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From Cities to Distributed Intelligence Landscapes: Hybrid Foresight Through Drawing, Philosophy, and Generative AI

Indrė Gražulevičiūtė-Vileniškė [1,*] and Kastytis Rudokas [2]

[1] Faculty of Civil Engineering and Architecture, Kaunas University of Technology, Studentu St. 48, LT-51367 Kaunas, Lithuania
[2] Institute of Architecture and Construction, Kaunas University of Technology, Tunelio St. 60, Lt-44405 Kaunas, Lithuania; kastytis.rudokas@ktu.lt
* Correspondence: indre.grazuleviciute@ktu.lt

Abstract

This research investigates an alternative approach to long-range urban foresight by employing a hybrid methodology combining deep-time conceptual reflection, exploratory drawing as an epistemic practice, structured interpretative analysis, and AI-assisted dialogical synthesis. The resulting synthesis articulates a theoretically generated post-urban scenario characterized by dispersed human habitation embedded in ecological landscapes, supported by advanced digital connectivity and artificial intelligence. Technologically intensive functions remain concentrated in infrastructural hubs, while everyday life becomes integrated with natural environments through walking-based mobility, bio-inspired architecture, and multispecies coexistence. The proposed model reinterprets urbanity as distributed intelligence within ecological continuity.

Keywords: urban foresight; speculative urbanism; deep-time forecasting; artistic research; human-nature-technology integration

1. Introduction

Contemporary urban studies increasingly operate under conditions of uncertainty. Accelerating ecological degradation, public health crises, technological disruption, geopolitical instability, and deepening social inequalities challenge the long-standing assumptions upon which modern urbanization has been built. In this context, conventional predictive planning tools, largely based on extrapolating short-term trends, prove insufficient for addressing questions related to the distant future of cities, human lifestyles, and the human–nature–technology relationship. As a response to this limitation, futurology and long-range future forecasting have gained renewed relevance within urban science, architecture, and spatial planning.

Foresight involves predicting future trends without necessarily predicting the exact future [1]. In urban research, such speculative foresight serves as a critical instrument: it allows researchers to question dominant paradigms such as continuous densification, metropolitan growth, and functional concentration, and to explore alternative spatial, social, and technological configurations that may become viable, or even necessary, under future conditions. Saffo's forecasting heuristic suggests that the more distant the future horizon, the further into the past one should look [2]. The underlying rationale is that long historical perspectives may reveal recurring patterns beneath apparently novel developments. In this sense, history is used not as a source of direct repetition but as a

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means of identifying structural analogies or "rhymes" that may illuminate possible future transformations. This research was informed by the previous research of the authors. In "Office-Nature Integration Trends and the Forest-Office Concept FO-AM" [3], the focus was placed on future work environments and lifestyles through the lens of health, ecology, and mobility. Drawing inspiration from pre-industrial and pre-sedentary modes of human activity, particularly the hunter-gatherer condition characterized by continuous movement and deep environmental attunement, the study proposed an inversion of the sedentary office paradigm. The forest-office concept explored the possibility that future knowledge work could be performed while walking in natural environments, supported by digital technologies, thereby reconnecting work, health, and landscape. In parallel, the paper "Total Heritage: Future Eopolis for Cultural Urban Singularity" [4] examined future urban form through the concept of Eopolis, originally introduced by L. Mumford [5] as the dawn of urban civilization rooted in village-scale settlement, agriculture, and close human–nature relationships. Reinterpreted through contemporary technological capacities, Eopolis was proposed not as a regression, but as a future-oriented urban condition: a low-density, distributed, culturally embedded settlement structure enabled by advanced connectivity and digital infrastructures.

Building upon these two conceptual lines, the present research advances a more distant and speculative vision of future urban development. By extending the retrospective gaze into the deep past, toward nomadic and hunter-gatherer societies, the study hypothesizes that future human lifestyles may once again become spatially dispersed, mobile, and deeply embedded in natural environments [3]. Such a transformation can be interpreted through the lens of discontinuous change, a concept widely discussed in futures studies and civilizational forecasting [6]. In this perspective, future socio-spatial configurations do not emerge solely through gradual linear evolution but may involve qualitative shifts in which elements of distant historical archetypes are recombined with emerging technological conditions. Accordingly, long-range forecasting models addressing the future of cities or civilizations beyond the so-called "event horizon" often rely on discontinuity-based approaches [7,8]. Historical analyses of major socio-technical transformations, from the emergence of agriculture to the industrial revolution, similarly reveal patterns of discontinuous development that fundamentally restructured human settlement systems [9–11]. In the contemporary context, rapidly expanding technological interconnectedness, artificial intelligence, and autonomous systems may generate comparable structural shifts by reducing the functional necessity for dense human concentration traditionally associated with cities. Under such conditions, large urban agglomerations may gradually cease to function as primary human habitats and instead evolve into infrastructural nodes hosting data centers, automated production systems, and intelligent machines that sustain planetary-scale digital and logistical networks.

Because this research operates in the domain of distant-future forecasting, its research questions cannot be empirical in the conventional sense. Instead, they are exploratory and generative, aimed at testing the plausibility, coherence, and explanatory power of alternative urban imaginaries and research methods. Besides grounding the foresight in developments of the past, this research raises the methodological hypothesis, that distant-future urban visions become more plausible, coherent, and culturally meaningful when they are generated through mixed methodologies that integrate deep historical reflection, embodied creative practices, and artificial intelligence as kind of "cognitive partner". Contemporary future forecasting widely acknowledges the use and benefits of creative practices [12] and the use of AI and particularly Large Language Models (LLMs) in developing future urban scenarios is taking the first steps [13]. In the sphere of qualitative research LLMs are used as "active, dialogic partners" that enhance qualitative research, learning,

and creativity by enabling users to "converse" with text data, identify patterns, and explore new interpretive angles [14]. Thus the following three research questions, focusing on methodological, substantive and theoretical aspects, could be raised. The first methodological question asks how can deep-time philosophical reflection, intuitive drawing, structured interpretation, and LLM-assisted dialogue be combined to generate and critically explore distant-future urban scenarios? The second substantive research question focuses on what alternative spatial, infrastructural, ecological, and socio-cultural configurations are articulated through the resulting post-urban scenario? The third theoretical question asks how does the theoretically generated post-urban scenario challenge established assumptions of contemporary sustainable urbanism, and what tensions and trade-offs arise from its alternative spatial logic? The three research questions reflect the complementary methodological, substantive, and theoretical contributions of the study. The first question is addressed through the hybrid foresight framework developed in Section 3 and its application to the speculative drawing series. The second is explored through the structured interpretation and synthesis of the 23 drawings into the multidimensional post-urban scenario presented in Section 4. The third is addressed through the critical discussion in Section 5, where the proposed scenario is positioned in relation to established sustainable urban paradigms and examined in terms of its conceptual implications, internal tensions, and potential trade-offs. Together, these three levels of inquiry connect the generation of a speculative scenario with its substantive articulation and critical theoretical evaluation.

The aim of this research is to develop and critically explore a theoretically generated post-urban scenario through a hybrid foresight methodology integrating deep-time philosophical reflection, intuitive drawing, structured interpretative analysis, and LLM-assisted dialogue, and to examine its implications for established assumptions about sustainable urban development. The visual component of the study consists of 23 author-generated drawings created by the first author during and following a series of philosophical discussions with the co-author concerning distant-future urban development. The study does not treat drawings as empirical evidence of a future condition, nor as design proposals requiring literal validation. Rather, they are used as researcher-generated speculative artifacts through which tacit, associative, and spatial ideas can be externalized, compared, and subsequently subjected to structured interpretation. Accordingly, the contribution of the study lies not in predicting a definitive future city, but in demonstrating a transparent process through which alternative urban imaginaries can be generated, interrogated, and synthesized into a conceptually coherent post-urban model. Furthermore, the study introduces the use of LLM as "a dialogic and interpretative partner" [14] within this process, expanding the reflective and analytical capacity of speculative urban research. The practical relevance of such speculative inquiry lies not in translating individual drawings directly into planning prescriptions, but in expanding the range of spatial futures that can enter urban debate. Under conditions of deep uncertainty, exploratory visual thinking can make tacit assumptions visible, challenge established planning imaginaries, and generate alternative hypotheses that may subsequently be examined through empirical, participatory, or scenario-based methods. The proposed approach should therefore be understood as an early-stage idea-generation and conceptual exploration method within a broader foresight process rather than as a substitute for evidence-based urban planning.

The study ultimately develops a post-urban model in which human habitation disperses into ecologically embedded landscapes while technologically intensive functions remain concentrated in interconnected infrastructural-intelligence hubs. The model is understood as a distant-future speculative scenario rather than an empirically validated forecast or near-term planning proposition. Here, post-urban refers not to the disappear-

ance of urbanity but to its systemic transformation from spatial concentration toward distributed relational connectivity.

2. Literature Review

Speculative thinking and long-range future forecasting have long been present in urban theory, particularly in moments of systemic crisis or paradigm shift. Scholars in futures studies and urban foresight emphasize that distant-future scenarios should not be understood primarily as precise predictions but rather as critical instruments for reflecting on present trajectories, values, and structural constraints [2]. Within urban history and futures scholarship, several conceptual models of temporal development can be distinguished. Linear models assume gradual and cumulative evolution of socio-spatial systems, whereas cyclical or spiral models emphasize recurring patterns in which earlier forms reappear in transformed configurations [15]. In contrast, "explosion" or discontinuity models highlight the possibility of radical systemic transformation in which future conditions may represent a qualitative break from previous historical trajectories [16]. Although linear and spiral perspectives continue to provide valuable interpretative frameworks, scholars have increasingly noted that such regularities often become visible only retrospectively, after major transformations have already reconfigured the historical landscape and turned the present into history [17,18].

From this perspective, some speculative approaches propose a more complex temporal relationship between present and future, suggesting that emerging futures may exert anticipatory influence on present imaginaries and development pathways. In this view, elements of possible futures appear not only as consequences of current actions but also as signals or projections that shape present thinking about transformation processes. Such interpretations emphasize the anticipatory role of future imaginaries, whereby expectations and representations of possible futures can influence present thinking and development pathways [19]. In this sense, the future operates not only as something that will occur but also as a conceptual horizon that already influences present dynamics and expectations [10,20]. Consequently, the linear or spiral trajectories that we observe within our own historical moment may later appear as only partial components of broader transformation processes that remain difficult to detect or measure in the present [8,21]. This perspective is particularly relevant for exploring distant urban futures, where emerging technological and ecological conditions may simultaneously revive deep historical archetypes while enabling unprecedented spatial and social arrangements.

Recent urban foresight research increasingly emphasizes the limits of extrapolative forecasting in the face of ecological breakdown, technological acceleration, and social transformation. As a result, speculative and scenario-based approaches have gained legitimacy as complementary tools to empirical urban analysis [22]. However, much of this work remains text-based and discursive, with limited engagement in visual or embodied modes of knowledge production.

Within architecture and design research, drawing has historically served not only as a representational medium but also as a cognitive instrument for thinking, reasoning, and discovery. Design research literature increasingly recognizes sketches, diagrams, and speculative drawings as vehicles for tacit knowledge, enabling designers to explore relationships, atmospheres, and spatial logics that resist full verbalization. In speculative and conceptual design practices, drawing allows for ambiguity, multiplicity, and emergence [23]—qualities particularly valuable when addressing distant or uncertain futures. Despite this recognition, the epistemic role of drawing is often under-theorized in urban studies, where visuals are typically treated as illustrations rather than as active contributors to theory-building or future forecasting.

The rapid emergence of generative artificial intelligence has begun to reshape architectural and urban research methodologies. Recent studies explore the use of image-based generative models for conceptual design [24–26], sketch-to-architecture workflows [27,28], and urban form generation [13] as well as LLM for textual synthesis [29], precedent retrieval [30], evaluation of images [31] and design reasoning support [32–34]. A growing body of research positions LLMs as conversational or dialogic "partners" in design processes, capable of supporting iterative exploration, critique, and reflection [32,33]. In architectural design studios and computational design research, LLMs have been tested as interfaces for parametric modeling, early-stage ideation, and collaborative discussion [35]. These studies demonstrate that AI systems can participate meaningfully in creative and analytical workflows when embedded in human-in-the-loop processes [36].

At the same time, most existing applications of generative AI in architecture and urbanism design and theory remain focused on efficiency, automation, or optimization. AI systems are typically employed to accelerate conventional workflows [24,29,35,37] rather than to expand epistemological horizons or engage with philosophical and deep-time questions.

Across the reviewed literature, three methodological strands emerge:

(1) Speculative and philosophical discussion as a tool for future-oriented inquiry;
(2) Drawing and visual speculation as a medium for tacit and embodied knowledge;
(3) Generative AI as a cognitive amplifier capable of synthesis, iteration, and dialogue.

While each strand has been explored independently, their full integration remains rare. Existing research seldom treats drawing as a primary knowledge generator and positions AI as an interpretative, dialogic participant in making sense of these visual and conceptual explorations. Likewise, urban futures research has only begun to engage generative AI beyond trend extrapolation or visual rendering. This gap suggests an opportunity for methodological innovation.

3. Research Methodology

This research employs a mixed speculative foresight methodology integrating philosophical deep-time reflection, intuitive hand drawing as an epistemic practice, and dialogical interaction with a LLM. The aim is not to predict a singular future scenario but to generate and critically interpret coherent distant-future urban imaginaries grounded in historical analogies and embodied creative exploration.

The research process extended from 2020 to 2026: the initial philosophical discussions and intuitive drawings were developed primarily in 2020–2021, while their structured interpretation and LLM-assisted synthesis were undertaken in 2026, when advances in generative AI enabled the material to be revisited through a new analytical lens. The inquiry originated in the Lithuanian cultural and geographical context and therefore incorporates locally grounded references, particularly Baltic heritage archetypes; however, the proposed post-urban principles are explored as potentially transferable beyond this specific context. The future horizon was intentionally left open-ended, referring to a distant future beyond conventional planning horizons rather than to a predefined target year.

