

Finite Earth, Open-Ended Architecture? Framing a Qualitative, Ecological Perspective on Housing

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ABSTRACT: In contemporary housing development, the dichotomy between quantitative and qualitative approaches underscores a fundamental tension. This article explores the significance of this dichotomy and its complex implications on the ecological relationship between humans, the built, and the natural environment. The paper asks: *how can the contemporary architectural practices of housing development encompass a qualitative ecological perspective?* This will be elaborated by examining the shortcomings of 'numerical environmentalism' to reevaluate the role of technology in mediating human-environment relationships, questioning not only the quantitative methodologies we utilize to assess environmental impacts, but also critically examining how we currently design, build, and maintain our built environments from within this rationalist mindset. To initiate the conceptualization of a qualitative alternative, a practice guided by an ethic of care is proposed to form a critical lens through which the contemporary practices of housing development can be challenged. As contemporary practices often prioritize numerical assessments and scalable solutions over context-specific, qualitative considerations, the research will advocate for what can be considered a qualitative 'open-ended' architectural paradigm, embracing uncertainty, time, the capacity to induce and absorb change, diversity, material proximity, and so forth. This is elaborated in a logical framework of concepts, principles, and incompatibilities, and further visualized as a spectrum covering the dichotomy foregrounded. At its core, the key message of this research is a call for architects to rethink their approach to housing development to embrace care relations and open-ended architectural principles with ambitions to cultivate a more harmonious relationship between humans and their surrounding environments.

KEYWORDS: sustainability, care, time, ecology, housing

INTRODUCTION

The primary goal of the discourse on 'absolute sustainability' is to evaluate the environmental impact of our actions, practices, products, and built environments against Earth's finite ecological capacities. Today, this is achieved by quantifying these impacts and capacities into numerical data for comparable measures (Hauschild, Kara, and Røpke 2020; Ohms et al. 2019; Andersen et al. 2020; Brejnrod et al. 2017). Fostered by advances in quantifying the nine planetary boundaries, the absolute sustainable discourse marks a turn in environmental assessments from relative assumptions towards unambiguous and absolute conclusions that introduce a mindset of unconditional certainty throughout many decision-making processes in the built environment. This turn has proven a strong communicative potential – not only by raising public awareness but by inciting political action through, for example, clear-cut reduction targets. Yet, this paper argues that there are significant pitfalls in solely relying on quantitative methodologies for transitioning society in a greener direction, foremost rooted in the reductive characteristics of the discourse, abstracting the world's intricacies into uncompromising data for the benefit of 'spreadsheet-compatibility'. Pitfalls that necessitate precaution for undesired side effects and misconceptions that may potentially fuel further the ecological instability between the built and the natural environment. Adding to this the dominating rationalist worldview spread wide by global capitalism, the paper claims that the real challenge of contemporary 'sustainable' architecture may well be to maintain a qualitative closeness to our environments.

Motivated by this, this paper seeks to challenge the practices that quantitatively give form to, change, and maintain our built environments. More specifically, the target of the paper will be the built environment of housing development, which, from 2015 to 2020, accounted for approximately 66% of new construction in Denmark (Tozan et al. 2023). In this context, the aim is to challenge the conception of designing, building, and maintaining housing through the lens of an ecological approach capable of considering the nuances that current reductive strategies may not. The ambition is not to provide any definite or categorical answers but to frame a spectrum of concepts, principles, and incompatibilities that may provide insights into '*how contemporary architectural practices of housing development may encompass a qualitative ecological perspective*'. For this reason, this paper will be directed mainly against what can be considered quantitative housing development, where future inhabitants are unknown to developers and architects, and not the specific case where a private client consults an architect as the communicative framework surrounding the ladder usually by default represents a qualitative exchange of ideas, ideals, thoughts, visions, and ambitions. Nevertheless, it is the hope that any conclusions may inform all kinds of architectural practices with principles that do not enforce distance, but in-depth closeness and consideration for the intricate ecological frameworks we all operate within.

