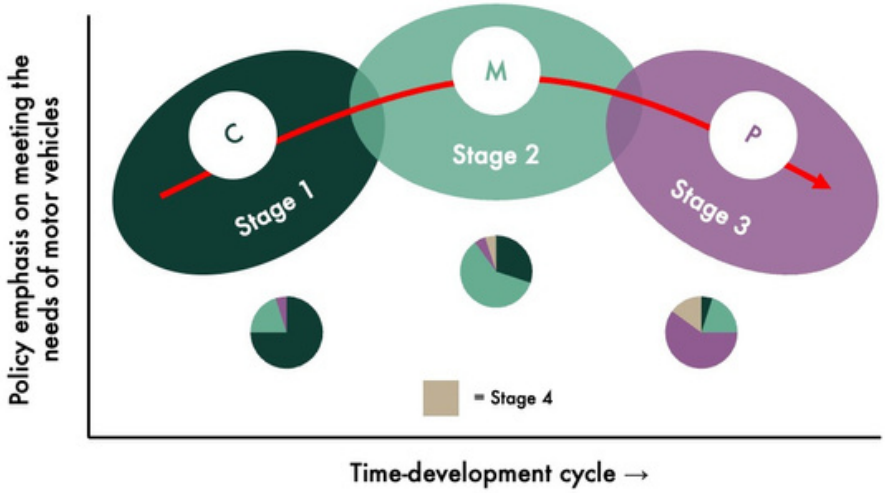

Figure 2 Post second world war urban development in most Western European cities has broadly followed a sequential three-stage process with traffic restraint and street place-making elements in Stage 3 (P) depending on the provision of modal alternatives in Stage 2 (M); in practice, however, the shift from one stage to another is much less clear cut, there may be elements of all three stages throughout a city's development (with the dominant perspective changing), and overlaps and short-term reversals of policy may sometimes occur following an election (Source: Jones et al., 2018)

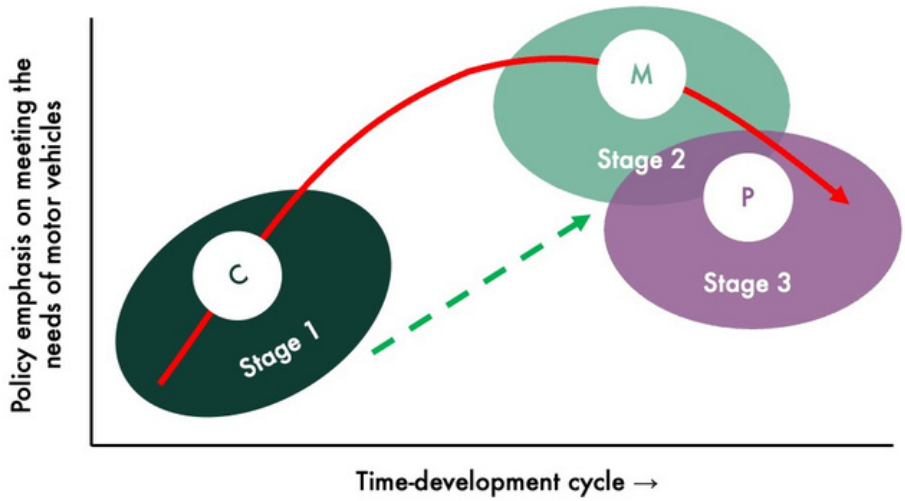

Figure 3 Accelerating the shifts in a city's policy perspective and mobility pattern and consequently its development trajectory towards one that is more sustainable and socially just (Source: Jones et al., 2018)

In the trans-disciplinary field of sustainability transitions research (STR), the term *sustainability transitions* refer to "transformations towards more sustainable modes of production and consumption" (Markard et al., 2012, p. 955). According to Grin et al. (2010), *sustainability transitions* differ from *socio-technical transitions* (a more established term in the literature), with the former not only driven by technological innovation and economics but also strongly influenced by political, scientific, and civil society actors(see Köhler et al., 2019 for elaboration). The incremental changes in the socio-spatial dynamics of *sustainability transitions* are based on the normative expectations these actors have in the process of shifting societies/cities towards a low-carbon economy (i.e., whether issues of societal inequality, stakeholder participation, fair distribution of cost and benefits, and non-discriminatory policymaking approaches should be addressed, and if yes, what are the consequences for social justice). Truffer and Coenen (2012: 12) assert that "sustainability transitions are by their very nature political projects".

The most dominant heuristic framework in STR is known as the Multi-Level Perspective (MLP), coined by Geels (2002, 2010: 495), which "provides [sic] an overall view of the multi-dimensional complexity of changes in socio-technical systems". In the MLP, sustainability transitions are non-linear processes occurring as a result of interactions between the three analytical levels:

- A **niche** level where innovations occur and build up momentum.
- A socio-technical **regime** level where existing or incumbent technologies intertwine within a configuration of actors, institutions, practices, and regulations become stabilised over time.
- A **landscape** level (or the broader environment, conditions, and pressures) where diverse factors such as macroeconomic trends, war, global environmental problems, migration, as well as political and socio-cultural discourses occur.