The methodology unfolds through four interrelated stages: (1) deep-time conceptual framing; (2) intuitive drawing as generative exploration; (3) structured interpretative analysis, and (4) AI-assisted dialogical synthesis. These stages form an iterative rather than linear process, enabling reflexive refinement of hypotheses and spatial concepts. The structure of research methodology is presented in Figure 1 and its main steps are described below.

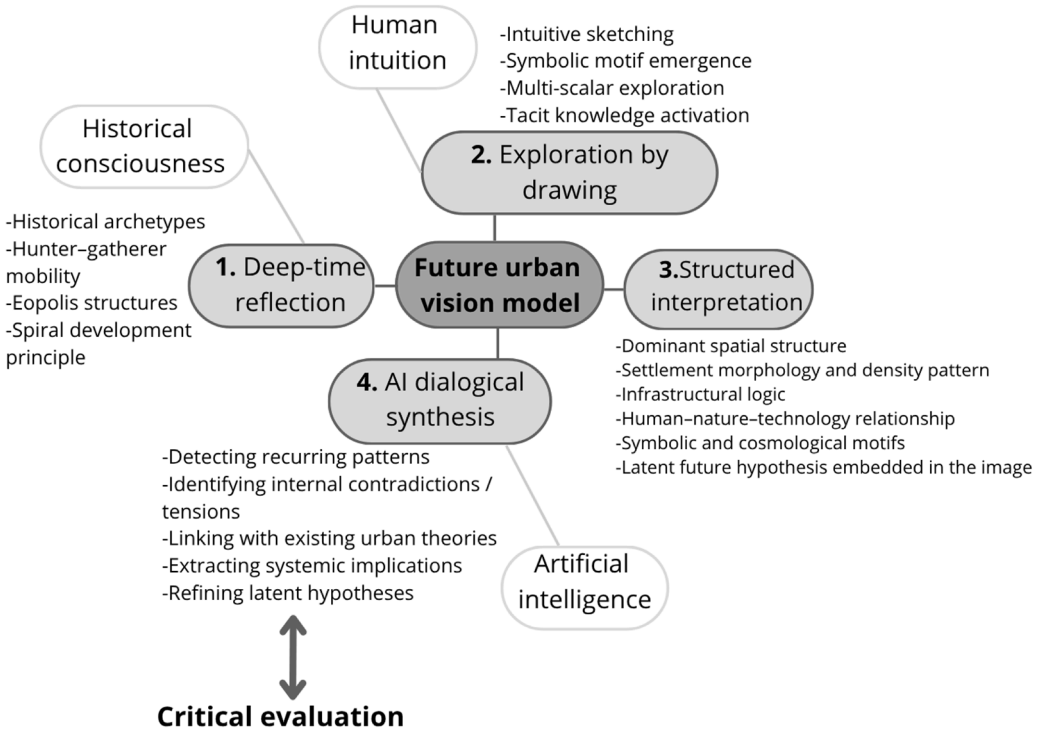

Figure 1. The structure and the main steps of the research methodology. Figure by the authors.

3.1. Deep-Time Futurological Framing

The research begins with a theoretical reflection grounded in a forecasting heuristic of long-range futurology: the more distant the future horizon under consideration, the deeper into the past one must look [2]. Human development is treated not as linear progression but as a spiral dynamic in which earlier modes of living re-emerge in technologically transformed forms. Two deep historical reference layers informed the conceptual framework: pre-urban village structures (Eopolis-type settlements) [5] and hunter-gatherer mobility patterns and environmental embeddedness. These were analyzed not as nostalgic models but as structural archetypes that may reappear under conditions of advanced technological interconnectivity and artificial intelligence. This stage generated initial conceptual hypotheses regarding dispersed settlement patterns, walking-based work practices, rewilded territorial organization, and the potential relocation of infrastructural functions from human-centered cities to technological hubs.

3.2. Intuitive Drawing as Generative Epistemic Practice

A series of hand drawings was produced as exploratory cognitive artifacts. Drawing was treated not as illustration but as a mode of inquiry capable of revealing tacit knowledge and spatial relationships that resist immediate verbal articulation. The drawing phase did not begin from a theoretically neutral or hypothesis-free position. Prior work and the initial philosophical discussions had already established several provisional premises, particularly the possibility of dispersed settlement, technologically supported landscape-embedded lifestyles, walking-based work, and the concentration of selected infrastructural functions in technological hubs. The purpose of drawing was therefore not to independently verify or rediscover these premises, but to explore their spatial implications and to allow additional relationships, forms, and propositions to emerge through visual inquiry. Accordingly, the study distinguishes between propositions originating in the initial conceptual framing and those subsequently elaborated or generated through the drawing-based and dialogical stages. The visual material comprised 23 drawings produced exclusively by the first author during and following a series of informal philosophical discussions between the two

authors on distant-future urban development in 2020–2021. Created manually on A4 paper using pencil, ink, markers, and ballpoint pens, the drawings were not generated through workshops, teaching activities, or stakeholder participation, but functioned as researcher-generated exploratory artifacts through which ideas emerging from the discussions of authors could be intuitively developed, transformed, and extended beyond their initial verbal formulation. No fixed time limit or predetermined representational scale was imposed on individual drawings; A4 paper was used consistently as a practical format allowing both spontaneous sketching and more elaborated visual exploration. The first author's combined architectural and artistic background informed this mode of visual inquiry. All 23 drawings produced within this exploratory series were retained for analysis.

The drawing process deliberately moved between spatial scales—from territorial and settlement structures to architecture and habitation—and between levels of abstraction, ranging from symbolic and philosophical imagery to more concrete urban and architectural configurations. The drawing process was intentionally open-ended and symbolic, allowing motifs such as neural networks, mycelium-like infrastructures, mounds as focal points, biomorphic technological structures, and walking-based mobility systems to emerge organically. The drawings operated across multiple scales: symbolic/cosmological (interconnected intelligence, fractality); territorial (density gradients, infrastructural nodes); architectural (biomorphic habitats, hidden technology).

The drawings were not intended as realistic representations or design proposals for future settlements, but as deliberately open-ended speculative artifacts whose ambiguity, abstraction, and intuitive character enabled spatial and relational ideas to emerge before being subjected to structured interpretation. Thus, additional spatial and relational hypotheses emerged visually beyond those established in the initial conceptual framing and were articulated explicitly only during the subsequent interpretative stages.

3.3. Structured Interpretative Protocol

Following the generative drawing phase, a structured interpretative protocol was applied to each drawing as a researcher-generated visual artifact. The protocol functioned as an analytical bridge between intuitive visual exploration and subsequent cross-drawing conceptual synthesis, introducing a consistent set of interpretative dimensions across the complete series of 23 drawings. Each drawing was examined in terms of: (1) spatial scale; (2) interpretative domain; (3) core motif; (4) structural principle; (5) interpretative rationale; and (6) tentative future hypothesis. The analytical dimensions were selected to progressively move from relatively descriptive properties of each drawing toward increasingly interpretative propositions. Spatial scale identifies the level at which the depicted configuration operates (architectural, settlement, territorial, multi-scale, not scale-specific, or combinations of these where appropriate), while interpretative domain identifies the principal thematic field addressed by the image, such as ecological, infrastructural, cultural, anthropological, multispecies, ontological, or networked-intelligence relations. The core motif records the dominant visually identifiable element, whereas the structural principle describes the spatial or relational logic suggested by the organization of these elements. An interpretative rationale was added to make explicit the analytical step connecting the observable visual material with its interpretation, before formulation of the latent future hypothesis. The categories therefore establish a progressive analytical sequence from visual description to spatial-relational interpretation and, finally, to speculative proposition, while preserving traceability to the original drawing.

The resulting drawing-level hypotheses were treated as provisional interpretations rather than findings in themselves and subsequently subjected to cross-drawing comparison, LLM-assisted dialogical synthesis, and researcher evaluation. For the purposes of

this study, coding was conducted through the above-mentioned predefined interpretative dimensions—spatial scale, interpretative domain, core motif, structural principle, interpretative rationale, tentative future hypothesis—which functioned as consistent analytical categories applied to all 23 drawings; recurrent patterns across these drawing-level codes were subsequently compared and clustered into the higher-order thematic dimensions presented in the Results section. The interpretative coding was intentionally researcher-led rather than designed as an inter-coder reliability procedure. Because the drawings function as researcher-generated speculative artifacts intended to externalize tacit and associative thinking, the author's situated interpretation forms part of the knowledge-production process rather than constituting a variable that can be fully eliminated. To reduce arbitrariness within this necessarily subjective process, the same analytical sequence was applied to all drawings, all 23 drawings were retained, interpretations were required to remain traceable to visible motifs.

3.4. AI-Assisted Dialogical Synthesis

Following the structured interpretation of the 23 drawings, the resulting analytical descriptions were introduced into an iterative dialogue with a Large Language Model. The AI-assisted analytical dialogue was conducted through the ChatGPT (OpenAI, San Francisco, CA, USA; standard default web interface; continuously updated service) conversational interface [38]. Because the exploratory dialogue developed iteratively over an extended period and across successive platform updates, more than one underlying ChatGPT model contributed to the process, and the exact model version associated with every earlier conversational iteration cannot be retrospectively established. The final methodological synthesis and manuscript revision reported in this article were conducted using GPT-5.6 Sol in 2026. The LLM stage was designed as a secondary interpretative procedure rather than as primary data generation: the original drawings and their initial coding remained human-generated, while the model was used to interrogate relationships across the resulting visual–conceptual dataset. The LLM was provided with both the original drawings as visual inputs and the researcher-generated textual interpretations developed through the structured analytical protocol. This dual input was intentional: alongside comparing and synthesizing the researchers' structured interpretations, the model was invited to inspect the visual material directly and to identify potentially relevant motifs, relationships, or alternative interpretations that might not have been explicitly recognized in the initial researcher-led analysis. LLM-generated visual interpretations were not treated as independent findings or accepted automatically, but were compared with the drawings, the structured interpretations, and the broader conceptual framework and subsequently accepted, reformulated, or rejected by the researchers. The interaction was conducted through the ChatGPT conversational interface in a continuous iterative dialogue rather than through API-based automated analysis. The multimodal input enabled the LLM to function not only as a synthesizer of researcher-generated textual interpretations but also as an additional interpretative perspective on the drawings themselves. This was intended to widen the range of possible readings and to expose visual relationships that might have remained implicit or unnoticed in the initial researcher interpretation. Nevertheless, because the researchers retained responsibility for evaluating and integrating these propositions, the procedure is understood here as a form of dialogical triangulation rather than as independent validation.

The dialogue proceeded through subsequent analytical operations. 1. Cross-drawing pattern identification: the structured descriptions of the drawings, including scale, core motif, structural principle, and extracted future hypothesis, were presented to the LLM and compared for recurring spatial, ecological, technological, anthropological, and symbolic

patterns. 2. Relational and critical interrogation: the model was prompted to identify connections, tensions, contradictions, and ideas appearing across multiple drawings rather than treating each visual artifact independently. 3. Conceptual clustering followed by 4. system synthesis: recurrent patterns were progressively grouped into broader dimensions capable of describing the emerging post-urban system, including territorial structure, architectural and infrastructural configurations, lifestyle patterns, intelligence networks, and ontological/cultural–temporal principles. 5. Theoretical articulation and positioning: the emerging synthesis was discussed in relation to concepts from urban theory, futures studies, heritage, biophilic thinking, and human–nature–technology relations, allowing implicit visual propositions to be translated into explicitly formulated hypotheses.

To increase the transparency and procedural reproducibility of the AI-assisted stage, the dialogical synthesis was formalized as a human-in-the-loop analytical protocol (Figure 2). The protocol specifies how the structured interpretations of the 23 drawings were interrogated through the LLM, critically evaluated by the researchers according to explicit analytical criteria, and progressively transformed into higher-order thematic dimensions contributing to the integrated post-urban model.

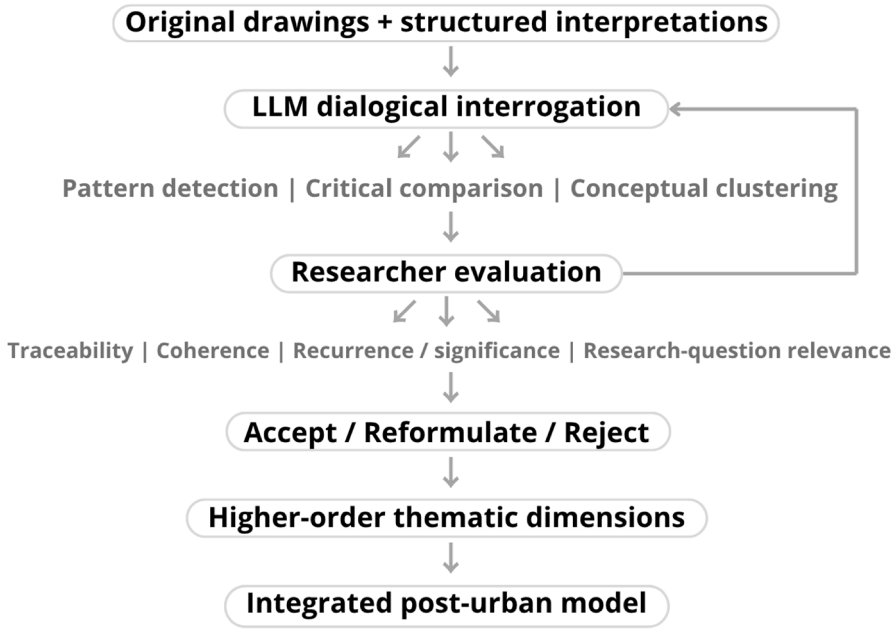

Figure 2. Human-in-the-loop protocol for AI-assisted dialogical synthesis and development of the integrated post-urban model. Figure by the authors.

LLM responses were treated as interpretative propositions rather than research findings in themselves. A proposition was retained for further consideration when the researchers considered it (1) traceable to one or more drawings or their structured interpretations; (2) analytically relevant to the preceding philosophical framing, whether supporting, extending, qualifying, or challenging its initial premises; (3) recurrent across the visual material or conceptually significant despite occurring in a single drawing; and (4) relevant to the research questions. Contradictory or counter-propositions were therefore not excluded because they challenged the initial framing; rather, they were examined for their traceability to the visual material and used, where relevant, to qualify or reformulate the emerging synthesis. The researchers therefore retained responsibility for coding decisions, conceptual categories, theoretical interpretation, and the final post-urban model. Representative prompts and their analytical functions are reported in Table 1 to make the AI-assisted stage traceable.