1.0 METHODOLOGY

The methodology of this paper follows critical argumentation, utilizing existing theories and concepts to build a logical framework encompassing this foregrounded perspective of a qualitative practice. This framework will be

outlined as a spectrum of concepts and principles, extending the span from normative contemporary practices of housing development to what will be conceptualized as an ‘open-ended architecture’. This will be achieved by first critically unfolding the issues relating to quantitative assessment models, to outline possible pathways for theoretical and ethical approaches that may foster a qualitative alternative. These will be considered ‘first principles’, and thus constitute the lens through which the research question will be addressed. Throughout the article, various examples will be made from cases relating to the topic of the paper. This includes the ‘Reduction Roadmap’ (Reduction Roadmap 2024), which will be used to demonstrate the potentials and conflicts surrounding the numerical and rational form of environmental assessment, as well as extracts from the projects in the ‘4>1 Planet, Next Generation Architecture’ initiative, that led up to the UIA World Congress of Architects in Copenhagen 2023 (4 til 1 Planet 2023), which is intended to demonstrate and validate possible qualitative architectural responses to the logical framework developed.

2.0 NUMERICAL ENVIRONMENTALISM: POTENTIALS, SHORTFALLS, ALTERNATIVES

As stated above, it is indisputable that quantitative methodologies play a central role in the green transition. A recent and quite successful example demonstrating *how* is the ‘Reduction Roadmap’, dedicated to keeping the carbon footprint of our built environment within an equivalent corresponding to the Paris Agreement’s threshold 1,5°C temperature increase (Hill-Hansen et al. 2022). By presenting categorical targets within different time perspectives in easily comprehensible graph visualizations, the ‘Reduction Roadmap’ exemplifies a communicative potential, being openly supported by more than 500 central actors within the Danish construction industry at the time of writing (Reduction Roadmap 2024). And, by using these declarations of support to induce pressure for more ambitious climate legislation, the ‘Reduction Roadmap’ equally demonstrates the capacity to influence political decision-making processes. However, examining the foregrounded conclusions, it becomes apparent that the ‘Reduction Roadmap’ is not as much a ‘roadmap’ *prescribing* possible pathways towards an environmentally stable practice, as it is a ‘postcard’ numerically *describing* the destination we aspire to reach. As such, quantitative targets might show us where to go, but not necessarily how to get there. Reduction is inevitable, but how we choose to reduce is a multifaceted question with no categorical answer.

To draw the contours of an alternative qualitative approach, it is first necessary to comprehend more fundamentally the shortfalls of the normative quantitative models and how they may affect practice. On account of Thomas S. J. Smith’s book ‘Sustainability, Wellbeing and the Posthuman Turn’ (Smith 2018), devoted to examining the exact issues of what Smith coins ‘numerical environmentalism’, the following sections will first outline three central arguments against present numerical conventions before engaging the task of framing an alternative.

2.1 Abstraction and commodification

The foremost argument built against the conventions of ‘numerical environmentalism’ is that quantified reductions conceal significant and overarching issues behind the rationality of categorical ‘facts’ (Smith 2018). In this light, methods, such as the calculation of carbon footprints and the quantification of planetary boundaries, simplify climate change to issues of carbon emissions, reducing the transgression of thresholds to a technical matter of innovation. To build this argument, departure is taken from Heidegger’s conception of technology as a means for society to uncover and interact with the world (Heidegger 1977). As such, humanity’s means of quantifying the world is co-constitutive to how we, as humans, position ourselves within the world. By reducing the Earth’s ecosystems into mere numbers, we partake in environmental commodification, making the ecological landscapes compatible with the neoliberal conventions that guide our society towards ambitions of endless expansion. We create a version of ‘nature’ without entanglements – a scalable ‘nature’ (Tsing 2012). On a global political scale, these issues are demonstrated in concepts like ‘carbon offsets’ (Carbon Offset Guide 2024); the trading of ‘carbon credits’ (Carbon Credits 2022); or the establishment of ‘markets for ecosystem services’ (Ecosystem Marketplace 2023). According to Thomas S. J. Smith, these technological ‘solutions’ thus devalue nature into what Heidegger phrases as a ‘bestand’, understood as a ‘standing reserve’ or ‘stockpile’ for the disposal of humanity alone (Smith 2018).

2.2 Objective and universal

The common understanding that numerical environmentalist approaches are apolitical, uncontroversial, and universally applicable can equally be drawn into question, as universality would require overlooking various conflicts, interests, and perspectives surrounding the definition of such approaches, including the diverse local conditions and contexts in which they are implemented (Smith 2018). Concepts like planetary boundaries may thus appear neutral until efforts to operationalize such concepts planetarily uncover biases, cultural differences, political and economic incentives, etc. What may be considered sustainable or beneficial in one region or culture may not be in another.

