

Table S1: Concept note: Three phases of planning paradigms as operationalised by this study (cf. Chapter 2)

Phase	Models / paradigms	Key principles	Debates & critiques	Role of sustainability
Modernist phase (until ~1970/80)	Functionalist, structured and segregated city, Urbanity through density, car-oriented city, ...	Functional zoning, High-rise apartment blocks in the park, industrialised mass production, automobile dependence (Albers 1997; Bruegmann 2019; Squires 2002)	Criticism of monotony, social segregation, ghettoization, car-dependence, excessive land consumption (Albers 1997; Bruegmann 2019; Squires 2002), Dear 1986; Ellin 1998; Hirt 2009)	Limited: focus on technical efficiency; early environmental critique emerges in response to land consumption and industrialisation
Postmodern phase (~1980–2000s)	New Urbanism, Smart Growth, European City (<i>embedded in postmodern urbanism debates</i>)	Shared principles: compactness; mixed-use; walkability; public space; connection to overall urban structure; smaller blocks and parcels (Zupan 2018; Calthorpe 1993)	Criticism of social exclusivity, commodification, weak sustainability effects, neo-traditionalism, limited transport impact (Roost 2000; Ellis 2002; Carmona/Tiesdell 2007; Gordon/Richardson 1997; Zupan 2017)	Initial and partial integration: focus on land-use efficiency, compact development and reduction of urban sprawl, ecological concerns present but limited in scope (Edwards/Turrent 2002; Koch 2001)
		New Urbanism: neighbourhood unit; human scale, neo-traditional design, urban mix (Knaap/Talen 2005; Dierwechter/Coffey 2017)		
		Smart Growth: growth management; transit orientation, containment of sprawl (Calthorpe 1993; Gordon/Richardson 1997)		
		European City: perimeter-block structures; corridor streets-define public space, small land parcels, morphological continuity (Siebel 2004; Wentz 2000)		
Contemporary phase (since ~2010)	Sustainable city; 15-minute city; sponge city, integrated urban design; diversity, urban district, circular city, resilient / climate-adaptive models	Integration of density, mixed-use and accessibility, climate adaptation, multifunctional open space, health, governance and participation, landscape (Calthorpe 2011; Carmona 2009; Forsyth 2020; Moreno et al. 2021; Larco 2016; Bentley et al. 2024)	Implementation gaps, conflicts between market forces and public goals, limited steering capacity, lacking flexibility and adaptability, lack of systematic evaluation of the outcomes of „postmodern“ approaches (Altrock 2022; Garde 2020; Xu 2017; Watt 2021)	Dominant and integrative paradigm: includes climate mitigation, adaptation, resource efficiency, social sustainability and health; extends and systematises postmodern principles (Larco & Knudson 2024; Cozzolino et al. 2020; Kamalipour et al. 2023), "reurbanising" lifestyles reflected in relatively dense, compact and functionally mixed urban designs (BBSR 2014)

Table S2: Calculation bases for TSUDAI (cf. Chapter 3.2)

Category	Calculation	Subcategories	Abbreviation	Values*	Note
Functional mix (IF)	$IF = fa/4 + fb/2 + fc/4$	Social infrastructure planned?	fa	Y=1, S=0.5, N=0	
		Mixed use beyond residential facilities planned?	fb	Y=1, N=0	
		Flexible ground floor uses planned?	fc	Y=1, N=0	
Density (ID)	$ID = da/150$	WE/ha based on neighbourhoods without parks and public green spaces	da	da=WE/ha	A density of 150 WE/ha is considered ambitious. Higher values are possible.
Mobility transition (IM)	$IM = (ma + mb + mc + md)/4$	Parking organised in neighbourhood garages?	ma	Y=1, N=0	
		Bicycle promotion planned?	mb	Y=1, N=0	
		Is the neighbourhood car park conceptually organised as an intermodal mobility hub?	mc	Y=1, N=0	
		Sharing approaches planned?	md	Y=1, N=0	
Free space (IO)	$IO = (oa + ob + oc + od)/4$	Traffic-calmed areas planned?	oa	Y=1, S=0.5, N=0	
		Is a networked open space system planned?	ob	Y=1, S=0.5, N=0	
		Special areas planned for ecological functions?	oc	Y=1, S=0.5, N=0	
		Areas designated for appropriation?	od	Y=1, S=0.5, N=0	
Housing construction (IH)	$IH = (ha + hb + hc)/3$	Cooperatives/building groups integrated?	ha	Y=1, S=0.5, N=0	
		Are innovative forms of living planned?	hb	Y=1, S=0.5, N=0	
		High proportion of social housing planned?	hc	>30%=1, <=30%=0	
Process quality (IP)	$IP = (pa + pb + pc)/3$	Dialogue-oriented formats used?	pa	Y=1, N=0	
		Competition with citizen involvement or multi-stage?	pb	Y=1, N=0	
		Concept-oriented land allocation?	pc	Y=1, N=0	