Table 1. Application of the LLM in different analytical stages of the research process. Table by the authors.

Analytical Stage	Input to LLM	Representative Prompt/Question	Function in Analysis	Researcher Treatment of Output
Cross-drawing comparison	Original drawings and their structured interpretations	"What recurring spatial and conceptual patterns can be identified across these drawings and their structured interpretations? Are there visual relationships or motifs not captured by the initial interpretations? "	Identify recurrent motifs	Retained only when traceable to visual material
Critical interrogation	Emerging interpretations	"What tensions or contradictions can be identified within this emerging future vision?"	Challenge internal coherence	Discussed and accepted, rejected, or reformulated by authors
Conceptual clustering	Full set of interpreted drawings	"How could these recurring patterns be grouped into broader dimensions of a post-urban system?"	Develop higher-order categories	Categories reviewed and refined by authors
System synthesis	Validated thematic dimensions	"What systemic relationships connect territorial structure, architecture, lifestyle, infrastructure, intelligence, and ontological principles?"	Explore relationships between categories	Used to support development of the theoretical model of the post-urban system
Theoretical positioning	Validated synthesis	"How do these propositions relate to established urban and futures theories?"	Connect emergent concepts with literature	Checked against scholarly literature

4. Results

To ensure analytical transparency and to demonstrate the systematic interpretation of the 23 speculative drawings (Figure 3), produced in the course and after philosophical discussions of the authors, each visual artifact was examined through the structured protocol described in the step 3 of the methodology. High-resolution reproductions of the individual drawings together with authors' original interpretative annotations are provided in the Appendix A to enable inspection of the visual material underlying the structured interpretations presented in Table 2.

Table 2 demonstrates that the drawings consistently converge around a limited set of recurring structural principles, networked intelligence, density gradients, polycentric infrastructural hubs, biomorphic architecture, multispecies coexistence, and heritage-based focal points. The propositions reported in Table 2 and developed in the following subsections should therefore be read as outcomes of a structured speculative foresight process rather than as empirically demonstrated trajectories of urban development.

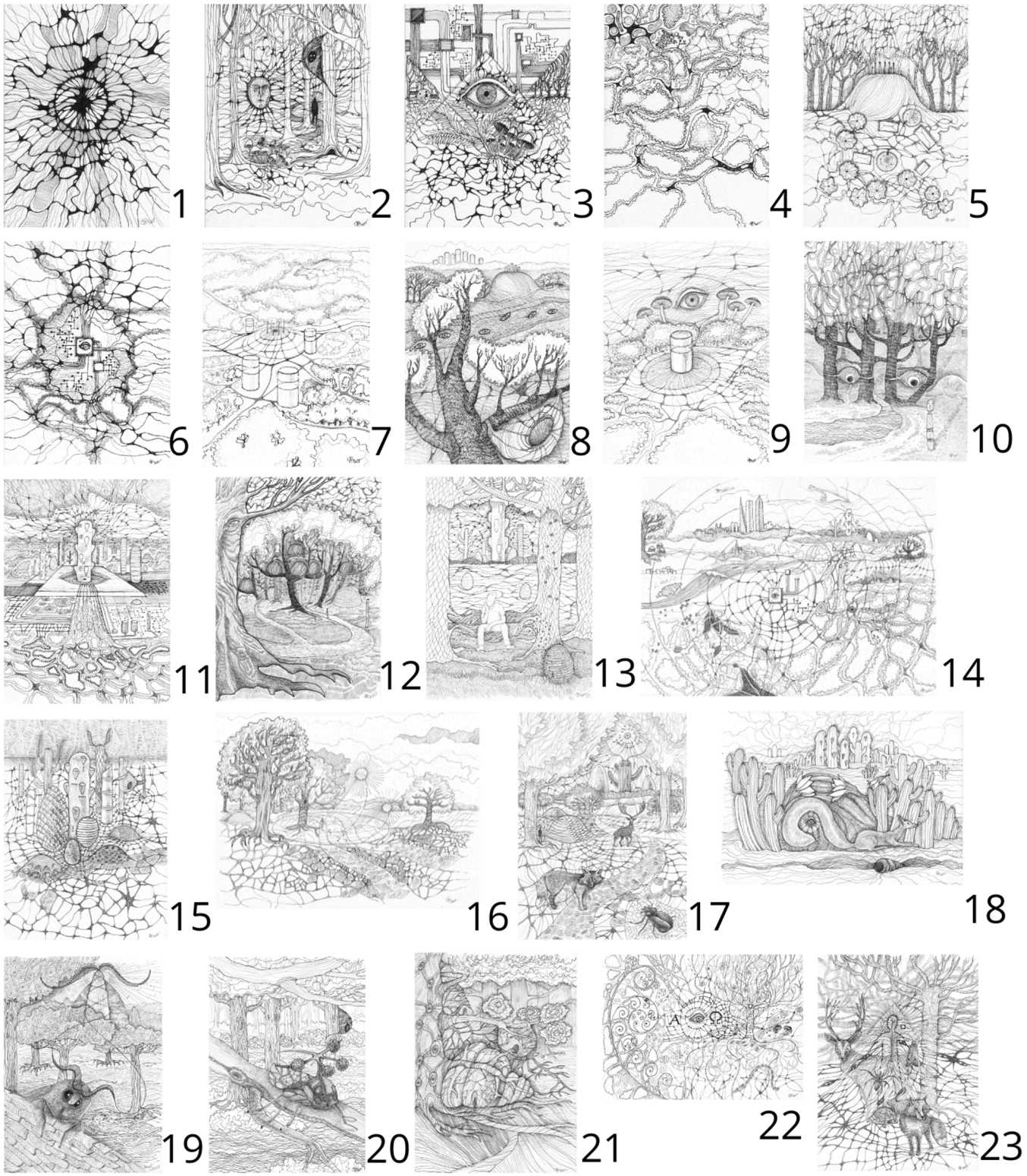

Figure 3. The results of the exploratory drawing—the step 2 of the methodology. Figure by the authors (**1**–**23**).

Table 2. Structural interpretation of the speculative drawing series. Table by the authors.

No.	Spatial Scale	Interpretative Domain	Core Motif	Structural Principle	Interpretative Rationale	Drawing-Level Future Hypotheses
1	Not scale-specific	Networked intelligence/ Ontological	Neural web	Networked core–periphery	A neural-like central structure branches into a continuous surrounding web, visually emphasizing connectivity rather than bounded spatial units	Digital connectivity reduces dependence on spatial concentration
2	Architectural/ settlement	Ecological/ Networked intelligence	Forest–network	Bio-digital integration	Human habitation is embedded within a forest whose trees, fungi and symbolic faces form a continuous communicative environment	Habitation embedded in ecological intelligence
3	Multi-scale	Infrastructural/ Networked intelligence	Eye + circuits	Mycelial infrastructure	Biological forms, circuitry and settlement elements are visually superimposed, suggesting analogous natural and technological networks operating across scales	Technology mirrors natural networks
4	Territorial	Infrastructural/ Ecological	Density gradient	Hub-to-wilderness transition	A differentiated landscape grades from concentrated technical areas through dispersed habitation toward less intensively occupied natural territories	Post-urban regions structured by decreasing intensity
5	Settlement/ landscape	Cultural/ Ecological	Sacred mound	Heritage node	Vernacular-scale habitation, cultivated elements, trees and a mound-like focal point combine continuity with the past and ecological embeddedness	Archaic morphology guides future settlement
6	Territorial	Infrastructural/ Ecological	Embedded hub	Ecological-digital core	A concentrated technological core dissolves outward into increasingly organic and less infrastructurally intensive landscape patterns	Infrastructure concentrated but ecologically integrated

Table 2. *Cont.*

No.	Spatial Scale	Interpretative Domain	Core Motif	Structural Principle	Interpretative Rationale	Drawing-Level Future Hypotheses
7	Settlement/ territorial	Cultural/ Infrastructural	Dome + cylinders	Rural-technical coexistence	Technical structures cluster around a mound-like communal landmark while habitation remains dispersed within a predominantly natural landscape	Cities evolve into infrastructural islands
8	Territorial/ landscape	Networked intelligence/ Ecological	Watching landscape	Distributed awareness	Repeated eyes embedded in trees and terrain distribute the motif of perception across the landscape rather than locating it in a single human observer	Territory as cognitive field
9	Settlement/ territorial	Infrastructural/ Networked intelligence	Mini-hubs	Polycentric structure	A small technological node is embedded within branching paths, vegetation, fungi and an observing eye, linking distributed infrastructure with shared connectivity	Urban functions fragment into nodes
10	Architectural/ landscape	Cultural/ Infrastructural	Hidden technology	Technological invisibility	Tree habitats, archaic imagery and a totemic object conceal technological functions within an apparently prehistoric or vernacular environment	Complexity becomes culturally camouflaged
11	Architectural/ settlement	Infrastructural/ Ecological	Biomorphic hub	Bio-megastructure	A concentrated technological hub combines server/production functions with biomorphic structures and neural-like connections extending into the surrounding landscape	Data centers evolve ecologically
12	Architectural/ landscape	Ecological/ Cultural	Solar path	Walking infrastructure	Tree habitation, primitive-hut forms, moving paths and a multifunctional totem combine archaic dwelling imagery with concealed advanced systems	Work integrates with movement

Table 2. *Cont.*

No.	Spatial Scale	Interpretative Domain	Core Motif	Structural Principle	Interpretative Rationale	Drawing-Level Future Hypotheses
13	Architectural	Ecological/ Multispecies	Grown habitat	Co-evolution	Trees and other biological forms appear as active producers of furniture, habitats and functional structures rather than as passive surroundings	Architecture becomes cultivated
14	Multi-scale	Cultural/ Infrastructural	Temporal layering	Multi-era coexistence	Different settlement types and historical forms coexist around an interconnected technological center, producing a visibly multi-temporal territorial system	Past and future overlap spatially
15	Architectural	Ecological/ Infrastructural	Biomorphic verticality	Climate-responsive morphology	Multiple biological analogues including egg, bamboo, shell, pinecone, beehive and insect forms are translated into interconnected architectural and technical typologies	Form adapts to biome logic
16	Landscape/ territorial	Anthropological/ Mobility	Moving path	Walking-based life	Human work and contemplation occur while walking through nature, while paths themselves become both movement infrastructure and inhabited space	Sedentary office dissolves
17	Landscape/ settlement	Multispecies/ Networked intelligence	Multispecies web	Non-anthropocentric system	Humans, animals, vegetation, paths and organic structures occupy a shared neural-like field without a visually dominant human center	Settlement includes non-human agency
18	Architectural/ landscape	Ecological/ Biomimetic	Cactus forms	Climate biomorphism	Cacti, shells and animal-like forms provide climate-responsive morphological analogues for habitats and technical structures	Architecture varies by ecosystem

Table 2. *Cont.*

No.	Spatial Scale	Interpretative Domain	Core Motif	Structural Principle	Interpretative Rationale	Drawing-Level Future Hypotheses
19	Architectural/ landscape	Multispecies/ Biomimetic	Insect–hub analogy	Organismic infrastructure	The technological hub echoes the morphology of the foreground insect, visually linking non-human form with technological architecture	Machine morphologies converge with biology
20	Architectural/ landscape	Multispecies/ Ecological	Insect intelligence	Multispecies coexistence	Human presence is visually subordinate within a forest habitat dominated by trees and an intricate insect form, suggesting low-density multispecies coexistence	Humans as one ecological agent
21	Architectural	Ecological/ Multispecies	Grown dwellings	Biological construction	Habitable organic structures appear to grow directly from trees and forest matter, positioning the forest as an active agent in habitat production	Forest co-produces habitat
22	Not scale-specific	Ontological/ Networked intelligence	Fractal network	Self-similarity	Fractal, spiral, vegetal, ocular and network motifs merge into a single field, visually expressing a common organizational logic across otherwise different entities	System operates fractally across scales
23	Not scale-specific/ landscape	Multispecies/ Networked intelligence	Cross-species neural web	Shared consciousness	Humans, animals, trees and technological/ network motifs are linked within one continuous web, dissolving clear boundaries between different forms of agency	Intelligence becomes relational field

The transition from drawing-level observations to higher-order thematic dimensions followed an iterative interpretative process. First, the visible motifs and spatial relationships identified in each drawing were translated into structural principles and provisional future hypotheses through the consistent analytical framework presented in Table 2. These drawing-level interpretations were then compared across the complete series to identify recurring patterns, conceptual affinities, and relationships extending beyond individual images. Through LLM-assisted dialogue, related propositions were provisionally clustered into broader thematic groups, while their coherence, overlaps, tensions, and relationship to the initial conceptual framing, including possible contradictions were critically examined. The researchers subsequently reviewed and refined these groupings, retaining or

reformulating propositions according to their traceability to the visual material and conceptual significance. This process resulted in six interrelated higher-order dimensions of the post-urban scenario, rather than six predefined analytical categories. Figure 4 illustrates representative pathways through this interpretative process, while Figure 5 presents their integration into the final conceptual model.

Because the LLM interaction developed as an iterative exploratory dialogue rather than as a predefined experimental coding procedure, individual conversational propositions were not prospectively registered as discrete units for quantitative counting. Consequently, retrospective counts of generated, accepted, reformulated, and rejected propositions would imply a level of procedural quantification that was not part of the original research design. Figure 4 therefore reports representative examples of these decision pathways, while the revised methodology documents the criteria by which LLM-generated propositions were evaluated.

