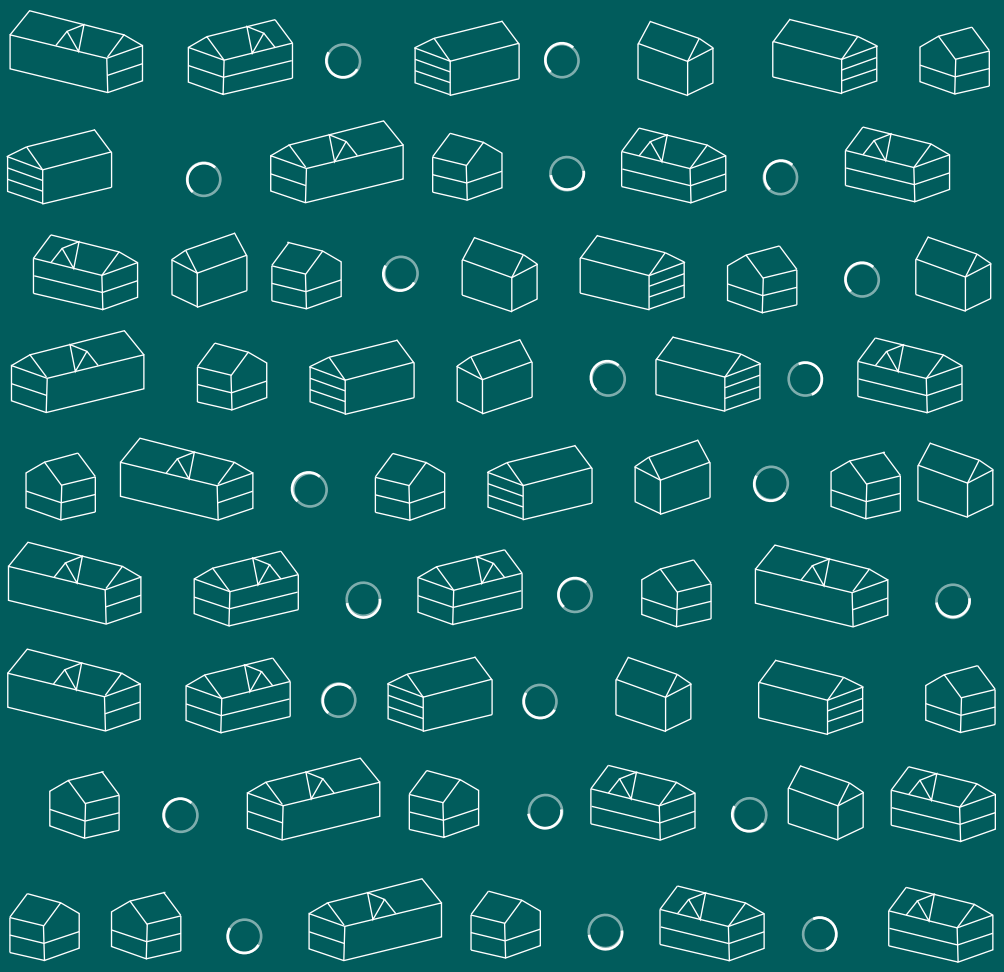

Parametric design and ecological awareness
The making of a tool for planning decisions

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Abstract

In our era, a new ecological awareness has been developing with the search for an environmental and planetary balance by dragging architectural design and urban planning into the debate (Gregory, 2013). The ecological issue gradually became, in the last decades, a design matter. Ecology, in the fold of architecture, wants to take a step beyond consolidated sustainable practices and promote a new balanced alliance between nature and humans, new ways of inhabiting the earth, and a new dialectic between natural and artificial (Causarano, 2017). In these terms, architecture is invested with the role of expressing a new philosophical and aesthetic vision by embodying ecological awareness and innovation in the fold of the information revolution (Wines, 2000).

The study grounds its roots in the context described and adopts a research-based approach to address the ***purpose of enquiring about the intersection between ecological awareness and information revolution related technologies in contributing to the foundation of a new philosophical vision of architecture and in triggering innovation and transformation in consolidated design practice***. How does it is possible to reach the purpose? The study tries to contribute to the debate on the theoretical and practical sides.

The purpose is addressed by different reading and enquiry plans developed in the dissertation in the following three parts: *Theoretical background and implications, The laboratory experience, Observatory on the experiment*.

The first part contextualizes the work's theoretical background and the starting research implications. It clarifies the background in its concepts, contributions, and terminology. It illustrates the theoretical recognition of ecology and digital technologies intersection supported by the elaboration of critical thought. It describes the wave of environmental, social and technological implications and the Academy-Industry collaboration model's influence on research development. The last part of the section is dedicated to introducing the research proposal definition.

The second part is the operative plan developed in the fold of a laboratory experience. It is dedicated to illustrating and discussing the original contribution of the thesis consisting of a digital tool planning decisions at a micro-scale to

create dynamic Embodied Carbon and Embodied Energy scenarios. In that context, the research employs the previous premises as a background and moves toward the practical exploration of digital dynamic methodologies. The procedure of creation and validation consists of building the perimeter of a real and working playground (made of roles, responsibilities, constraints, objectives and implications). Later, assemble the digital tool (by setting architectural and environmental impact variables) and putting it into play on a real action context to observe its performative power. The section documents the process and unfolds the digital tool's model/data responsiveness, its potential in hybrid configurations and decision-making scenarios creation.

The third part is dedicated to tracing the critical discussion and observations of the process and results in their theoretical and practical challenges. Its task consists in outlining a knowledge account founded on the observative and practical involvement in the research process. In particular, it builds a theoretical reflection by employing the laboratory experience process as a means of interpretation. It unpacks the research path stages and highlights its performative characteristics to trace the innovations that parametric practice can trigger in the design discipline. Besides, the observatory illustrates the performative characteristics of the tool in itself and comparison with traditional methods, its transformative power in the design process and its influence on the designer’s role and the creative process. It links back to the outcomes with the initial research questions and interests and outlines the potential of the research's theoretical and practical output in contributing to ecological debate in the fold of the information revolution.

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