2.3 Dichotomizing culture and nature

By drawing a comparison to the 19th-century English philosopher John Stuart Mill’s ‘harm principle’, Smith argues that the planetary boundaries passively overlook unsustainable actions until the point at which these actions transgress thresholds (Smith 2018). Consequently, this subtly enforces the anthropocentric division of ‘culture’ and ‘nature’ by building on the notion of a cultural environment whose actions impact an isolated and fragile concept of the natural environment. As a result, coping mechanisms are promoted over more radical solutions to the dysfunctional dynamic between humans and their surrounding ecological systems.

2.4 Caring as alternative

Considering these arguments in the conception of an alternative practice, Smith proposes revisiting the ‘deep ecological movement’ of Norwegian Philosopher Arne Næss and his notion of the ecological ‘Self’, understood as

a relational reconceptualization and enlargement of the ego with the world (Naess 1995; Smith 2018). Consequently, such reconceptualization transforms environmental preservation from what may be considered actions of altruism to actions of 'Self'-preservation, maintaining that our existence is contingent on recognizing the interconnection between us, as humans, and everything non-human. According to Smith, such a perspective on being in the world aligns with a feminist 'ethic of care', directed toward fostering connections, emotional responses, and caring dispositions (Smith 2018). As a moral theory, it traces back to the research of psychologist Carol Gilligan who uncovered that in moral dilemmas, women, unlike men, tended to focus more on the particular circumstances and responsibilities involved, rather than relying on generic and categorical principles or rules (Gilligan 1982). In this light, caring can be seen as a reciprocal, context-bound, relationship-oriented process between actors, aimed towards maintaining and meeting the needs of what constitutes one's world, encompassing oneself, each other, and the environment, both living and non-living (Collins 2015). Thus, by altering the understanding of actors from being seekers of self-interested goals to being engaged in relationships of care, our conception of 'well-being' is equally altered, from being concerned with ambitions of quantified growth and consumerism to being directed towards processes of maintenance and continuation. This outlines a societal organization echoing the principles of post-consumerist thinking, where new and broader environmental agencies become possible. Thus, if our numerical assessments give us a target and direction, the reciprocal practice of care between us and our environments may be the vehicle to get us there. The challenge, however, now lies in figuring out how our contemporary housing practices may comply.

3.0 CONFRONTING ARCHITECTURE'S PRACTICES OF TODAY

Building on this understanding, this section will draw into question the contemporary practices of housing development. This will be elaborated through a series of 'incompatibilities', that, when unfolded, may introduce challenges and possibilities to inform principles of a qualitative practice. Without a doubt, more misalignments can be uncovered, but for now, the focus will be on 'scalability, ideals, and uncertainty', then 'time, durability, and change', and finally 'technology, alienation, and the material world'. Along each section, different extractions from the '4>1 Planet, Next Generation Architecture' projects, will aim to demonstrate some of the considerations foregrounded. This is not an effort to frame specific solutions, but a demonstration of what positions architecture can take towards these incompatibilities when 'care' guides the practice.

3.1 Scalability, ideals, and uncertainty

To outline the first incompatibility, we should consider again the 'Reduction Roadmap', and how the graph visualization's categorical appearance leaves little room for ambiguous and novel thinking. In the article 'Visualizing Uncertainty and Vulnerability', Peg Rawes, professor of Architecture and Philosophy at The Bartlett School of Architecture, points to how similar visualizations of the recent pandemic's progression in the UK portray the picture of the government's apparent successful course of action during the lockdown, but in reality, are built upon incomprehensible and unstable data (Rawes 2020). According to Rawes, the visualizations are utilized to conceal uncertainty and promote ideological motives behind what appears to be scientific validity and authority (Rawes 2020). As such, the visualizations demonstrate the employment of a biopolitical power pushing an 'objective truth' infused with political incentives. Revisiting in this light the argument that 'numerical environmentalism' is neither apolitical nor universally applicable encourages us to reconsider what unspoken influences quantitative methodologies such as the 'Reduction Roadmap' impose on our practices. What is insinuated here is that methods of assessing, calculating, visualizing, and mapping might be oriented to generate specific behaviors and responses in line with various underlying ideological or speculative motives, with or without intention. It is a mechanism not unlike Foucault's concept of 'disciplinary power':

[...] discipline fixes; it arrests or regulates movements; it clears up confusion; it dissipates compact groupings of individuals wandering about the country in unpredictable ways; it establishes calculated distributions (Foucault 1995, 219).