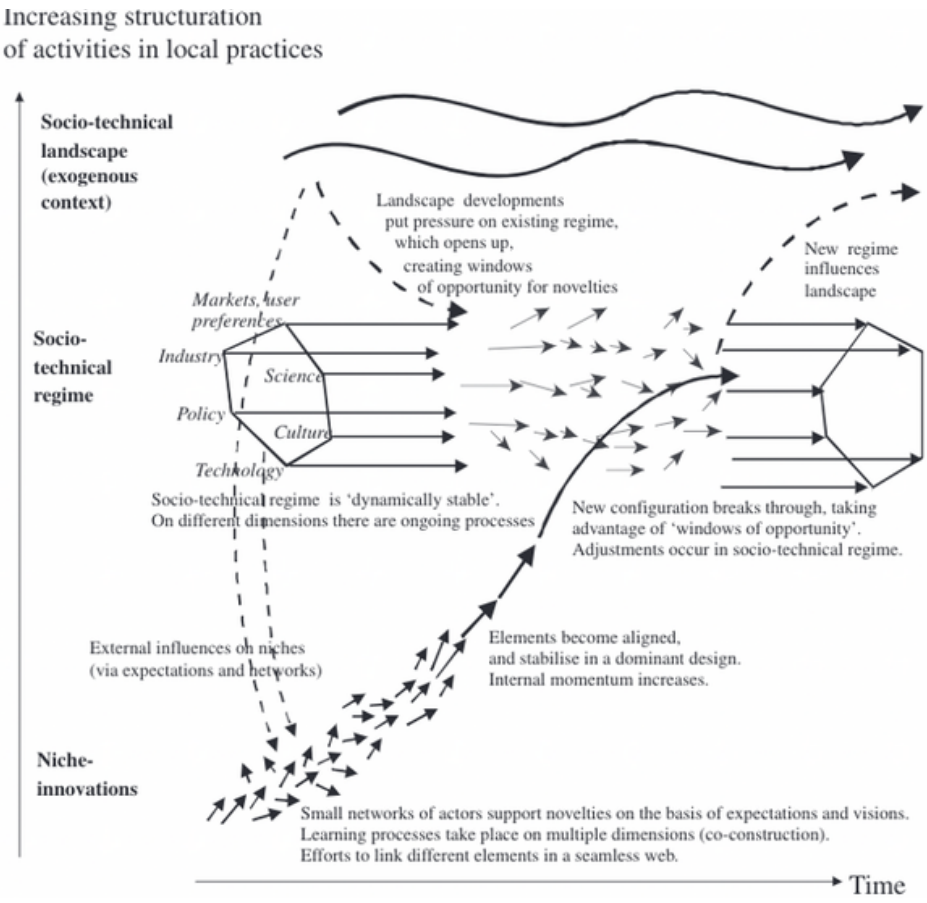

Figure 4 MLP on sustainability transitions (Adapted from Geels, 2002)

A common criticism of the MLP is its lack of attention to questions of space and scale (Coenen et al., 2012). Consequently, this poses an analytical challenge for researchers who seek to adopt the MLP to study sustainability transitions in the urban mobility sector (e.g., Auvinen & Tuominen, 2014; Kemp et al., 2012; Nykvist & Whitmarsh, 2008; Ruhrort, 2020; Whitmarsh, 2012; Zijlstra & Avelino, 2012; see also Geels, 2012). Canitez (2019: 320) addresses this criticism by identifying "[f]ragmented institutions, ambivalent transport and land use policies, lack of public awareness regarding sustainability, incompetent authorities, vested interests and clientelist political relations" as critical characteristics researchers adopting the MLP to study mobility systems in global South cities would need to take into account.

The Share the Road Programme, launched by UNEP and the FIA Foundation in 2008, is a notable example of a programme that seeks to shape sustainability transitions towards low-carbon mobility in the global South by supporting governments and other stakeholders to "move away from prioritising the car-driving minority, towards investing in infrastructure for the majority: those who walk and cycle" (UNEP, 2022). Besides strategic investments in walking and cycling infrastructure, the Programme also emphasises the design of an integrated, multi-modal transport system so that global South cities may avoid the negative socio-environmental externalities associated with car-dependent urban development. There, however, remains a persistent challenge for planners and policymakers due to the deeply entrenched socio-cultural association of motorised transport with affluence and elevated status in the global South (UNEP, 2016).

In the context of the T-SUM project, the terms '**Accelerating Sustainability Transitions**' and '**Sustainable urban mobility transitions**' refer to the acceleration of structural and functional transformations and the reconfiguration of urban systems towards sustainability and zero carbon emissions. These transformations must lead to system changes, at times disruptive, with a particular focus on mobility, accessibility, and land-use issues at the urban level. They should lead to mobility, accessibility, and land-use systems that are efficient, ecologically sustainable and socially equitable. The project draws from both the theory and practice of sustainability transitions to engage with public and professional stakeholders across levels of governance and urban sectors to develop city visions based on sustainability, prosperity, social equity, health, and well-being.

Active travel

Active travel, also called active transport, non-motorised transport, and human-powered transport, refers to active modes of transport such as walking and cycling as well as scooter, handcart, and wheelchair use. In the past two decades, many high-income cities have promoted active transport as an alternative to motorised travel through policy and technological innovations. Winters et al. (2017) suggest that active transport policies (i.e., to create an urban environment that is safe, convenient, and comfortable for walking and cycling) broadly fall into the following four categories: society-level, city-level, route-level, and individual-oriented.

On the other hand, active transport has long played a central role in the everyday mobility practices in sub-Saharan African (SSA) cities (Foley et al., 2022). The vast majority of transport users in SSA cities are from low-income households and are therefore dependent on active transport modes, particularly walking (or cycling in SSA cities, see Acheampong, 2017; Castañeda, 2021; Jennings, 2021; Morgan, 2019, 2020). Active transport is, therefore, very much a necessity as there are no other viable options for transport users to meet their daily travel needs (Oviedo et al., 2021). Improving the everyday accessibility and mobility of low-income transport users in SSA cities is crucial to address urban poverty and inequality. However, investments in the region tend to focus on road infrastructure as it is seen as an enabler of economic growth and poverty reduction, focusing on car usage and limited (at best) considerations for collective transport and active transport (Beuran et al., 2015). Mitullah and Opiyo (2012) observe that the lack of suitable institutional framework as well as insufficient policy and investment into pedestrian infrastructure has made these spaces a hostile environment for pedestrians to navigate despite the dominance of the mode (see also Massingue & Oviedo, 2021; Okyere et al., 2021). Further, there is little to no integration of pedestrian infrastructure into cities' overall planning and infrastructure development (Diaz Olvera et al., 2013).