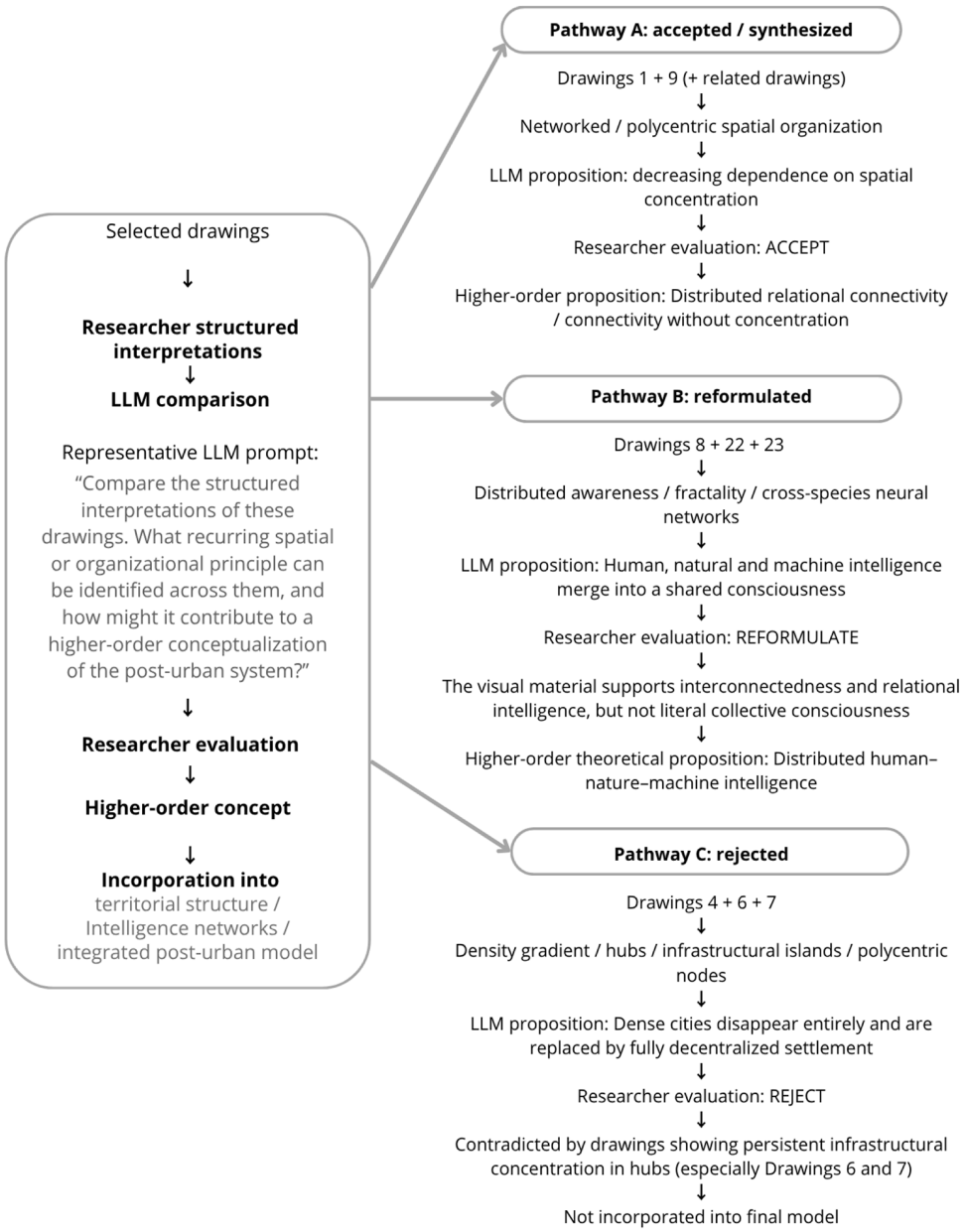

Figure 4. Representative analytical pathways from drawing-level interpretations through LLM-assisted comparison and researcher evaluation to accepted, reformulated, or rejected theoretical propositions. Figure by the authors.

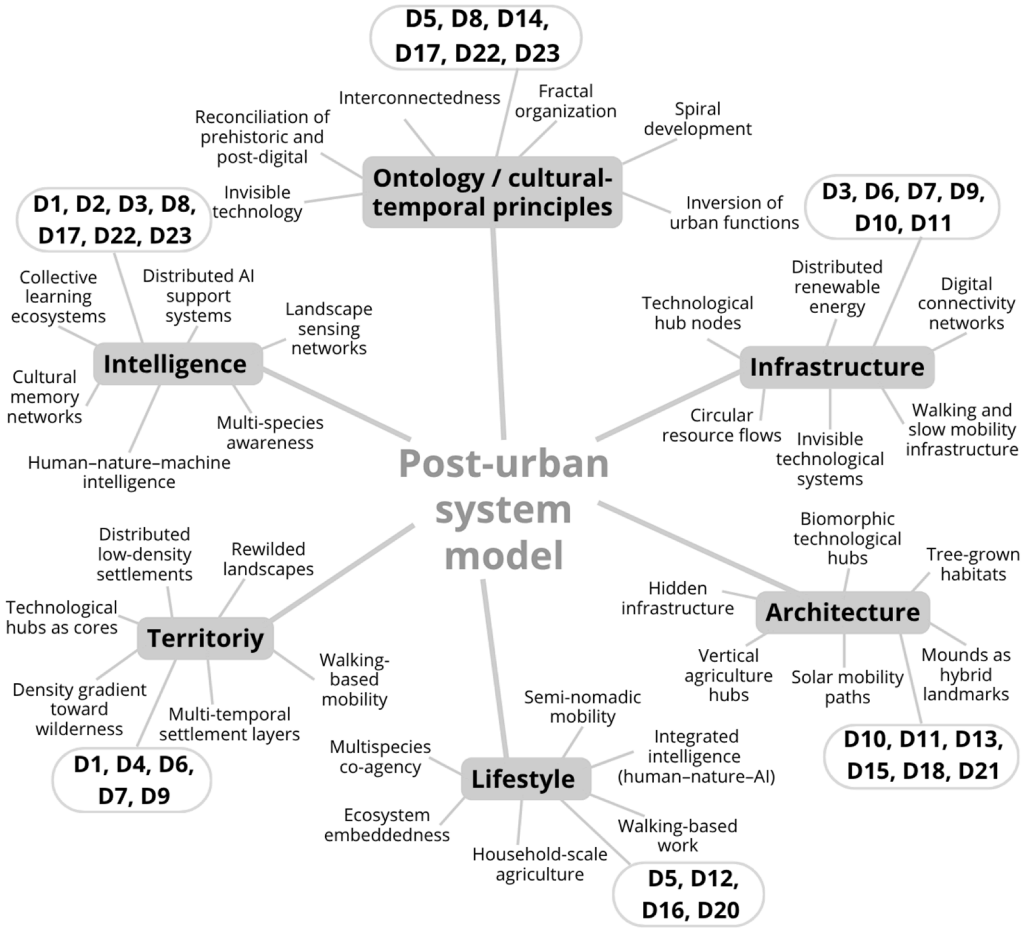

Figure 5. The theoretical model of the post-urban system. Figure by the authors.

This process helped to identify latent conceptual connections between drawings, clarify systemic relationships between spatial, technological, and anthropological elements, and position these emerging patterns within broader debates in urban theory and futures studies. The following subsections, therefore, represent a synthesized interpretation resulting from the interplay between visual exploration, analytical reflection, and AI-assisted dialogue. Accordingly, the six dimensions presented below should be understood as theoretical propositions derived from the drawing series and its subsequent interpretative synthesis, rather than as empirically established characteristics of future urban development. In each subsection, the principal source drawings and drawing-level interpretations are identified to make the analytical basis of these propositions explicit.

4.1. Structural Characteristics of the Future Urban Model

The drawing series articulates a theoretical proposition of a distributed territorial structure, most explicitly expressed in Drawings 1, 4, 6, 7, 9, 12, 16 (Table 2; Figure 5, Appendix A). Across these drawings, networked core–periphery relations, density gradients, polycentric nodes, and walking-based mobility converge toward a spatial logic in which permanent human concentration becomes less necessary. Within the proposed scenario dense metropolitan agglomerations are replaced by a nodal system composed of small-scale settlements embedded within natural ecosystems and interconnected through advanced digital infrastructures. A defining spatial principle is the density gradient: infrastructural intensity is concentrated in technological hubs, while settlement density progressively decreases toward zones of rewilded nature. Rather than forming continuous urban fabric, built structures are envisioned as dispersed clusters intended to preserve

ecological permeability and landscape continuity, although these outcomes would depend on their spatial arrangement and infrastructural footprint. The distributed character of the system does not imply spatial homogeneity or the complete absence of hierarchy. Rather, different degrees of infrastructural intensity persist across the territory: technologically intensive hubs form functional nodes within a wider distributed network, while human habitation and everyday activities remain more dispersed. The proposed system is therefore relational and polycentric rather than strictly non-hierarchical. The dispersed territorial structure proposed here should not be interpreted as a return to hunter-gatherer population densities or subsistence patterns. The scenario assumes a technologically advanced society in which dispersed habitation is supported by a combination of localized food cultivation and highly automated, resource-efficient food production concentrated within technological hubs. No specific future population density is proposed, since the model explores a distant spatial possibility rather than a demographic forecast. Contemporary processes of depopulation and urban shrinkage, including those documented in Lithuania, may provide partial analogies for reduced spatial concentration but should not be interpreted as direct trajectories toward the speculative condition proposed here.

Mobility within this system is reorganized around pedestrian movement, assisted pathways, and low-impact energy systems (Drawing 6). The territorial structure thus prioritizes ecological integration, reduced material footprint, and cognitive connectivity over physical concentration. Connectivity does not replace proximity; it reduces the requirement for permanent spatial concentration. The resulting morphology represents a post-urban condition in which connectivity intensifies as spatial density decreases.

4.2. Ontological and Cultural–Temporal Principles

A second, more explicitly theoretical proposition emerges primarily from Drawings 5, 8, 14, 17, 22, and 23 (Table 2; Figure 5; Appendix A). Recurring neural, mycelial, fractal, and cross-species motifs were interpreted as articulating a form of relational intelligence distributed across human, ecological, and technological systems. Within the proposed scenario, artificial intelligence is imagined not as external to nature but as part of an increasingly interconnected informational environment. Concepts such as "distributed consciousness" or "shared consciousness" are used metaphorically and exploratively, referring to distributed relationships of information, perception, and agency rather than a literal unified consciousness.

Time is also reconceptualized. Historical layers—prehistoric, vernacular, industrial, digital—are not erased but coexist within a non-linear temporal field. Discontinuous transformations therefore do not simply replace earlier stages of development but retrospectively illuminate their latent structures, allowing historical archetypes to gain new meaning within emerging technological conditions. The future does not replace the past; it reinterprets and intensifies its latent structures. The city thus transforms from a monument of concentration into a field of relational intelligence.

4.3. Architectural and Infrastructural Typologies

The drawing series including Drawings 10, 11, 13, 15, 18, 21 (Table 2; Figure 5, Appendix A) proposes a transition from rectilinear, extraction-oriented construction toward biomorphic and adaptive typologies. Technological hubs—hosting data centers, communication systems, and automated production—function as infrastructural cores. Within the scenario, these hubs adopt bio-inspired geometries and material logics intended to reduce visual discontinuity with surrounding landscapes, although their ecological performance would depend on actual resource consumption, material systems, and infrastructural requirements. Residential and work environments appear as small-scale,

climate-responsive structures integrated within forests, hills, and agricultural clearings. In some scenarios, dwellings are imagined as partially grown, adaptive, or co-produced with biological systems, symbolizing a shift from domination over nature to co-evolution with it.

Infrastructure becomes increasingly invisible. Complex technological systems are embedded beneath landscapes or disguised within vernacular-like forms, allowing the experiential surface of the environment to remain natural, tactile, and culturally resonant. The infrastructural system operates at complementary levels rather than being either fully concentrated or fully dispersed. Resource- and technology-intensive functions, such as data processing, automated production, major energy systems, and logistical coordination, remain concentrated in specialized hubs, while lighter connective infrastructure, including communication networks, sensors, local energy and mobility systems, and smaller technical nodes, is distributed across the inhabited landscape. "Invisible infrastructure" therefore does not imply immaterial infrastructure: it refers to systems that are physically embedded within buildings, paths, landscape structures, underground networks, or biomorphic and vernacular-like architectural forms, reducing their visual dominance while retaining their material presence. In relation to research question 4, the model therefore differentiates between concentrated resource-intensive functions (data processing, automated production, major energy and logistical systems) and distributed everyday functions (habitation, knowledge work, local mobility, small-scale cultivation, and digitally mediated communication). The architectural language thus reflects technological sophistication combined with ecological humility.

4.4. Human Lifestyle and Anthropological Model

Taken together, these drawing-level interpretations (particularly Drawings 5, 12, 16, and 20; Table 2; Figure 5; Appendix A) were synthesized into the higher-order proposition that the proposed urban transformation implies a corresponding anthropological shift. Human life becomes less sedentary and less spatially centralized. Work, including knowledge-based tasks, is no longer confined to enclosed office spaces but is integrated into movement through natural environments, supported by portable devices and AI systems. Walking emerges as both a functional and contemplative mode of existence. Physical activity, ecological awareness, and cognitive work converge, recalling pre-industrial and even pre-urban modes of human mobility while being technologically augmented.

Although projected into the distant future, this lifestyle scenario has partial precursors in contemporary remote work and digital nomadism, which already demonstrate that digitally mediated knowledge work can weaken the fixed spatial relationship between employment and conventional workplaces. These present tendencies do not validate the proposed post-urban scenario, but indicate an existing socio-technological trajectory from which more radical forms of spatially flexible and landscape-embedded work may be speculatively extrapolated. Small-scale food production and household-level agriculture persist alongside advanced automation, not as economic necessity but as cultural and ecological practice. Such practices sustain embodied knowledge and maintain a direct relationship between humans and land.

At the social level, the visual scenario suggests relatively limited differentiation in the material conditions of everyday habitation, partly inspired by the comparatively small-scale and materially less stratified communities used as deep-time references in the conceptual framing. This should not be interpreted as a prediction of social equality: access to technological infrastructure, land, automated production, and decision-making could generate new forms of inequality even where differences in individual material consumption be-

come less visible. Equity therefore remains a normative and unresolved dimension of the proposed model rather than an assumed consequence of spatial dispersal.