*The evaluation is based on an analysis of the planning documents. Y stands for "Yes", S for "Somewhat" and N for "No". A rating of Y is given if the planning documents indicate that the sub-criterion has been taken into account to a high degree, S if the sub-criterion has been taken into account to an average degree, and N if the sub-criterion has not been mentioned.

Table S3a-I: Locational aspects and urban design features

a. Neighbours (n = 68)			b. Links to surroundings (n = 64)			c. Previous land-use (n = 69)			d. Urban fabric (n = 67)		
	Count	Share		Count	Share		Count	Share		Count	Share
Family houses	61	(90%)	1	6	(9%)	Agriculture	53	(77%)	Block (open)	56	(84%)
Agriculture	54	(79%)	2	23	(35%)	Others	8	(12%)	Row	46	(69%)
Natural area	21	(31%)	3	13	(20%)	Military	2	(3%)	Solitary	35	(54%)
Estate	17	(25%)	4	7	(11%)	Industrial	2	(3%)	Block (closed)	16	(24%)
Commerce	15	(22%)	5	8	(12%)	Irrigation field	2	(3%)	Hybrid	4	(6%)
Others	15	(22%)	>5	7	(11%)	Airport	1	(1%)	Unclear	0	(0%)
Mixed use	3	(4%)				Horticulture	1	(1%)			
e. Building types (n = 66)			f. Public space (n = 65)			g. Functional mix (n = 65)			h. Social infrastructure (n = 65)		
	Count	Share		Count	Share		Count	Share		Count	Share
Line	61	(92%)	Green corridor	48	(74%)	Simple mix	46	(72%)	Kindergarten	65	(98%)
Terraced house	47	(71%)	Community	47	(72%)	Extended mix	17	(27%)	Grocery	42	(64%)
Block	34	(52%)	Central Square	46	(71%)	Pure housing	2	(3%)	School	38	(58%)
Detached double	25	(38%)	Parks	40	(62%)				Misc. Service	27	(41%)
"Villa"	23	(35%)	Private	39	(60%)				Youth	22	(33%)
Detached single	19	(29%)	Decentral square	35	(54%)				Elderly	21	(32%)
Tower	17	(26%)	Meadow [Anger]	17	(26%)				Health	18	(27%)
Hybrid	12	(18%)	Lake	9	(14%)				Religious	7	(11%)
Unknown	0	(0%)	Other	3	(5%)				Other	5	(8%)
i. Special housing (n = 44)			j. Parking (n = 65)			k. Public transport (n = 67)			l. Non-motorised transport (n = 44)		
	Count	Share		Count	Share		Count	Share		Count	Share
Seniors	26	(59%)	Collective Garage	40	(62%)	Bus	53	(79%)	Bike infrastructure	36	(73%)
Mix	17	(39%)	U.-ground Garage	34	(52%)	Metro rail	30	(45%)	Bike network links	28	(57%)
Others	17	(39%)	Street	33	(51%)	Tram	25	(37%)	Pedestrians	25	(51%)
Intergeneration	16	(36%)	Private	22	(34%)	Commuter train	6	(9%)	Mobility impaired	5	(10%)
Students	14	(32%)	Shared lot	4	(6%)				Other	1	(2%)
Refugees	2	(5%)	Others	1	(2%)						