Beyond the economic and technical dimension, active transport also has a public health dimension (see Bloyce & White, 2018 for elaboration). The little to no integration of pedestrian and cycling infrastructure into cities' overall planning development means that pedestrians and cyclists bear a more significant cost associated with the construction and/or upgrading of transport infrastructure, including higher road accident rates, longer travel time, greater exposure to pollution, as well as the elimination of pedestrian traffic from certain parts of the city (Vanderschuren & Zuidgeest, 2017). According to the World Health Organization (2018), road traffic deaths in Africa are at 26.6 deaths per 100,000 people, nearly three times that in Europe. Adeloye et al. (2016), however, estimate the actual figure to be significantly higher than official records at 65 deaths per 100,000 people.

By examining the interaction between various groups of road users, Venter (2017) finds that drivers might not be attentive to pedestrians and cyclists due to how frequently they encounter active transport users as part of their day-to-day driving experience, which 'dilutes' the perception of them being at greater risk. This supports Khayesi et al. (2010: 106), who suggest that instead of viewing pedestrians, cyclists, and street vendors as vulnerable transport users at risk, a more appropriate framing would be to view them as the "neglected and victimised road user group", and consequently, their needs ought to be examined to promote equity in land use and transport planning (see Vasconcellos, 2001 for elaboration). Additionally, Loo and Siiba (2019) observe that the rate of active transport among school children in Africa is showing signs of transitioning towards what has been previously observed in other regions of the world — a decline in walking trips to school coupled with an increase in car travel — demonstrating the uneven development of active transport in cities across the world despite the well-documented health benefits (see Rabl & de Nazelle, 2012; Saunders et al., 2013).

Car dependency/ Car-dependent urban development

Authors such as Newman and Kenworthy (1989) introduced the notion of car dependency, which has subsequently been interpreted in various ways. Merom et al. (2018) define 'car dependency' as permanently relying on private motorised vehicles as the only transport mode. Litman and Laube (2002) argue that car dependency is associated with high rates of car travel per capita, car-oriented land-use patterns, and the lack of alternative transport options. Handy et al. (2005) assert that, from a research and policymaking perspective, people who drive a car out of choice should be treated differently from those who drive it because they have no other viable option. Other authors have moved beyond the notion of car dependency as an objective variable (i.e., car travel per capita and the number of cars in the household) to explore the subjective variables shaping practices and norms. For example, Behren et al. (2018) observe that factors such as a lack of knowledge on public transport or emotional needs and car use should be considered.

At the city or metropolitan scale, car-dependent urban development refers to car use becoming "a key satisfier of human needs, largely displacing less carbon-intensive alternatives" (Mattioli et al., 2020: 2). This 'carbon lock-in' creates political, institutional, and technological inertia to mitigate emissions as well as the transition to sustainable urban mobility (ibid.).

Co-production of knowledge and evidence

Co-production is “a process through which inputs from individuals who are not ‘in’ the same organisation are transformed into goods and services” (Ostrom, 1990, p. 1073). Furthermore, as it articulates certain values (i.e., justice, equity, fairness, accountability), co-production is both a normative and moral concept (Albrechts, 2015) grounded in a deeper understanding of the complex dynamics of formal and informal urban relations that emerge from learning, negotiation, and experimentation (Buyana et al., 2021).

The term is currently used in various contexts beyond its initial conceptualisation around the co-production of urban services(see Galuszka, 2019). Within urban governance, policymaking, and research, co-production is often discussed as a form of engagement between stakeholders and a distinctive approach to knowledge-building (Durose et al., 2012; Moser, 2016). It focuses on influencing the status quo by challenging "unitary visions and instead embraces knowledge production borne of the confrontation and juxtaposition of multiple ways of living, working, and seeing the city” (Osuteye et al., 2019: 5). In other words, by spurring community engagement in urban development-related policies, co-production ties research with community needs and preferences in the spirit of more sustainable urban transitions (Perry & Atherton, 2017), - which is especially relevant for cities in the global South where institutional norms are often counterproductive and/or exclusionary when it comes to the welfare of the urban poor (Galuszka, 2019), and formal channels of engagement do not exist or are not satisfactory (Watson, 2014).

Proponents of co-production assert that it goes beyond standard 'citizens' participation' (which has been criticised for tokenism) as it seeks to provide a more equal and reciprocal relationship between the state and citizens (Albrechts, 2015). Co-production rests on bringing together different social worlds (i.e., academia and grassroots groups) to develop a shared "thought style" that recognises the value of citizens' contextual knowledge or lived experiences that can be used to assess the credibility of experts' claims (Fenge et al., 2012), and transdisciplinary knowledge-building (Pohl et al., 2010, p. 271). That said, there is no clear boundary between co-production and citizens' participation (Simon et al., 2020), as both are creative processes that seek to develop socio-spatial imaginations such that it "includes not only the views of the most articulate or powerful, but also the views of those who have been systematically excluded by structural inequalities of class, gender and religion" (Sandercock, 1998, p. 65).