The anthropological model underlying this system is neither purely nomadic nor purely sedentary, but a hybrid condition enabled by digital interconnectivity: a technologically mediated return to embeddedness.

4.5. Heritage Considerations: Integration of Cultural Archetypes

Drawing upon the holistic and eschatological approach to heritage articulated in K. Rudokas [39] work, heritage is not treated as a static artifact but as an active structural imperative for future development in this future post-urban system as visible in the Drawings 5, 7, 8, 10, 12, 14 (Table 2; Figure 5, Appendix A). In this particular model, archaic Baltic mounds (*piliakalniai*) function not merely as preserved monuments but as spatial archetypes (Drawings 5, 7, 8). Their morphological logic—elevated focal points integrated with surrounding landscapes—becomes a template for future settlement organization. Such structures mediate between nature and habitation, symbolically and functionally embodying the balance between cultural articulation and ecological continuity. The Baltic mound should, however, be understood as a culturally and geographically situated example rather than a universal spatial archetype for post-urban development. In other cultural contexts, different vernacular settlement forms, sacred landscapes, indigenous spatial traditions, or other locally embedded heritage archetypes could perform an analogous generative role, allowing the general principle of deep-time cultural continuity to be translated through place-specific histories and relationships with landscape.

Heritage is therefore reactivated as a generative principle. Rather than isolating historical artifacts within protective boundaries, the model integrates their structural logic into contemporary spatial organization. In this sense, the post-urban system represents an eschatological fulfillment of cultural genotypes embedded in the territorial past. Heritage becomes not a remnant of history but a catalyst of future form.

4.6. Integrated Model of the Post-Urban System

Synthesizing the above dimensions, the post-urban system can be described as a distributed, ecologically embedded, and technologically interconnected settlement network. The major dimensions incorporated into the integrated model (Figure 5)—territory, infrastructure, architecture, lifestyle, intelligence, ontological and cultural–temporal principles—were not predefined or selected according to an external hierarchy. Rather, they represent higher-order thematic categories emerging from the preceding analytical sequence. Drawing-level motifs and hypotheses identified through the structured interpretative protocol were compared across the complete visual series, recurrent and conceptually significant relationships were clustered through the human–LLM dialogical process, and these clusters were subsequently consolidated into the thematic dimensions examined in Sections 4.1–4.5. Their inclusion in the final model was therefore based on their recurrence across the analyzed material, their capacity to integrate multiple drawing-level propositions, and their relevance to the research questions. The dimensions are not ranked by importance; instead, they represent interdependent components of the proposed post-urban system. This multidimensional systemic organization is also consistent with urban foresight approaches that conceptualize cities as complex, open systems composed of interacting spatial, social, technological, and environmental processes [1].

The core characteristics of the proposed post-urban system include decentralized human habitation, discreet but technologically intensive infrastructural hubs, walking-based mobility, bio-inspired architectural typologies, embedded small-scale food production, integrated human–nature–machine intelligence networks, and the continued influence of

cultural archetypes in spatial organization. In this configuration, traditional cities evolve into infrastructural-intelligence nodes supporting planetary-scale technological systems, while everyday human life unfolds within dispersed landscapes enriched by digital connectivity. Spatial concentration thus becomes less dominant as an organizing principle, while relational connectivity and systemic complexity gain greater importance. The synthesis, however, should not be interpreted as deriving all components of the post-urban model de novo from the drawings. Dispersed settlement, walking-based work, ecological embeddedness, and technological hubs formed part of the initial conceptual framing, whereas the visual–dialogical process extended these premises through emergent propositions including density gradients, polycentric mini-hub networks, technological invisibility, biomorphic and biologically grown habitats, multispecies intelligence, fractal organization, and the integration of cultural archetypes into the systemic model. To further clarify the traceability of the integrated model, Figure 5 identifies the principal drawings contributing to each of its higher-order dimensions. These associations are not mutually exclusive: individual drawings frequently contribute to more than one dimension, reflecting the relational and cross-scalar character of the visual material and its subsequent synthesis.

Beyond its spatial and infrastructural characteristics, the proposed model also implies a transformation in how relationships among humans, technology, and the environment are conceptualized. Under conditions of deep integration and pervasive connectivity, agency, information, and perception may increasingly be understood as relational and distributed across human, ecological, and technological systems. This proposition is used metaphorically rather than as a claim of literal collective consciousness and resonates with relational approaches that question exclusively human-centered understandings of agency and mind [40,41]. In a technologically mediated future, comparable forms of relational awareness may re-emerge in transformed form through artificial intelligence, sensor networks, and ecological integration.

The future city can be interpreted not merely as a spatial configuration but as a collective cognitive field in which human, natural, and technological intelligences interact. Such an interpretation resonates with futures studies approaches that emphasize discontinuity, emergence, and the reinterpretation of historical processes in light of transformative future states [10,17,20,21]. Within this framework, the post-urban system represents not the disappearance of the city but its transformation into a distributed field of relational intelligence embedded within ecological continuity.

Although speculative, several structural principles of the proposed post-urban model resonate with established research on biophilic design, pattern-based urbanism, and complex urban networks. In particular, its emphasis on ecological embeddedness, interconnected rather than strictly hierarchical organization, human-scale movement, and distributed relational complexity corresponds with approaches that conceptualize viable urban environments as evolving networks of overlapping relationships and recurrent adaptive patterns [42,43]. Biophilic urbanism further supports the proposition that future settlement structures may benefit from integrating natural processes and forms into the organization of everyday human environments [44]. These parallels do not validate the proposed future scenario as a prediction, but provide a scientific and theoretical basis for several of the organizational principles from which the speculative model is constructed.

The proposed system nevertheless contains important unresolved tensions. Its dependence on technological hubs, AI, and ubiquitous digital connectivity implies substantial demands for energy, land, resource circulation, governance, and equitable access, while the model cannot assume that digital connectivity would substitute physical proximity for all social and urban functions. In the distant-future scenario considered here, distributed human–nature–machine intelligence and technological advances may enable radically

different energy, governance, and resource-exchange systems, potentially reducing contemporary inequalities; however, their specific forms remain beyond the evidential scope of this study and should be treated as open questions rather than predetermined features of the post-urban model. Accordingly, the ecological plausibility of the proposed territorial model remains conditional upon future energy, water, food-production, and land requirements; these variables are not quantified in the present speculative study and constitute necessary subjects for subsequent scenario testing.

5. Discussion

The post-urban model proposed in this study, characterized by distributed settlements, ecological embeddedness, technological hubs, walking-based lifestyles, and heritage-informed spatial organization, diverges significantly from dominant contemporary paradigms in sustainable urbanism. The discussion section situates the proposed vision in relation to compact city theory, smart city discourse, the 15-min city, New Urbanism, and selected strands of academic futurology.

Compact city theory, widely associated with sustainable urban policy [45], promotes high density, mixed use, and reduced car dependency as mechanisms for lowering ecological footprints and enhancing social interaction. More recent work [46] further integrates compactness with digital optimization. The post-urban model proposed here challenges the foundational assumption that sustainability necessarily correlates with density. Instead, it introduces a hypothetical "connectivity-without-concentration" principle, whereby advanced technological interconnectivity could reduce dependence on spatial proximity for selected functions without eliminating the continuing importance of physical accessibility, social interaction, and infrastructural concentration. Rather than densification, the model prioritizes ecological permeability, landscape continuity, and polycentric infrastructural nodes. In this sense, it aligns partially with critiques of excessive densification [47], which question the ecological and experiential limits of compact urban form. The ecological permeability envisioned here also requires consideration of the land sparing–land sharing debate [48]. The model proposed here does not assume either strategy exclusively: the concentration of automated and intensive food production within technological hubs could enable forms of land sparing and ecological restoration, while small-scale cultivation integrated with dispersed habitation represents a land-sharing condition. The ecological performance of such a hybrid configuration would ultimately depend on population density, food demand, production efficiency, and the amount and spatial continuity of land effectively released for ecological processes. An important distinction in this context is that between overall land consumption and ecological fragmentation. Although dispersed habitation may occupy relatively small areas individually, its cumulative spatial footprint, together with the associated paths, utilities, and infrastructural networks, could fragment habitats and disrupt ecological connectivity. Conversely, concentrating resource-intensive production and technological functions within specialized hubs could potentially release larger continuous areas for ecological restoration. The environmental performance of the proposed post-urban configuration would therefore depend not only on the total amount of land occupied but also on the spatial arrangement of development, the continuity of ecological corridors, and the balance between land-sharing and land-sparing strategies. These relationships remain hypothetical and would require spatial and ecological assessment before any sustainability advantages could be established.

The smart city paradigm [49] emphasizes data-driven optimization, sensor networks, and algorithmic governance. While presented as progressive, critics have argued that smart cities often reinforce centralization, technocratic governance, and corporate control. The proposed post-urban model incorporates advanced AI and digital infrastructures but inverts

their spatial consequences. Instead of concentrating population within sensor-saturated metropolitan cores, AI enables dispersal. Technological hubs remain, but primarily as infrastructural-intelligence nodes rather than human residential centers. In this respect, the model shifts from "smart city" to what might be described as "silent intelligence territory": technology becomes increasingly embedded and invisible, supporting ecological integration rather than dominating urban form. This perspective resonates with calls in critical urban studies for more human-centered and ecologically grounded technological integration.

The 15-min city [50] advocates proximity-based urban living, ensuring access to daily needs within short walking or cycling distances. It revalues localism and reduces commuting. The post-urban model shares certain principles: walking-based lifestyles, mixed activities, and reduced reliance on vehicles. However, the spatial logic differs fundamentally. The 15-min city presupposes dense, urban neighborhoods. In contrast, the proposed vision imagines dispersed settlements embedded in natural environments, where digital connectivity compensates for physical distance. Thus, while both models prioritize human-scale mobility and local autonomy, the post-urban system extends localism beyond the traditional city and redefines it within bioregional landscapes.

New Urbanism [51] promotes walkable neighborhoods, traditional architectural forms, and community-oriented planning. It reintroduces vernacular aesthetics and human-scale urban morphology. The post-urban model shares New Urbanism's concern for community scale and vernacular continuity, particularly through the reinterpretation of Baltic mounds and low-intensity settlement archetypes. However, New Urbanism largely operates within suburban or peri-urban frameworks and retains conventional city structures. The present model goes further by dissolving the city as the primary habitat of human life, relocating dense infrastructural functions into technical hubs while allowing everyday habitation to integrate with ecosystems. It therefore extends vernacular continuity into a post-urban condition rather than reforming suburbia.

The proposed model should not, however, be interpreted as negating the established advantages of density and physical proximity, including accessibility, social interaction, efficient service provision, and reduced travel demand. "Connectivity without concentration" becomes conceivable only under conditions in which advanced digital and autonomous systems can reliably support functions presently dependent on spatial agglomeration, while distributed settlement does not generate greater mobility, resource consumption, or ecological fragmentation. The post-urban scenario therefore represents not an alternative applicable under present conditions, but a distant-future possibility contingent upon profound technological, infrastructural, ecological, and social transformation. Furthermore, the dispersal of habitation could increase the length and maintenance requirements of physical infrastructure, while distributed digital connectivity, autonomous systems, and specialized technological hubs may entail substantial energy and resource demands. These potential costs would need to be assessed alongside any benefits associated with reduced commuting, localized activities, and the concentration of resource-intensive functions.

Urban futures research often explores megatrends including digitalization, climate adaptation, demographic shifts, and planetary urbanization [52]. Many forecasts assume continued urban concentration, often intensified by digital infrastructures and global networks. At the same time, alternative strands of futures research have questioned hyper-urbanization. Degrowth urbanism, bioregionalism, and post-carbon scenarios [53] propose relocalization and reduced material throughput. The post-urban model intersects with these latter perspectives but introduces a distinctive dimension: the integration of artificial intelligence as an enabler of ecological dispersal rather than centralized optimization. In most futurological scenarios, AI strengthens megacity governance; here, AI supports

distributed intelligence networks across landscapes. Furthermore, the model adds an ontological dimension largely absent from technocratic forecasts: the integration of multispecies coexistence and fractal interconnectedness as structuring principles. This aligns loosely with emerging discussions of more-than-human urbanism and relational ontologies but extends them into a spatialized future system.

From a weak-signals perspective [8], several contemporary developments can also be read as early indications relevant to the speculative scenario, including the normalization of remote and hybrid work, increasing AI-mediated coordination, distributed renewable-energy systems, automated food production, and growing interest in biophilic and more-than-human design. These developments are not treated as evidence that the proposed post-urban condition will occur; rather, they represent presently observable signals that make selected components of the distant scenario conceivable.

The comparative analysis suggests that the proposed model does not reject contemporary sustainable urban paradigms outright but repositions their core assumptions. It retains walkability, community scale, technological integration, and sustainability objectives; however, it reorganizes these elements within a different structural logic: reduced density, distributed settlement, infrastructural-intelligence nodes, and heritage-informed spatial archetypes. Where mainstream paradigms seek to optimize the city, the present model questions the long-term necessity of the city as a concentrated human habitat. It proposes a shift from "urban sustainability" toward "post-urban ecological intelligence." This repositioning contributes to academic urban futures discourse by expanding the range of plausible scenarios. Rather than assuming perpetual metropolitan growth, it explores the possibility that advanced technological interconnectivity may enable a structural return, albeit in transformed form, to low-intensity, landscape-embedded settlement patterns reminiscent of pre-urban and early urban archetypes. In doing so, the model offers a speculative but theoretically grounded alternative trajectory for urban evolution under conditions of ecological constraint and AI expansion.