Following this line of thinking, by uncritically continuing these normative methodologies of assessing, we exercise this disciplinary power in a self-perpetuating process that fabricates fixed solutions, keeping our practices in place by opposing innovations that transcend the frameworks of quantitative models. Consequently, as the 'Reduction Roadmap' advocates a staggering 96% reduction of carbon emission in the production of new housing (Hill-Hansen et al. 2022), it subtly delimits our understanding of possible solutions to those quantifiable while discouraging efforts to develop qualitative approaches as these may not be scalable nor appear economically viable in a numerical manner. This may not completely prevent qualitative practices, but it does elevate engagement in context-specific qualities and challenges into an out-of-the-ordinary practice for the architect engaging with scalable housing development.

Thus, it appears an architectural practice encompassing ambitions of quantitative scalability may be incompatible with any practice guided by a context-bound 'ethic of care'. To further situate this incompatibility within the practices of housing, one can look to the writings of John Habraken, former head of The Department of Architecture at MIT and initiator of 'the participation movement' that today is strongly linked to 'the open building practice'. As Habraken argues in his book 'Supports: An Alternative to Mass Housing', there is a paradox in implementing 'ideals' as generic solutions because: "what is ideal [...] is subject to the imperfection of man's existence" (Habraken and Valkenburg 2011, 10). As such, 'ideals' as well as 'care' share the properties of being context-bound. What Habraken was criticizing was the functionalist belief in a universal one-size-fits-all design of the 'ideal' dwelling – not unlike a strictly quantitative approach to sustainable architecture. In mass housing, the individual was dissolved into the masses at the cost of personal identity and significance just like a scalable numerical environmental engagement will oppose strategies and considerations capable of recognizing unique contextual conditions. Although Habraken's ideas derive as a resistance to the mass housing projects of the '60s, contemporary housing development today shares the same power dynamic between architect and dweller, necessitating the dweller to take form and fit into the

overarching architectural ambitions and not the other way around.

For the practice of housing development to be 'scalable' it must thus exclude 'diversity' following numerical environmentalist ideals, meanwhile repeating the misconceptions that gave ground to the mass housing projects we reject today. To use the term of anthropologist Anna Tsing, ideals and care relations are 'non-scalable', built up by 'elements of social landscapes' (Tsing 2012). Fitting these qualities into a scalable practice would require a diversified approach, not unlike Habraken's division between 'support' and 'infill' describing respectively a building's permanent constructive system, as a product of the architect, and the building's dynamic functionality, independent of the constructive dimension and assigned to the individual to operate (Habraken and Valkenburg 2011). In short, the ambition must be to allow diversity and uncertainty to exist between the invariable vectors of a scalable framework.



Picture 1: The 'Planetary Pavilion' by architectural office 'Lokal' exemplifies the integration of non-scalable elements within a scalable framework. Through participatory programming facilitated by a modular wood beam structure, the dwelling adapts to evolving user needs, fostering flexibility and inclusivity. Source: (Sandra Gonon 2023)

3.2 Time, durability, and change

By questioning the ambition of 'ideals', new opportunities emerge in architecture's relation to 'time'. As Jeremy Till argues in 'Architecture Depends': "time is the medium that most clearly upsets any notion of static idealized perfection in architecture" (Till 2013, 65). In the seminal 'How Buildings Learn', Stewart Brand unfolds a similar argument, proclaiming foremost that "architects should mature from being artists of space to becoming artists of time" (Brand 1994). By putting 'time' before 'space', Brand does away with the conventional strive for architectural perfectionism, implying that 'ideal form' is an ambition correlating with only a snapshot of contextual circumstances that will not be the same tomorrow: "All buildings are predictions, all predictions are wrong" (Brand 1994, 178). Refraining from predetermining formalistic ideals may thus allow time to emerge as a dimension of significance equivalent to the predominant three dimensions wherein architecture's spatiality unfolds – it matures architecture from 'form' to 'process'.