Cross-sectoral and multi-level governance

In the context of sustainable transport planning and management, cross-sectoral and multi-level governance are two key concepts to overcome institutional silos, which refer to "the sectoral division of management, whether by tasks or thematic division and where there are differences in institutional logics, workings and culture, inhibiting cross-sectoral work" (Oseland, 2019: 1).

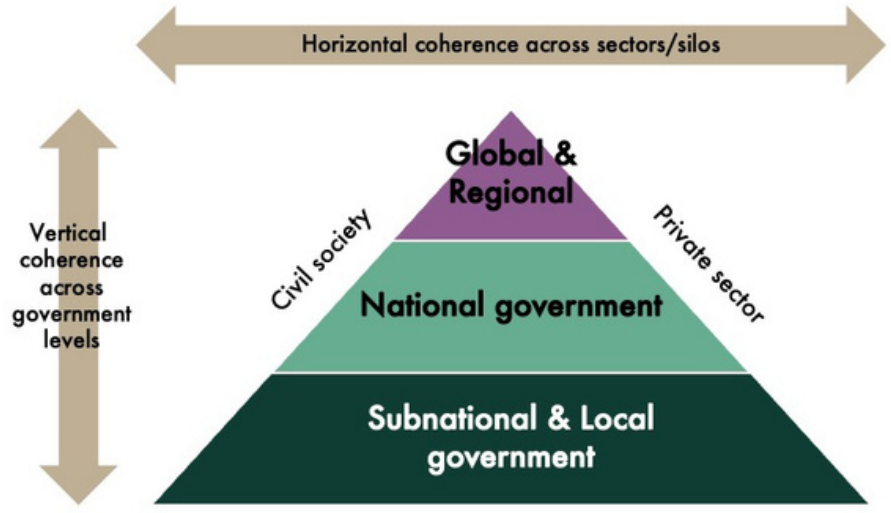

Figure 5 Policy and institutional coherence for the SDGs – horizontal and vertical integration across institutional silos (Meuleman, 2021)

Cross-sectoral governance refers to the coordination and collaboration among different stakeholders in different sectors involved in the provision of sustainable transport, including national transport regulators, land-use and transport planners, private operators, civil society organisations, and residents. The recognition that sustainable transport intersects with other urban sectors such as land-use, energy, housing, healthcare, environment, and heritage, is central to the notion of cross-sectoral governance. On the other hand, multi-level governance refers to the decision-making and implementation processes, as well as the distribution of accountability across the different levels of government (i.e., international, national, regional, and local) and other stakeholders to tackle issues related to sustainable transport (Marsden & Rye, 2010).

When put into practice, cross-sectoral and multi-level governance aims to foster a more holistic and collaborative approach to transport planning, administration, and management. The urgency to overcome institutional silos is significantly greater in the context of the climate crisis and extreme weather events (Leiren & Jacobsen, 2018). Processes of cross-sectoral and multi-level governance may occur from the top-down and from the bottom-up to also overcome path dependency to sustainable transport governance (Dowling, 2018) and avoid possibly damaging technology lock-ins" (Pangbourne et al., 2018).

Integrated multi-modal transport

Integrated multi-modal transport refers to the possibility for users to combine several modes of transport for a seamless trip. Common modes of transportation include walking, cycling, public transport (bus and rail), taxis, private vehicles, and micromobility (Cottrill et al., 2020). Theoretically, multi-modal transport systems provide a range of efficient, convenient, and affordable transfers through the strategic development of supportive policies and infrastructure and the careful coordination between different transport regulators and providers. Multi-modal transport systems have the significant potential to reduce congestion, environmental pollution and contribute to greater urban liveability (Oeschger et al., 2020). However, Kilani et al. (2022) noted that existing multi-modal transport systems often remain limited to some predetermined trip configurations/possibilities and may not be sufficiently flexible to meet the diverse needs of vulnerable and underserved transport users.

Mobility practices

Practices are routinised and "defined by interdependent relations between material, competencies and meanings" (Shove et al., 2012, p. 24). According to Cresswell and Merriman (2011: 5), "mobility is practiced, and practice is often conflated with mobility. To move is to do something." In this sense, mobility practices are "embedded, embodied and emplaced" with a complex array of political, cultural, and economic contexts within the city (Jirón, 2009, p. 46).

Placemaking

Placemaking describes "[t]he ongoing collaborative process in which diverse groups of stakeholders within a community work together to define, develop, and deliver on a common vision for spatial transformation" (Horgan, 2020, p. 145). It is a collaborative 'art' and 'science' (Fincher et al., 2016) that occurs outside disciplinary boundaries of architecture, planning, landscape architecture, economics, ecology, and sociology, engendering a new constellation of relationships based on "tacit, place-based, local, and situated and shared experience" (Horgan, 2020, p. 147).

Placemaking relies on building capacities that allow for different types of local knowledge (e.g., expert, lay, subaltern, and indigenous) to recalibrate political and economic power relations. However, local knowledge in itself is a moving target as people attach specific meaning(s) to place, which is broadly understood as a space people are attached to through "reiterative social practices" (Cresswell, 2004, p. 39). Moreover, as a result, evaluating the impact(s) of placemaking activities is difficult as it remains contested and elusive in practice.

In the context of sub-Saharan African cities, mainstream planning's market-driven and techno-managerial objectives are largely disconnected from the issues of poverty, inequality, and informality, leading to enduring tension with the livelihood strategies of its most populations (Faldi et al., 2021). Some regard the collaborative nature of placemaking practices as a tool for planners and the planning system to acknowledge people's 'right to the city' and establish a working relationship for engagement (see Friedmann, 2010 for elaboration). Furthermore, in the context of sustainable urban mobility, placemaking is a tool for transport planning practice (which is rooted in the notion of 'segregation' rather than 'integration') to consider the notion of place, something that has been divorced from its practice for decades (Curtis, 2016). Specifically, it

is about raising questions on the kind of place that is being served or planned (i.e., origins and destinations) and by what kind of activity (i.e., land use) from the perspective of different transport users at different spatial scales (ibid.)