Table S4a-d: Stakeholder, planning tools and processes

a. Informal planning tools (n = 59)			b. Citizen engagement (n = 63)			c. Main developer (n = 55)			d. Stakeholder (n = 59)		
	Count	Share		Count	Share		Count	Share		Count	Share
Masterplan	37	(61%)	Information	59	(94%)	Local government	42	(76%)	Public company	37	(63%)
Competition	20	(33%)	Workshops	59	(94%)	Private	16	(29%)	Construction company	36	(61%)
Competition & Participation	19	(31%)	Online engagement	22	(35%)	Public Cooperation	13	(24%)	Private developer	34	(58%)
Multiple stage competition	13	(21%)	Walks etc.	15	(24%)	Independent (PPP)	6	(11%)	Private individual	30	(51%)
Others	11	(18%)	Others	9	(14%)				Building association	22	(37%)
Competition Study	6	(10%)	Project website	6	(10%)				Cooperative	18	(31%)
			Consultations	4	(6%)						

Table S5: Summary of findings

Themes (cf. Chapter 3) / Analytical categories (cf. Chapter 5)	Findings (cf. Chapter 4 and 5)
Location	Urban expansion projects show a strong spatial concentration in dynamic metropolitan regions and selected growing medium-sized cities and less in stagnating regions are underrepresented. Most projects complement the urban edge and “continue the city” , often on previously undeveloped agricultural land . They are typically embedded in heterogeneous environments and mediate between existing structures and new development through graded transitions. This indicates that location is shaped both by structural demand (growth dynamics) and planning strategies , including public acceptance.
Building structure and use	New urban expansion largely follows compact and dense development principles , often implemented through multi-open block structures combining spatial order with flexibility. At the same time, they respond to peripheral, landscape-dominated contexts through graded densities and morphological transitions . While mixed-use is widely intended , more complex functional mixes (including workplaces beyond local services) remain limited and are mainly found in larger projects and cities.
Open spaces, landscape and nature	Open space systems play a central and often structuring role . Many projects integrate landscape elements into the neighbourhood through continuous green networks , allowing the surrounding landscape to “flow” into the development. Compared to earlier periods, open spaces are more differentiated and multifunctional, combining ecological (e.g. climate regulation, water management) and social functions (e.g. recreation, interaction).
Social aspects and services	Social mix is actively pursued through a combination of housing typologies, special housing forms and, in many cases, subsidised housing . Although social housing is not a new instrument, its renewed prioritisation is evident, with a significant share of projects including quota-based approaches. A broad range of social infrastructure and community-oriented facilities indicates an increasing integration of social objectives into urban development.
Mobility	Mobility concepts show a clear shift towards multimodal and integrated systems , including public transport, cycling infrastructure and shared mobility . Neighbourhood-based parking solutions (e.g. mobility hubs) are increasingly used. At the same time, projects differ in their spatial accessibility : some benefit from proximity to existing transport nodes, while others rely more strongly on newly created infrastructures, reflecting both planning strategies and given locational conditions.
Planning and governance	Planning processes are characterised by increasing complexity and diversification . Multi-stage competitions, framework plans and participatory formats are widely used. A broad range of actors contribute to project development. Municipalities tend to lead, but invite partners such as private, housing companies, cooperatives and building groups . This — indicates a shift towards collaborative and process-oriented forms of urban development .
Sustainability ambition (TSUDAI dimensions derived from the six themes/categories)	Sustainability ambition shows a broad and diverse distribution , indicating that sustainability approaches are pursued across many places and fields. The level of ambition tends to increase with the number of planned housing units , likely due to the greater scale, complexity and visibility of larger projects, which often involve more public attention, protest and justification . Political contexts that prioritise social and environmental goals also appear to support higher ambition levels . At the same time, projects differ considerably in their overall sustainability performance , while factors such as city size, project area and long-term population dynamics appear to play only a limited role .