In their book 'Buildings Must Die: A Perverse View on Architecture', Jane M. Jacobs, professor at Yale, and Stephen Cairns, professor, and leader of the research group Future Cities Lab at ETH, argue how architecture's 'obduracy' might be the foremost precursor to architectural obsolescence (Cairns and Jacobs 2014). By using the verb 'obdurate', commonly used to describe a personality trait, Cairns and Jacobs emphasize the slow pace, almost static state, of most contemporary architecture, without denying it as something 'alive' or 'dynamic' – without denying it a relation to time. What is important here is to not mistake obduracy for durability. According to them, architecture should never be regarded as durable, as continuous processes of maintenance and investment are necessary to sustain architecture's value (Cairns and Jacobs 2014). In this light, one can see the value of architecture as being subject to processes of social constructs more than static structural and material aspects. Thus, when architecture is cared for its value is maintained, meanwhile, obdurate architecture that appears durable might eventually lose value and become obsolete as a consequence of societal mechanisms, such as the neglect of care and maintenance. Contrarily, a more fragile architecture requiring ongoing care will potentially maintain its value over time. Cairns and Jacobs further state that "A building that changes over time is also an architecture that can stand in time" (Cairns and Jacobs 2014, 126). One can even argue that 'time' in architecture appears in the form of 'change'.

What is being foregrounded here is a concept of 'change' as a form of adaptation different from the modernist understanding of 'flexibility' where the empowerment to and nature of 'change' is something preconditioned by the

architect's ingenuity and prior intention, and therefore biased by limited imagination. It is not about submitting to a predetermined scheme but about being capable of adjusting to unforeseen conditions, and by doing so, adjusting the condition itself. A fitting concept to elaborate on this dynamic is French philosopher Catherine Malabou's notion of 'plasticity' as an 'intelligent flexibility':

To be flexible is to receive a form or impression, to be able to fold oneself, to take the fold, not to give it. To be docile, to not explode. Indeed, what flexibility lacks is the resource of giving form, the power to create, to invent or even to erase an impression, the power to style. Flexibility is plasticity minus its genius. (Malabou 2022, 12)

As a concept derived from neuroscience, 'plasticity' describes the brain's ability to change its structure and function in response to experience and development (Malabou 2022). But within architecture, 'plasticity' is relevant as it lets us consider 'adaptation' as an 'exchange of changes' between actors and environments. In this understanding, 'change' is a reciprocal process just like 'care' and presents the capacity to challenge fixated norms and presumptions, such as the invariable metrics of a scalable practice. If managed and given the right intention, this form of 'change' can become an expression of 'care', not only in the form of thorough transformations, but also more cautious alterations, maintenance, and continuation. Or even as the 'exchange' of identity and significance between an architectural environment and its user. This is also 'change', but with a different velocity and trajectory. It is more than just materialistic change; it is relational change. Or, as Bruno Latour and Albena Yaneva argue in their article 'Give Me a Gun and I Will Make All Buildings Move':

[...] a building project resembles much more a complex ecology than it does a static object in Euclidian space. (Latour and Yaneva 2013, 109)

Again, 'time' is being centered as the necessary fourth dimension needed to introduce this ecological relation between the built and the natural environment. Time is a necessity for change, while change is a medium for care. Accordingly, if 'care' is about 'maintaining' through this concept of 'change', the idea of maintenance-free architectures or components thus excludes 'time' by rejecting 'change' in favor of an illusion of 'durability' that can only lead to obsolescence. Through change, we reinvigorate relevance, and when we maintain the built environment, we care about the natural environment.



Picture 2 and 3: The fragile yet solid rammed earth walls of the project 'Naturlig Rækkerne' by architectural office 'Reværk' demonstrate the relation between time, change, durability, and care. The construction is in a constant process of change, and without care, the walls would return to earth over time. But by reapplying clay and pressure, the structure can be maintained easily thus renewing its relevance. And by caring for it, the earthen walls provide shelter, accumulate warmth, and regulate moisture. It is an exchange of care. Source: (Sandra Gonon 2023)

3.3 Technology, alienation, and the material world

Recalling again Heidegger's inquiry into the 'essence of technology'; technology is for humans a means of 'enframing' or 'revealing' the material world we inhabit (Heidegger 1977). When relating to our environment, we do it through a sensory system deeply entwined with technology. As we understand 'care' as a relational exchange between actors and environments, questioning our understanding and use of technology appears fundamental in the ambition to alter our position from an anthropocentric utilitarian perspective toward one guided by care.