Several limitations should be acknowledged. The drawings were generated by the first author and subsequently interpreted by the same researchers; therefore, the analytical categories and higher-order propositions cannot be considered independent of the researchers' conceptual perspective. Independent or blind coding could increase intersubjective validation, but it might also constitute a methodologically different exercise from the present researcher-led speculative inquiry. Future studies could productively compare author interpretation with independent expert coding or participant-based interpretation to examine which propositions remain stable across different interpretative perspectives. The LLM-assisted stage introduces additional epistemic limitations as well. Although the model was provided with the original drawings as well as researcher-generated interpretations and was explicitly invited to identify additional patterns, tensions, and alternative readings, its responses may nevertheless have been influenced by the framing of the prompts and by the tendency of conversational LLMs to elaborate or affirm conceptual directions established by the user. Prompts requesting alternative interpretations were used to mitigate this tendency, but LLM sycophancy cannot be fully excluded. Likewise, because the model's complete training corpus is not transparent, it is not possible to determine whether the authors' previously published work informing the initial conceptual framing [3,4] was represented in its training data. The LLM outputs are therefore not treated as independent validation, but as an additional interpretative perspective within a researcher-led dialogical process.

The temporal context of the visual material constitutes an additional limitation. The drawings were produced primarily in 2020–2021, during the COVID-19 pandemic, when questions of remote work, reduced physical co-presence, mobility restrictions, and renewed

engagement with nearby natural environments were unusually prominent. Although the study cannot retrospectively determine the extent to which this context influenced particular visual propositions, it may have reinforced the exploration of dispersed habitation, landscape-based work, and digitally mediated connectivity. Moreover, the structured coding and LLM-assisted synthesis were conducted in 2026, introducing a temporal distance between generation and interpretation of the visual material. The resulting model should therefore be understood as historically situated rather than context-neutral.

6. Conclusions

This study explored the potential of a hybrid foresight methodology combining deep-time philosophical reflection, intuitive drawing, structured interpretative analysis, and dialogical interaction with a Large Language Model (LLM). Philosophical reflection established the initial conceptual premises, while drawing externalized tacit, associative, and emergent spatial knowledge that could not be fully articulated through verbal reasoning alone. Structured interpretation translated these visual propositions into comparable drawing-level hypotheses, and the subsequent multimodal LLM-assisted dialogue supported cross-drawing comparison, recognition of recurrent patterns, critical interrogation, conceptual clustering, and articulation of systemic relationships. The LLM functioned not as an autonomous generator or independent validator of the future vision, but as an additional interpretative perspective within a researcher-led process. The methodological contribution therefore lies in demonstrating how embodied creative inquiry and AI-assisted dialogue can be integrated to generate and critically explore speculative scenarios while retaining human responsibility for interpretation, evaluation, and theoretical synthesis.

The resulting theoretically generated post-urban scenario proposes a possible transformation of urbanity from dense metropolitan concentration toward distributed relational connectivity. Under the hypothetical conditions of advanced digital technologies, artificial intelligence, and autonomous systems, technologically intensive functions, including data processing, automated production, communication infrastructure, and logistical coordination, remain concentrated within specialized infrastructural-intelligence hubs, while habitation, knowledge work, everyday mobility, and small-scale food production become increasingly dispersed across natural and semi-natural landscapes. This spatial configuration is accompanied by walking-based mobility, smaller-scale and bio-inspired habitation, multispecies coexistence, and renewed integration with natural environments. Cultural heritage becomes a generative rather than solely preservational resource, with historical spatial archetypes, exemplified in this research by Baltic mounds, reinterpreted under transformed ecological and technological conditions. Thus the scenario explores how deep historical patterns might acquire new spatial and cultural meanings without implying a literal return to pre-urban forms.

The proposed scenario challenges the assumption that spatial concentration and urban density necessarily constitute the dominant organizing principles of sustainable urban development. It suggests that, under substantially transformed technological conditions, relational connectivity, ecological integration, and distributed habitation could provide alternative ways of conceptualizing urbanity. However, this alternative spatial logic introduces significant potential trade-offs. Dispersed habitation could increase land consumption, infrastructural requirements, and energy demand, while potentially fragmenting ecological habitats despite the envisioned opportunities for rewilding and ecological connectivity. Similarly, digitally mediated accessibility may reduce dependence on physical proximity without eliminating the need for equitable access to services, infrastructure, and mobility. The concentration of technologically intensive functions within specialized hubs could also create new forms of spatial, economic, and technological inequality. Consequently,

the ecological and social sustainability of the proposed configuration cannot be assumed from its spatial form alone but would depend on population distribution, resource efficiency, infrastructure provision, ecological continuity, and governance arrangements. These tensions do not invalidate the speculative scenario but identify critical conditions for its further theoretical examination and possible future testing. Future research could examine these conditions through comparative scenarios, spatial and environmental modelling, and interdisciplinary evaluation, while also testing the proposed foresight methodology across different cultural contexts, visual materials, and AI systems. More independent and systematically documented forms of human–AI interpretative triangulation could strengthen its methodological robustness. Advances in multimodal and generative AI may further extend the interpretation and transformation of drawings into spatial environments or simulations; however, such developments should expand rather than replace embodied creative practices whose tacit associations, ambiguities, and unexpected relationships constitute an important source of speculative knowledge.

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Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

AI	Artificial Intelligence
LLM	Large Language Model

Appendix A

Complete series of 23 speculative drawings with authors' original interpretative annotations. The annotations presented below accompanied the original exploratory drawing process. They have been lightly edited for linguistic clarity for publication but have not been retrospectively reformulated according to the subsequent structured analysis or LLM-assisted synthesis.

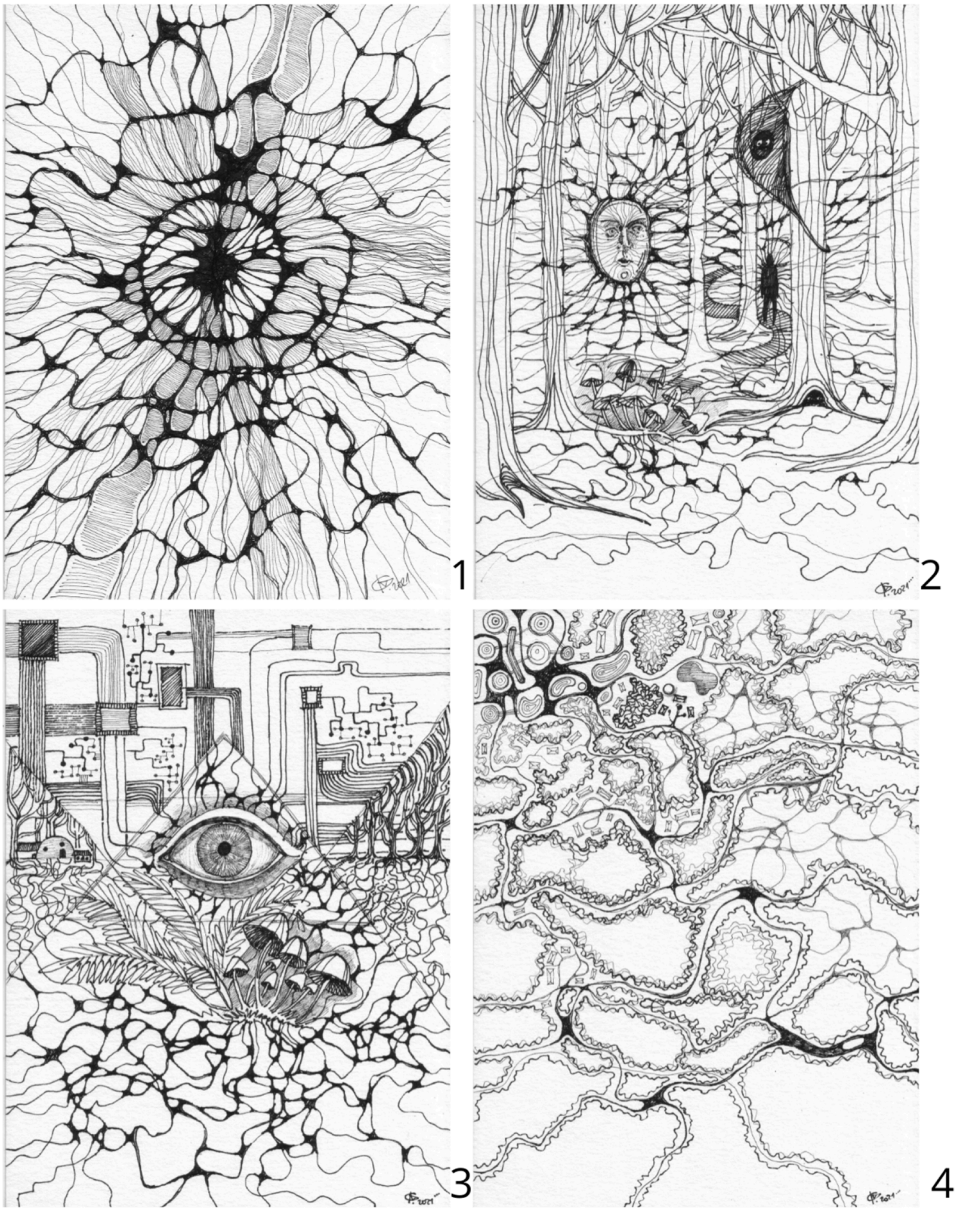

Figure A1. Speculative drawings with authors' original interpretative annotations: drawing (**1**)—interconnectedness and total interconnectedness; neural networks and connected consciousnesses; drawing (**2**)—interconnectedness and total interconnectedness; neural networks and connected consciousnesses; forest habitats and nest-like dwellings. Humans, nature, and artificial intelligence form a common network of intelligence and shared knowledge. The forest internet and fungal networks symbolize this interconnectedness; drawing (**3**)—interconnectedness and total interconnectedness; neural networks and connected consciousnesses. Small-scale human habitats remain close to nature, while technological hubs coexist with them. The network of mushrooms and trees—the "forest internet"—provides an analogy for the connection between natural and artificial networks, neurons, and microcircuits; drawing (**4**)—aerial view or plan of a future region showing a transition from technological hubs toward relatively undisturbed nature. Technological hubs also accommodate agricultural production, while small-scale human settlements scattered within natural settings form an intermediate condition between infrastructure and wilderness. Office work is undertaken while walking or wandering in nature; walking paths are denser around human habitats and gradually become less intensive toward natural areas. Traditional rural homesteads and individual homes coexist with architecture adapted to climatic conditions through both advanced technology and vernacular knowledge transmitted across generations. Mounds or hillforts function as landscape landmarks, suggesting not only technological advancement but also the development of consciousness or spirituality.

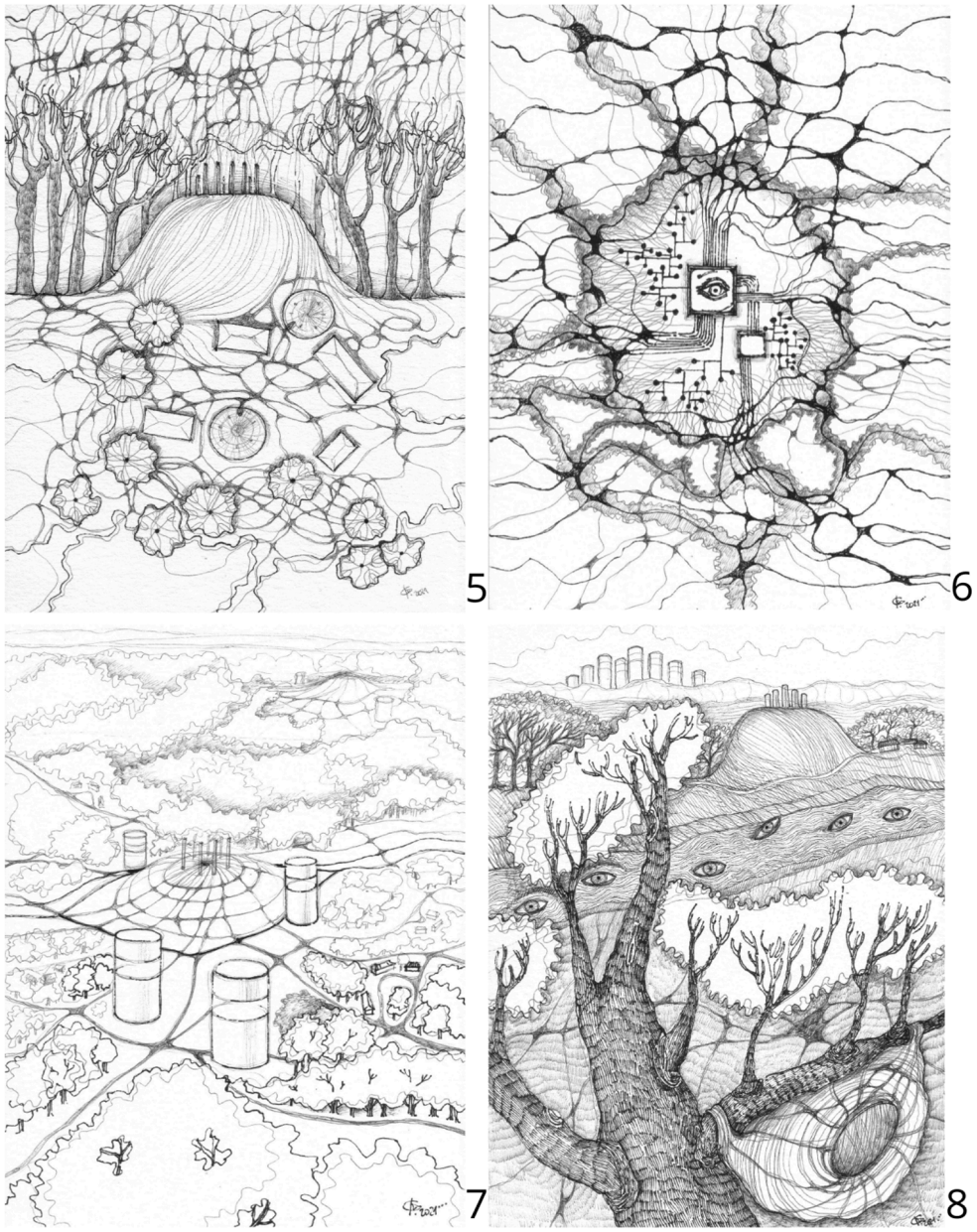

Figure A2. Speculative drawings with authors' original interpretative annotations: drawing (**5**)—trees and neuron-like networks symbolize interconnectedness. Technological advancement is integrated with vernacular forms of settlement and habitats close to nature. Household-scale agriculture and manual activities persist despite technological advancement, maintaining connections with the land, personal discipline, traditions, and inherited lifestyles. Mounds or hillforts serve as landmarks and focal points of community or spiritual life, while pillars on the mounds function as shrines or temples connecting past and future; drawing (**6**)—an aerial or conceptual view symbolizing the direct interconnection of nature and technology and the decreasing density of infrastructure toward less modified natural areas. Technological hubs coexist with rewilded former agricultural areas and extensive forests. Wood is used primarily for the construction of vernacular-style homes; drawing (**7**)—mounds function as focal points alongside technical structures and landmark-like forms reminiscent of ancient stone circles. They may become centers of community life. People inhabit rural-style homesteads surrounded by nature, while technical structures such as servers, data centers, and vertical farms remain nearby. A network of paths replaces visibly dominant vehicular infrastructure; drawing (**8**)—the eye symbolizes an integrated consciousness connecting human intelligence, natural intelligence, and machine intelligence. This interconnectedness is associated with trees, nest-like habitats, mounds, vernacular settlements, and technological hubs.