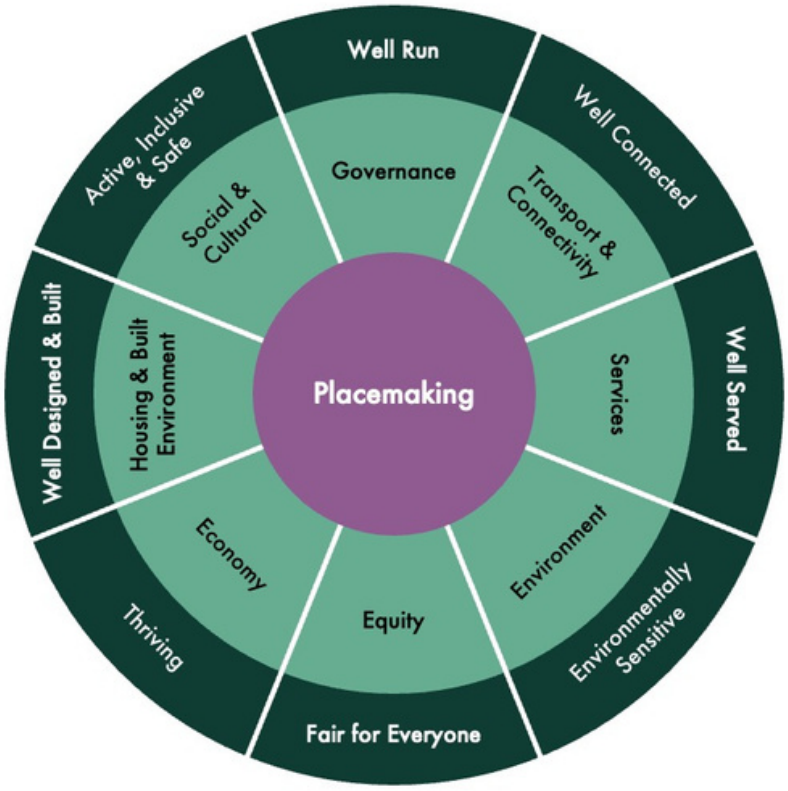

Figure 6 The Egan Wheel is a tool designed to facilitate placemaking conversations, which offers a holistic set of factors that impact place (Horgan, 2020: 146)

Andres et al. (2021: 29) suggest that placemaking practices, particularly "impermanent, adaptable, temporary and alternative forms", must be better integrated into the planning processes and planning system as a development tool.

Practical implementation challenges

In the context of the T-SUM project, practical implementation challenges refer to enabling factors and barriers to change, which either enable or hinder governments from transitioning towards the desired sustainable urban mobility vision. These technical, financial, and/or political challenges can hinder the adoption of new technologies and progressive transport policies.

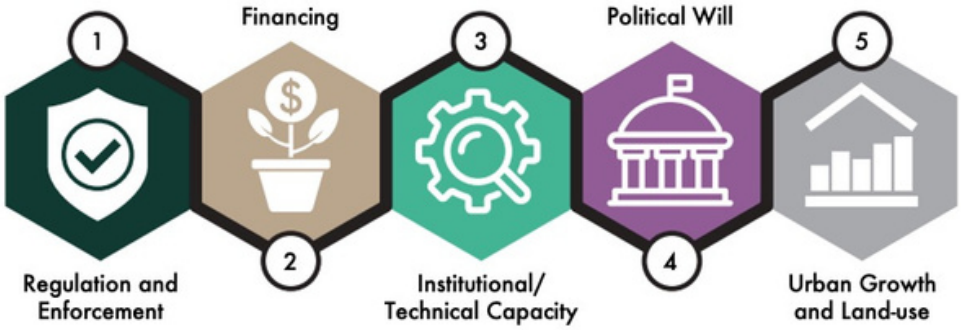

Figure 7 Main practical implementation challenges (Source: T-SUM)

Policy instruments

The term 'policy instruments' is often used synonymously with 'policy measures'. It refers to policy and planning tools to achieve specific policy objectives. Transport policy instruments may take the form of taxes, subsidies, grants, investments in transport infrastructure and services or urban plans. The design of policy instruments for strategic/systemic transitioning to sustainable mobility is shaped by the socio-political and economic context in which it is being implemented. In other words, the parameters of what is considered economically feasible, financially viable, and politically acceptable are highly time and place specific.

The table below provides examples of some of the policy instruments recommended by T-SUM within the avoid-shift-improve (ASI) framework.