In the article 'Architecture, Technology, and the Body: From the Prehuman to the Posthuman Society' Jonathan Hale, architect and professor at The University of Nottingham, argues how increasingly complex technologies distance humanity from the natural environment which derives an 'alienation' that also manifests itself in the relationship between the architect and the architecture (Hale 2012). Hale builds his arguments upon the concepts of 'transparent' and 'opaque' technology, formulated by Peter McCleary, former professor at Penn University (McCleary 1988). Drawing reference to both Heidegger's notion of 'ready-to-hand' and Merleau-Ponty's 'blind man', McCleary elaborates that 'transparent technology' allows its user to experience the environment through the 'technic', that is a tool, machine, or equipment, similar to how the blind man experiences the environment through his cane, causing the cane itself to become 'transparent' and withdraw from his consciousness. Contrary, an 'opaque technology' allows its user only to experience the 'technic' experiencing the environment, thus withdrawing instead the environment from the user (McCleary 1988). As 'transparent technology' allows the user's attention to be directed toward the material at hand, it uncovers, for the user, embodied knowledge of the material world. Contrarily, as technology becomes increasingly autonomous and sophisticated, human perception is directed towards 'opaque' controls and interfaces, distancing the user from the environment, eventually leading to a digitalized abstraction of reality where 'black-box' technology reduces material knowledge into mere data (Hale 2012, 519).



Picture 4 and 5: The thatched facade of the pavilion 'Thatched Bricks' by the offices 'Leth & Gori' and 'Rønnow' in collaboration with 'CINARK'. Thatching is a craft that today is done by a skilled craftsman utilizing a variety of 'transparent technologies', such as the thatcher's 'leggett'; a flat board attached to a handle used to drive the reeds into place. In this instance, the façade was constructed off-site as façade-elements, and subsequently transported for on-site montage. This allowed for a somewhat 'scalable' production, enabling a broader variety of reed quality to be used, as well as providing logistical potentials in terms of improved workflow and sheltering. In combination with the sophisticated insulating bricks, it demonstrates the possibility of working within the spectrum of 'transparent' and 'opaque' technologies. Source: (Sandra Gonon 2023)

In architectural practice, this technological advancement has made available digital tools capable of overlooking aspects of material constraints for scalability. But as the use of these complex tools preconditions a homogenized perspective on the material world, it follows that concealed flaws, potentials, characteristics, and differences easily are neglected. On the other hand, approaching the material world in its full essence requires a practice of immersed attention, qualitative, precise, and investigative, and thus 'nonscalable'. At one end of this spectrum stands the architect, or the 'draftsman' of the 'Albertian Paradigm' as architectural historian Mario Carpo has phrased it (Carpo 2013), that through his pen (or cursor) orchestrates architectural interventions, unrestricted by context or material specifics, thus scalable and replicable. At the other end stands the 'craftsman', who through his transparent technologies is directly engaged in the material world, uncovering its complexities and unique possibilities. Hale further elaborates:

The carving out of a special niche for design within the construction process [...] involves a necessary degree of alienation between thinking and building, which is at the same time both liberating and troubling. (Hale 2012, 524)

To the practice of the 'modern' architect, an inherent aspect of alienation is thus a constituting quality. But, this alienation is a spectrum, framed by a tension between 'drafting' and 'crafting'; 'opaqueness' and 'transparency', or as architectural theorist Marco Frascari coins it; 'constructing' and 'construing' – the 'knowledge of construction' and 'the construction of knowledge' – derived from the etymology of technology's 'techne' and 'logos' (Frascari 1983). In the article 'Tell the Tale Detail', Frascari points to building detail as the technological dimension for balancing this tension, as opposed to the plan which historically has been given predominance in the 'modern' architectural practice (Frascari 1983). Frascari writes:

In the details are the possibilities of innovation and invention, and it is through these that architects can give harmony to the most uncommon and difficult or disorderly environment generated by a culture. (Frascari 1983, 2)

What Frascari frames is the tectonic dimension of architecture, as an expression or manifestation of intention transcending scales, bound together by construction techniques, materiality, structure, craftsmanship, and cultural context. Through this dimension, an architecture that either enforces distance or uncovers ecological interrelations between the built and the natural environment is formed. As alienation is default to the architectural practice – and scalable housing development in particular – aspiring towards transparency and material proximity over programmatic functionality and space planning appears to be the objective for a practice of care. This, however, does not mean fostering a blind focus on materiality alone, as the British anthropologist Tim Ingold argues:

[...] the prevailing emphasis on materiality obstructs our understanding of the fields of force and circulations of materials that actually give rise to things and that are constitutive of the web of life. (Ingold 2012, 429)

Thus, a closeness to the material environment encompasses recognizing the underlying ecological network of forces and complex systems that influence the production, distribution, use, and disposal of materials. For the architect of care, fully grasping this complex ecological network is a major challenge, but one that can be reduced when materials are locally available, unprocessed, non-composite, and biodegradable.