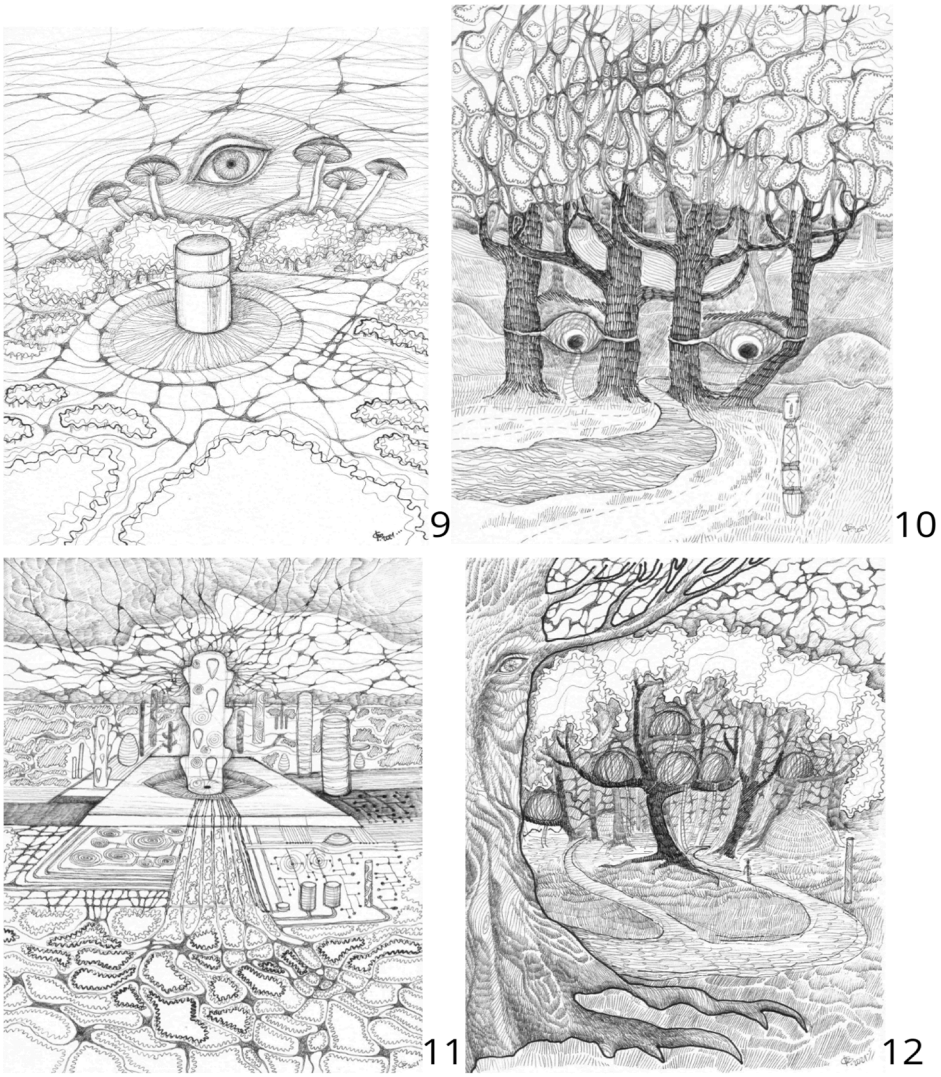

Figure A3. Speculative drawings with authors' original interpretative annotations: drawing (**9**)—smaller technological hubs are distributed throughout the landscape. The eye symbolizes a connected or unified consciousness of nature, machines, and humans, while mushrooms represent connectivity through mycelial networks—the "forest internet." Neuron-like paths symbolize information transmission and interconnectedness; drawing (**10**)—tree habitats function as residences or workplaces and symbolically resemble the eyes of a sacred grove. A wooden statue evokes traditional folk or pagan art. Although the landscape appears non-technological, technology is concealed within it: moving paths provide transportation, while the statue may also function as a technological station. Complexity and advanced technology become hidden, or invisible, within an environment that appears almost prehistoric; drawing (**11**)—a technological hub accommodates servers, data centers, vertical agriculture, communication, production, and related functions. Despite its technological character, some vertical structures resemble natural forms and may either be biomimetically designed or grown from organic matter. The hub remains interconnected with the surrounding natural environment through neural-like networks, while the center of the structure resembles a human eye; drawing (**12**)—tree habitats coexist with ground-level dwellings resembling primitive huts. Moving paths powered by solar or other forms of energy provide mobility, while a totemic pole simultaneously performs a technological function. The tree is imagined as a sentient and conscious being, and total interconnectedness is symbolized through neuron-like networks.

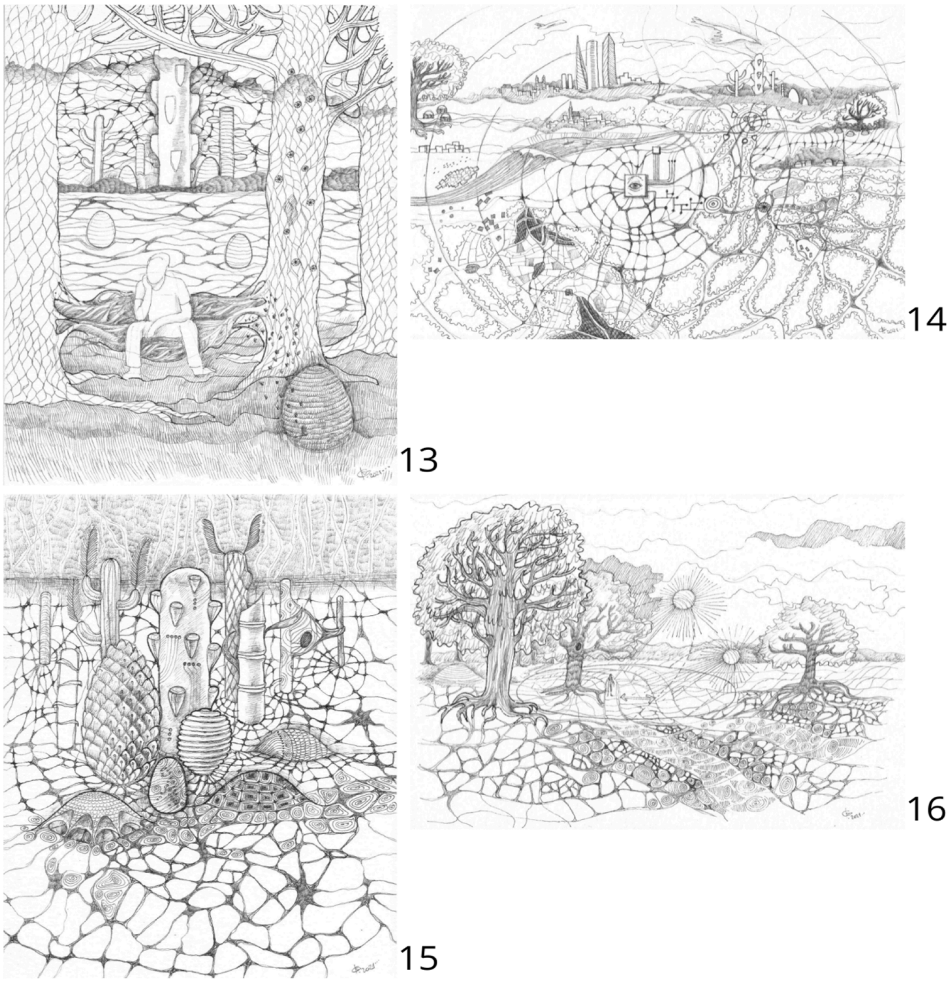

Figure A4. Speculative drawings with authors' original interpretative annotations: drawing (**13**)—egg-shaped beehives coexist with intelligent, sentient trees capable of growing functional objects, such as a bench for humans. Egg-shaped forms may serve as habitats or technological structures. In the distance, a technological hub consists of biomorphic vertical structures; drawing (**14**)—a generalized view of different land uses, functions, and settlement types interconnected through a technological hub represented by an all-seeing eye at the center. Some settlements resemble historical villages and towns, others prehistoric settlements, while elements of traditional agriculture remain present. Technological hubs contain vertical structures of both biomorphic and explicitly technological character. Settlement forms associated with different historical periods appear to coexist, with earth mounds functioning as focal points; drawing (**15**)—various biomorphic forms are explored for vertical technological structures and dwellings, connected through neural-like networks. Biological inspiration is drawn from eggs, bamboo, tortoise shells, pinecones, beehives, insect antennae, termite mounds, and other natural forms; drawing (**16**)—moving paths powered by solar or other forms of energy provide transportation. Office work, thinking, and contemplation take place while walking or travelling slowly through natural environments.

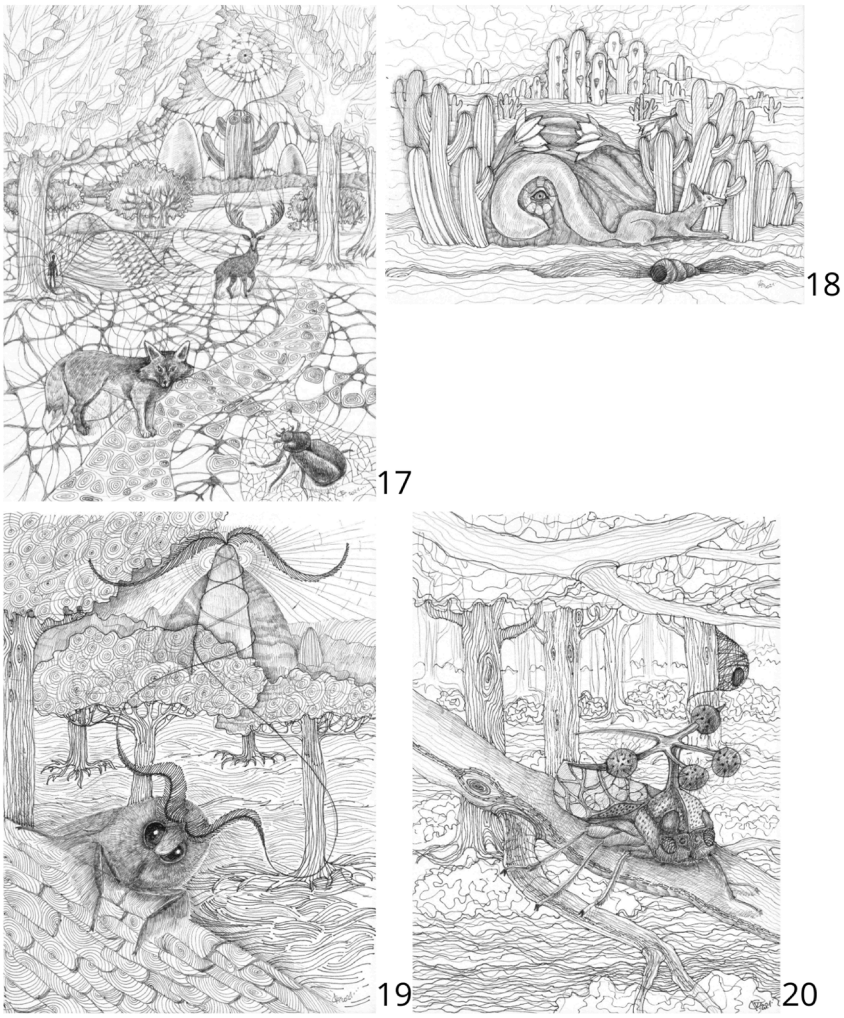

Figure A5. Speculative drawings with authors' original interpretative annotations: drawing (**17**)—humans and various non-human species coexist within an interconnected environment. Moving paths, organically shaped dwellings, and technological structures are integrated into the landscape, while neuron-like networks symbolize interconnectedness; drawing (**18**)—cacti provide inspiration for dwellings and technological structures and are imagined as intelligent, sentient beings capable of growing different functional forms. Different biological models could inspire architecture adapted to different climatic zones; seashells provide another source of biomimetic inspiration; drawing (**19**)—an insect is visually interconnected with a biomorphic technological hub whose form echoes the morphology of the insect, suggesting a direct relationship between biological organization and technological architecture; drawing (**20**)—an intricate insect inhabits a landscape containing tree-based human habitats. Human presence is sparse and embedded within nature. The insect functions as a symbol of biological inspiration and biomorphic design.