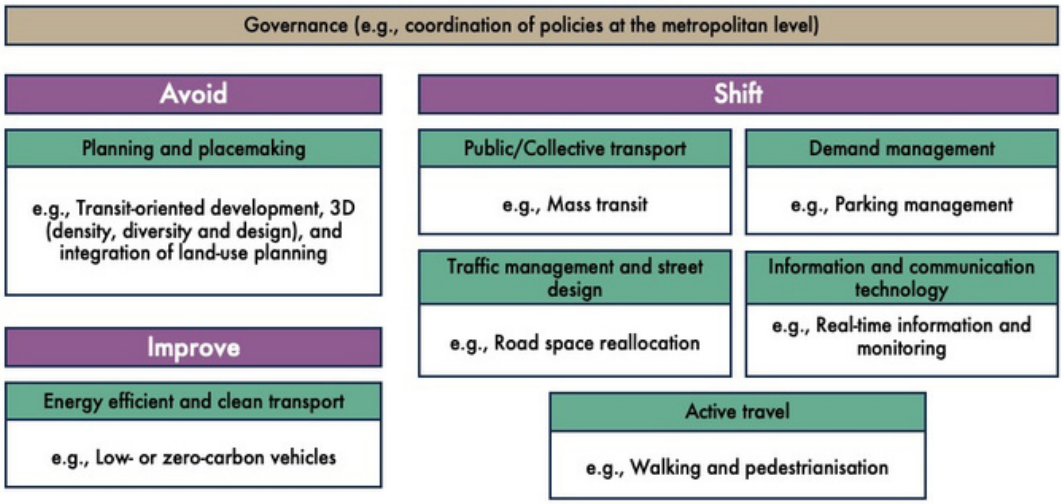

Figure 8 Avoid-Shift-Improve framework (Source: T-SUM)

Semi-formal transport

Semi-formal transport, also called 'paratransit' or 'artisanal transport', is ubiquitous in Sub-Saharan African cities. According to Tun et al. (2020), semi-formal transportation services are demand-responsive, unscheduled, and flexible public transportation services offered by self-organised operators without effective regulatory frameworks. They fill a market need in urban areas where public transport services are insufficient and/or unreliable by providing high-frequency, high-coverage, and adaptable services with set routes and designated stops. The vehicle size and capacity can vary from cars to full-size buses (Zhang et al., 2013). However, semi-formal transport also creates negative externalities such as environmental pollution, congestion, poor road safety, as well as issues surrounding poor data and understanding of operations, labour exploitation, and regulation (Klopp, 2021). Unlike informal transport, semi-formal transport operators usually have a license to operate (e.g., minibuses in Freetown or Maputo).

Sustainable accessibility

Accessibility refers to “the potential for interaction, both social and economic, the possibility of getting from home to a multitude of destinations offering a spectrum of opportunities for work and play” (Handy & Niemeier, 1997, p. 1175). The scales at which accessibility is approached have also evolved across the literature, from a focus on the "how" to a consideration of the "who" or "what" (Handy, 2020), which can, in turn, be loosely grouped into three levels as illustrated in Figure 9. On the other hand, access refers to the realisation of such potential, which can be achieved by travelling from home to a destination; having

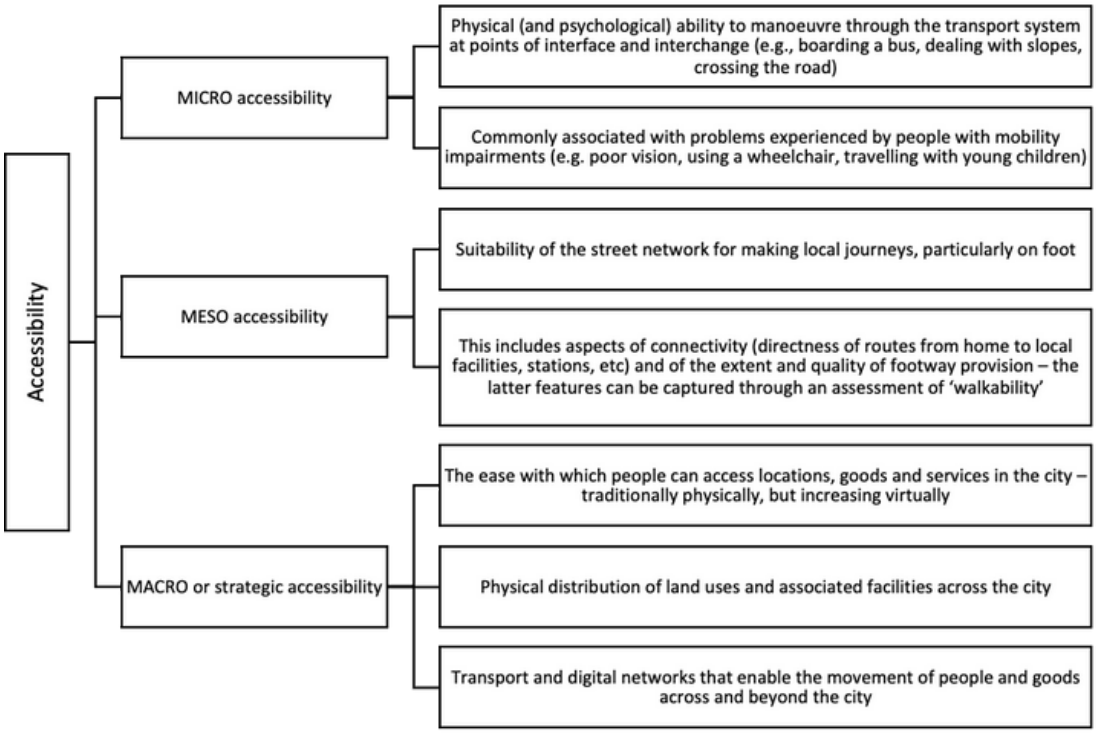

Figure 9 Scales of accessibility (Oviedo et al., 2022)

the good or service delivered to, provided at the home or in proximity; accomplishing the activity via the Internet (e.g., watching a film), using pipes (e.g., water), wires (e.g., electricity) or air waves (e.g., radio) to link people and products.