CONCLUSION

Conclusively, this section aims to unify the concepts, principles, and incompatibilities elaborated throughout the article, to fully frame the spectrum drawn between the dichotomy of quantitative and qualitative practices. At one end of this spectrum the practice of 'close-ended architecture' unfolds and towards this extreme is where most contemporary practices of housing development are situated. At the other end the conceptualization of a 'open-ended architecture' takes place, favoring the qualities derived from 'the practice of care'.

Thus, a completely 'open-ended architecture' does not follow a conventional life span encompassing a production phase, use phase, and end-of-life phase. It represents much more an assemblage of various life cycles, interchangeable, perceptible to change, and thus capable of engaging in relations of care and maintenance. A completely 'open-ended architecture' should therefore not be conceived as an isolated form, typology, or even as a singular building, restricted to Euclidean space, but as a rhizome that unfolds in all four dimensions of space and

time, with no beginning, end, center, or fringe. What is ‘open-ended’ is a continuous process of adjustments more than a solid form of certain intention. Through the lens of an ‘open-ended practice’, we do not conceive our natural environments as a ‘standing reserve’ but may, contrarily, understand our built environments in this way. Not with the aim of endless expansion, but with the aim of ongoing continuation. If ‘close-ended practices’ promise ‘solutions’ to the ecological crisis in the form of categorical targets, an ‘open-ended practice’ acknowledges that there are no quick fixes or solutions and that what is needed is a fundamental change in attitude towards our position and role in this crisis. Thus, an ‘open-ended practice’ represents a continuous endeavor to change for the better.

Table 1: Unravelling the spectrum between the poles of ‘close-ended’ and ‘open-ended’ reveals a wide range of concepts, principles, and incompatibilities. Source: (Petersen, 2023)

Close-ended architecture	Open-ended architecture
Guided by rational reasoning	Guided by an ethic of care
Quantitative (measurement)	Qualitative (meaning)
Generic	Specific
Scalable	Nonscalable
Universal	Context-bound
Certain	Uncertain
Predetermined	Indetermined
Form	Process
Obdurate	Malleable
Static	Dynamic
Submitting	Adjusting
Flexibility	Plasticity
Maintenance-free	Maintenance-capable
Homogeneity	Heterogeneity
Opaque	Transparent
Alienation	Proximity
Constructing	Construing
Drafting	Crafting

No practices can be conceived as completely ‘open-ended’ or ‘close-ended’. In reality, every practice is situated somewhere in between the outer poles. Thus, being solely ‘open-ended’ or ‘close-ended’ may be more a theoretical conception than a practical one. However, as elaborated above, the architectural practice of housing development tends to default towards being ‘close-ended’, driven by our rationalist mindsets, political constitutions, societal norms, professional conventions, assessment methods, etc. Thus, aspiring towards the qualities of an ‘open-ended architecture’ may be the broadest applicable conclusion to be taken from this paper.

Finally, one might wonder what position the architect should take within this spectrum of extremes. In addressing this, it is relevant to distinguish the everyday urban fabric as our housing from the singular manifestations of architecture that constitute our cultural, political, and educational institutions. In the book ‘Palladio’s Children’, John Habraken makes a similar distinction and further claims that today’s everyday urban environment, or ‘field’, is being addressed through an architectural heritage that stems from the creation of monumental objects (the Albertian paradigm) and that this mixing of fundamentally different practices results in conflicts and dissatisfactions echoing the problems outlined above (Habraken and Teicher 2005). Habraken further states:

We [architects] share another heritage as well, the heritage of master builders acting within living, growing, ubiquitous and autonomous built environment (Habraken and Teicher 2005, IX)

Thus, maybe the ‘architect of care’ should start by revisiting the pre-modern practices of vernacular housing, where our built environments were conceived as living ‘fields’, and where contextual sensitivity, material closeness, and the craft of the hand were constitutive qualities, emphasized over the scalable, extraordinary, and ideal.

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