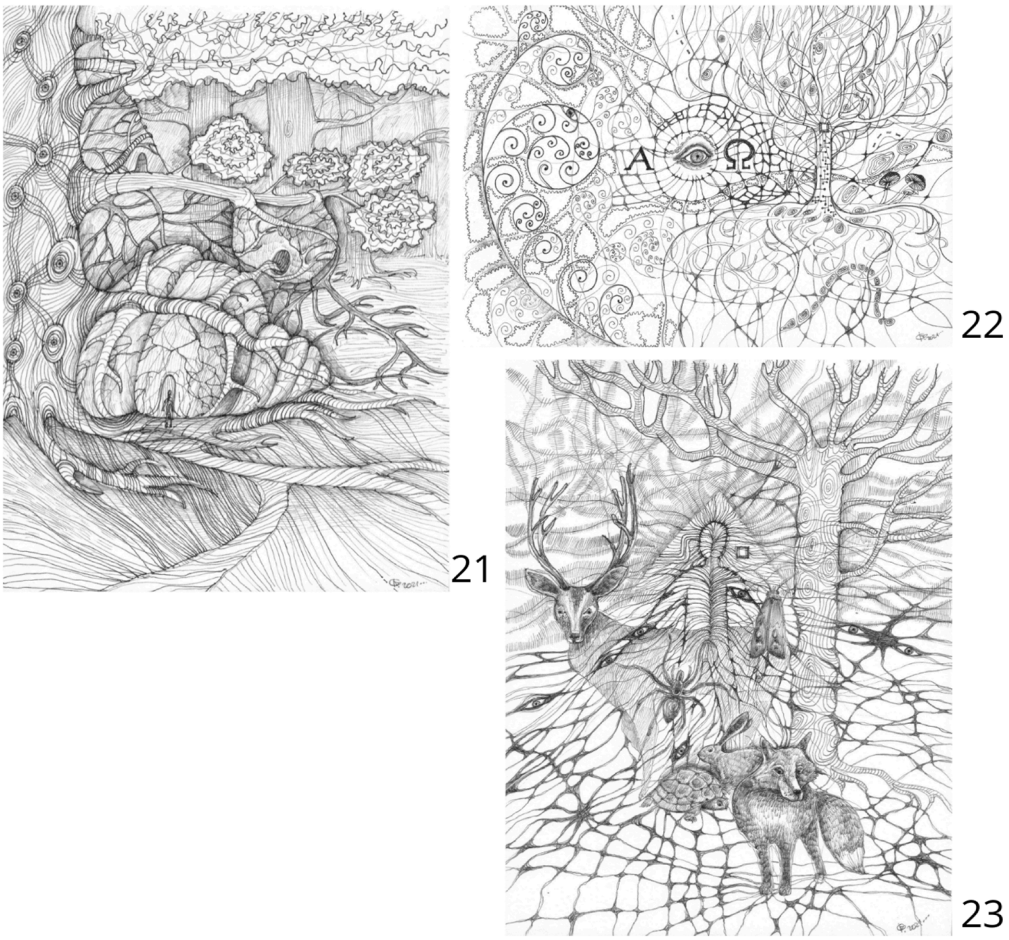

Figure A6. Speculative drawings with authors' original interpretative annotations: drawing (**21**)—intricately shaped organic human habitats are imagined as being grown within the forest by trees using organic matter. The forest is conceived as a conscious agent capable of producing habitats for humans; drawing (**22**)—a symbolic representation of total interconnectedness among nature, humans, and technology, together with unifying organizational principles found in nature, such as fractality; drawing (**23**)—a representation of interconnectedness between humans and non-human beings through conscious networks and technology.

References

1. Ouf, A. Urban planning for the futures; urban foresight. *Ain Shams Eng. J.* **2024**, *15*, 103070. [CrossRef]
2. Saffo, P. Six rules for effective forecasting. *Harv. Bus. Rev.* **2007**, *85*, 122.
3. Rudokas, K.; Dogan, H.A.; Viliūnienė, O.; Vitkuvienė, J.; Gražulevičiūtė-Vileniškė, I. Office-nature integration trends and forest-office concept FO-AM. *Archit. Urban Plan.* **2020**, *16*, 41–47. [CrossRef]
4. Rudokas, K.; Grazuleviciute-Vileniske, I. Total heritage: Future Eopolis for cultural urban singularity. *Foresight* **2021**, *23*, 95–108. [CrossRef]
5. Mumford, L. *The Culture of Cities*; Harcourt, Brace and Company: New York, NY, USA, 1938.
6. Van Der Leeuw, S.E.; McGlade, J. Structural change and bifurcation in urban evolution: A non-linear dynamical perspective. In *Time, Process and Structured Transformation in Archaeology*; McGlade, J., Van Der Leeuw, S., Eds.; Routledge: London, UK; New York, NY, USA, 2013; pp. 331–372.
7. Inayatullah, S. Futures studies: Theories and methods. In *There's a Future: Visions for a Better World*; Al-Rodhan, N., Ed.; T.F. Editores, S.L.C.: Alcobendas, Spain, 2013; pp. 36–66.
8. Saritas, O.; Smith, J.E. The Big Picture—Trends, drivers, wild cards, discontinuities and weak signals. *Technol. Forecast. Soc. Change* **2011**, *78*, 292–302. [CrossRef]
9. Hiltunen, E. Was it a wild card or just our blindness to gradual change? *J. Futures Stud.* **2006**, *11*, 61–74.
10. Slaughter, R.A. Towards responsible dissent and the rise of transformational futures. *Futures* **1999**, *31*, 147–154. [CrossRef]

11. Kavanagh, D.; Lightfoot, G.; Lilley, S. Are we living in a time of particularly rapid social change? And how might we know? *Technol. Forecast. Soc. Change* **2021**, *169*, 120856. [CrossRef]
12. Evans, M. A Design Approach to Trends and Forecasting. In Proceedings of the Futureground—Design Research Society International Conference 2004, Melbourne, Australia, 17–21 November 2004. Available online: https://dl.designresearchsociety.org/drs-conference-papers/drs2004/researchpapers/130/ (accessed on 5 May 2026).
13. Cao, Z.; Mao, Y.; Mustafa, M.; Mohd Isa, M.H. Future cities imagined by ChatGPT-4o: Human evaluation using importance-performance analysis. *Humanit. Soc. Sci. Commun.* **2025**, *12*, 630. [CrossRef]
14. Hayes, A.S. "Conversing" with qualitative data: Enhancing qualitative research through large language models (LLMs). *Int. J. Qual. Methods* **2025**, *24*, 16094069251322346. [CrossRef]
15. Smith, M.E.; Lobo, J.; Peeples, M.A.; York, A.M.; Stanley, B.W.; Crawford, K.A.; Gauthier, N.; Huster, A.C. The persistence of ancient settlements and urban sustainability. *Proc. Natl. Acad. Sci. USA* **2021**, *118*, e2018155118. [CrossRef]
16. Phillips, F. *What About the Future? New Perspectives on Planning, Forecasting and Complexity*; Springer: Cham, Switzerland, 2019. [CrossRef]
17. Hunt, G.; Voje, K.L.; Liow, L.H. Punctuated equilibrium: State of the evidence. *Paleobiology* **2025**, *51*, 652–661. [CrossRef]
18. Marshall, C.R. Explaining the Cambrian "explosion" of animals. *Annu. Rev. Earth Planet. Sci.* **2006**, *34*, 355–384. [CrossRef]
19. Suckert, L. Back to the future. Sociological perspectives on expectations, aspirations and imagined futures. *Eur. J. Sociol./Arch. Eur. DE Sociol.* **2022**, *63*, 393–428. [CrossRef]
20. Tonn, B.E.; Hill, C.J. The case for a transcendental futures subdiscipline. *Futures* **2025**, *174*, 103692. [CrossRef]
21. Hines, A. Guiding foresight into the future. *Futures* **2021**, *132*, 102784. [CrossRef]
22. Vervoort, J.M.; Astrid, A.C. *The Roles of New Foresight Methods in Urban Sustainability Transformations: A Conceptual Framework and Research Agenda*; Urban Futures Studio: Utrecht, The Netherlands, 2018. Available online: https://www.uu.nl/en/research/urban-futures-studio (accessed on 5 May 2026).
23. Gaver, W.W.; Beaver, J.; Benford, S. Ambiguity as a Resource for Design. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Fort Lauderdale, FL, USA, 5–10 April 2003; pp. 233–240.
24. Yiannoudes, S. Shaping architecture with generative artificial intelligence: Deep learning models in architectural design workflow. *Architecture* **2025**, *5*, 94. [CrossRef]
25. Li, P.; Li, B.; Li, Z. Sketch-to-architecture: Generative ai-aided architectural design. *arXiv* **2024**, arXiv:2403.20186. [CrossRef]
26. Shi, M.; Seo, J.; Cha, S.H.; Xiao, B.; Chi, H.L. Generative AI-powered architectural exterior conceptual design based on the design intent. *J. Comput. Des. Eng.* **2024**, *11*, 125–142. [CrossRef]
27. Çalışkan, E.B. Exploring possibilities and limits of ChatGPT: Usage in building design studies. *Turk. J. Eng. (TUJE)* **2025**, *9*, 490–500. [CrossRef]
28. Nashaat, B.; Elzeni, M.M. Reviewing AI in architectural computational design: Applications, opportunities, and the AI-ACD workflow for improved design integration. *Int. J. Archit. Comput.* **2025**, *24*, 675–720. [CrossRef]
29. Stadlmann, C.; Zehetner, A. Comparing AI-based and traditional prospect generating methods. *J. Promot. Manag.* **2022**, *28*, 160–174. [CrossRef]
30. Li, D.; Shi, Y.; Wang, Y.; Shi, Z.; Kapadia, M. ArchSeek: Retrieving architectural case studies using vision-language models. *arXiv* **2025**, arXiv:2503.18680. [CrossRef]
31. Belaroussi, R.; Martín-Gutierrez, J. Architectural ambiance: ChatGPT versus human perception. *Electronics* **2025**, *14*, 2184. [CrossRef]
32. Cheung, L.H.; Dall'Asta, J.C.; Di Marco, G. Exploring large language model as a design partner through verbal and non-verbal conversation in architectural design process. In Proceedings of the XXVII International Conference of the Ibero-American Society of Digital Graphics, Punta del Este, Uruguay, 29 November–1 December 2023; pp. 1059–1070.
33. Cheung, L.H.; Lombardi, D.; Di Marco, G. Agentic, Multimodal Large Language Model (LLM) with behavioural parameters and self-iterative capabilities for conversational architectural design processes. *Archit. Sci. Rev.* **2025**, 1–21. [CrossRef]
34. Cheung, L.H.; Wang, L.; Lei, D. Conversational, agentic AI-enhanced architectural design process: Three approaches to multi-modal AI-enhanced early-stage performative design exploration. *Archit. Intell.* **2025**, *4*, 10. [CrossRef]
35. Ko, J.; Ajibefun, J.; Yan, W. Generative AI-powered parametric modeling and BIM for architectural design and visualization. *Proc. Des. Soc.* **2025**, *5*, 1943–1952. [CrossRef]
36. He, M.; Liang, Y.; Wang, S.; Zheng, Y.; Wang, Q.; Zhuang, D.; Tian, L.; Zhao, J. Generative AI for urban design: A stepwise approach integrating human expertise with multimodal diffusion models. *arXiv* **2025**, arXiv:2505.24260. [CrossRef]
37. Rodriguez, J.D.S.; Joyce, S.C.; Sockalingam, N.; Khoo, T.E. Large Language models in architecture studio: A framework for learning outcomes. In *Learning and Collaboration Technologies*; Smith, B.K., Borge, M., Eds.; Springer Nature: Cham, Switzerland, 2026; pp. 93–110. [CrossRef]
38. OpenAI, 2026. Available online: https://chatgpt.com/ (accessed on 20 August 2026).

39. Rudokas, K. Urbanistikos ir architektūros paveldo holistinis suvokimas: Eschatologinė prieiga. *LOGOS-A J. Relig. Philos. Comp. Cult. Stud. Art* **2019**, *101*, 147–158. [CrossRef]
40. Lévi-Strauss, C. *The Savage Mind*; University of Chicago Press: Chicago, IL, USA, 1962.
41. Bateson, G. *Steps to an Ecology of Mind*; original work published 1972; University of Chicago Press: Chicago, IL, USA, 2000.
42. Mehaffy, M.W. Patterns of growth: Operationalizing Alexander's "Web Way of Thinking". *Urban Plan.* **2023**, *8*, 235–245. [CrossRef]
43. Mehaffy, M.W.; Jiang, B. Reassessing Christopher Alexander's theory of urban morphogenesis. *Comput. Urban Sci.* **2025**, *5*, 36. [CrossRef]
44. Mehaffy, M.W.; Kryazheva, Y.; Rudd, A.; Salingaros, N.A. *A New Pattern Language for Growing Regions: Places, Networks, Processes*; Sustasis Press: Portland, OR, USA, 2020.
45. Burton, E. Measuring urban compactness in UK towns and cities. *Environ. Plan. B Plan. Des.* **2002**, *29*, 219–250. [CrossRef]
46. Bibri, S.E.; Krogstie, J.; Kärrholm, M. Compact city planning and development: Emerging practices and strategies for achieving the goals of sustainability. *Dev. Built Environ.* **2020**, *4*, 100021. [CrossRef]
47. Säynäjoki, A.; Heinonen, J.; Junnila, S. A scenario analysis of the life cycle greenhouse gas emissions of a new residential area. *Environ. Res. Lett.* **2012**, *7*, 034037. [CrossRef]
48. Phalan, B.; Onial, M.; Balmford, A.; Green, R.E. Reconciling food production and biodiversity conservation: Land sharing and land sparing compared. *Science* **2011**, *333*, 1289–1291. [CrossRef]
49. Hollands, R.G. Will the real smart city please stand up?: Intelligent, progressive or entrepreneurial? In *The Routledge Companion to Smart Cities*; Willis, K.S., Aurigi, A., Eds.; Routledge: Abingdon, UK, 2020; pp. 179–199.
50. Moreno, C.; Allam, Z.; Chabaud, D.; Gall, C.; Pratlong, F. Introducing the "15-Minute City": Sustainability, resilience and place identity in future post-pandemic cities. *Smart Cities* **2021**, *4*, 93–111. [CrossRef]
51. Duany, A.; Plater-Zyberk, E.; Speck, J. *Suburban Nation: The Rise of Sprawl and The Decline of the American Dream*; North Point Press: New York, NY, USA, 2000.
52. Bibri, S.E.; Krogstie, J. Smart sustainable cities of the future: An extensive interdisciplinary literature review. *Sustain. Cities Soc.* **2017**, *31*, 183–212. [CrossRef]
53. Trainer, T. De-growth: Do you realise what it means? *Futures* **2012**, *44*, 590–599. [CrossRef]

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