Geurs and van Wee (2004) identified four key components of accessibility:

- **Land-use** (the quantity, quality, and distribution in space of opportunities such as jobs, shops, healthcare, social and recreational facilities at destination locations as well as the demand for opportunities at origin locations)
- **Transport** (features of the transport system expressed in terms of the (dis)utility for an individual to travel between origins and destinations using a given mode of transport)
- **Time** (time constraints related to both availability of opportunities during the day and the availability of time for individuals to make use of such opportunities)
- **Individual** (the needs, abilities, and opportunities of individuals that can influence levels of access to transport and their ability to participate in opportunities)

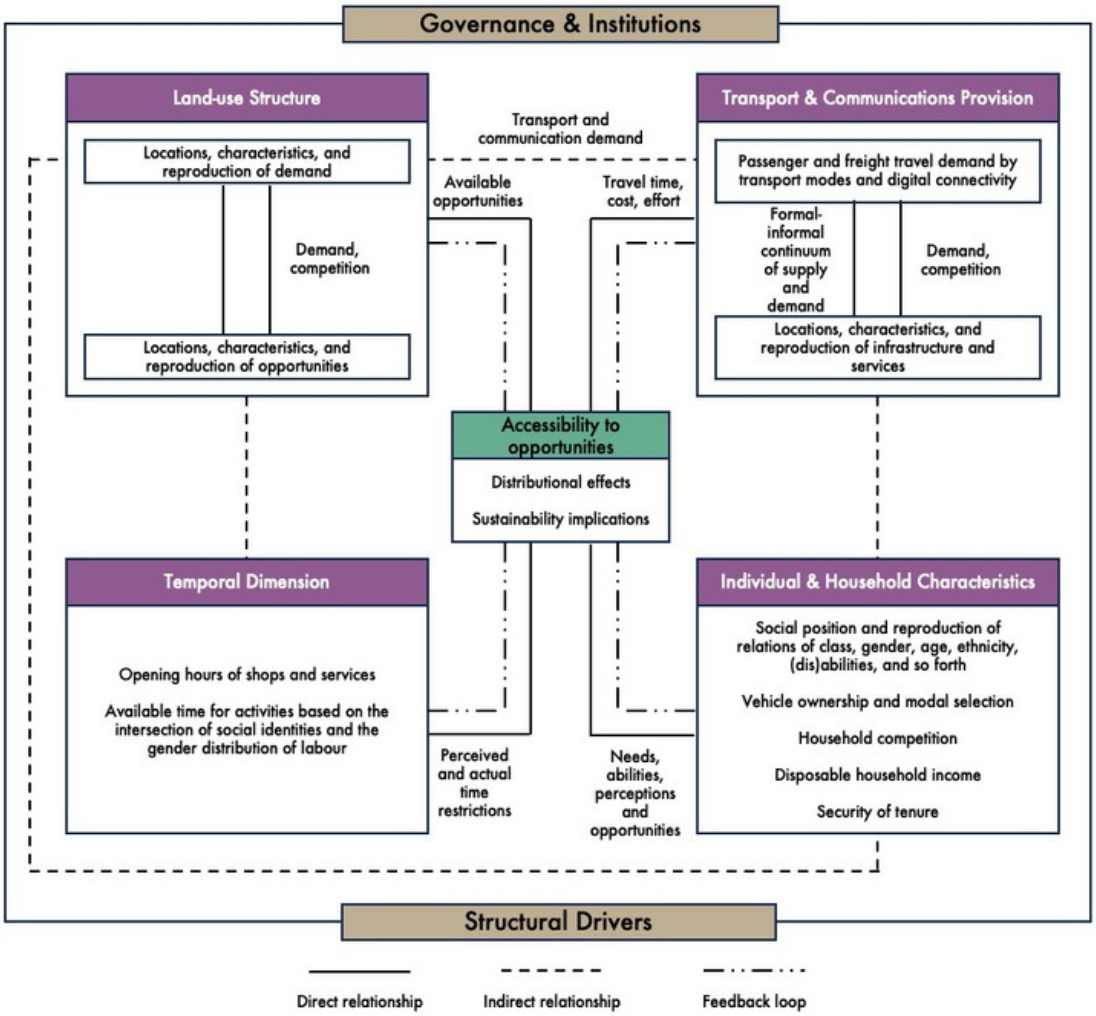

Figure 10 Components and relations of accessibility (Adapted from Geurs & van Wee, 2004)

By examining the relations of accessibility (i.e., the potential for interaction), Geurs and van Wee's framework provides a bird's eye view of how the land-use structure, as well as transport and communication systems interact and generate a differentiated set of opportunities that individuals can reach by mode, location, social groups, and activity (see Jaramillo et al., 2012; Niehaus et al., 2016; Vasconcellos, 2001). However, a consolidated framework has yet to be proposed to account for the complexities of accessibility in sub-Saharan African cities. Future research has to explicitly account the room for manoeuvre in which informality, technology, and power may influence the components and relations of accessibility (Benevenuto & Caulfield, 2019; Venter et al., 2019), and consequently, the role of accessibility in the development of specific trajectories for sustainable urban mobility. The quadrants proposed in Figure 11 illustrate a simplified set of alternative trajectories at the city (i.e., macro) and the neighbourhood (i.e., meso) level can materialise over time from an accessibility perspective, using dependency from private motorisation as a proxy for how sustainable each potential stage is. Figure 12 unpacks these alternative trajectories further by introducing accessibility practices at the individual and community level (i.e., micro) while adding a more explicit definition of timeframes for considering the short-term, mid-term and long-term sustainable urban mobility transitions in practice.

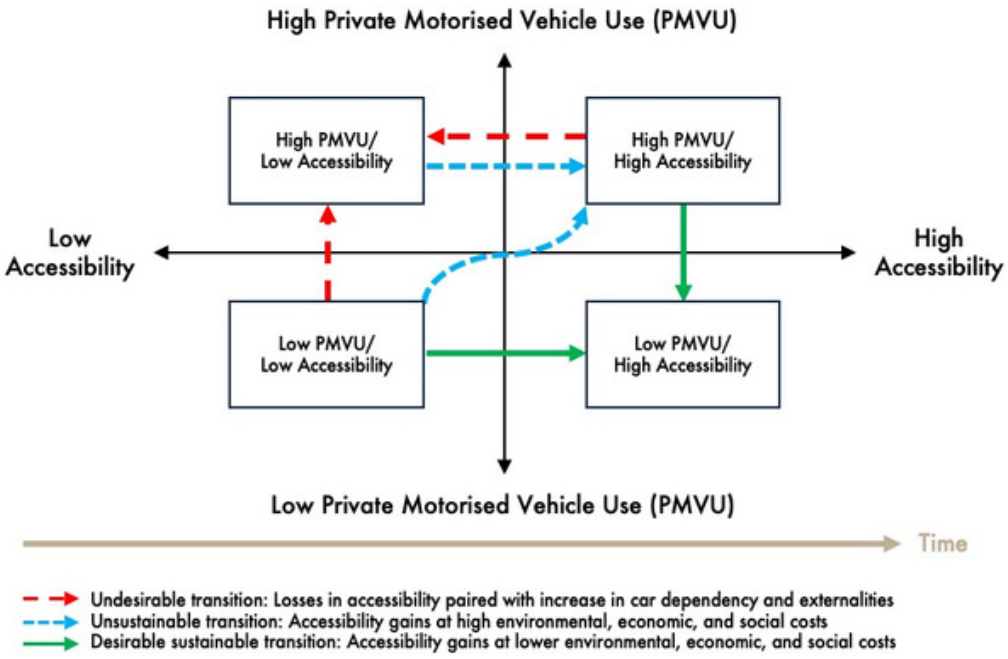

Figure 11 Quadrant of transition to sustainable accessibility practices (Source: T-SUM)

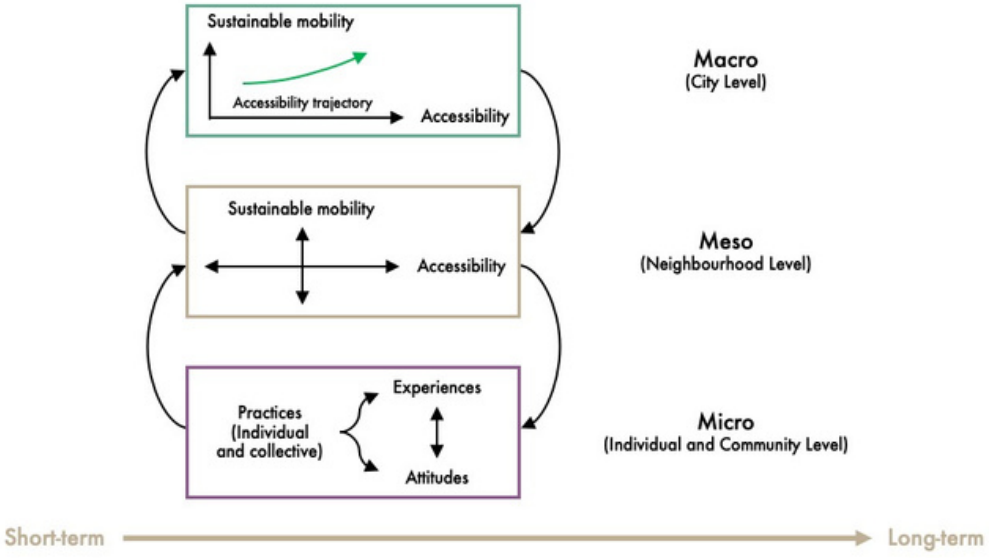

Figure 12 Links between accessibility practices, experiences and attitudes at different spatial and temporal scales (Source: T-SUM)

Sustainable urban mobility

Sustainable urban mobility refers to the ability of a city's or urban region's transport system to meet its residents' physical and virtual mobility needs. Simultaneously, the provision of transport infrastructure and services to facilitate the efficient movement of people and goods in the context of climate, energy and extreme weather events should be within the carrying capacity of supporting ecosystems and to enhance residents' general health and well-being (Tsavachidis & Petit, 2022).

Sustainable urban mobility policies often promote active travel (i.e., walking, cycling) and public transportation as viable alternatives to private car usage. It also emphasises the significance of a just transition to decarbonised urban mobility solutions so as not to compromise the ability of future generations to experience a safe, accessible, fast, affordable, comfortable, and clean transport system.

Urban development trajectory

At any given time, existing land-use and transport patterns in a city shape the possibilities for the direction of change in the future. Urban development trajectory refers to the spatio-temporal organisation of socio-environmental risks and/or vulnerabilities interlinked with poverty, inequality, migration patterns, and technological and institutional capacities, locking cities into a hard-to-reverse trajectory of urban development. A critical role of planning is to understand these trajectories, "drawing out the degree of fixity and fluidity in urban practices [i.e., the interactions between individual and collective agency] and structural drivers [i.e., the political economy] that underpin them" as well as socio-environmental flows that offer points of entry for policy actions and/or socio-technical changes that can result in a more sustainable and just urban mobility system (Levy et al., 2017, p. 11).

Trajectories are embedded within broader contexts or pathways that articulate future mobility visions in the city (Hodson et al., 2016). According to Castán Broto (2017: 757), "[p]athways emphasise future possibilities and alternative courses of action" whereas "[t]rajectories emphasise the course or direction of change". Hence, pathways are linked to multiple and competing values that shape urban trajectories (Leach et al., 2010).

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