

The *potential* of form. Assessing the *transformative potential* of existing buildings in the post-functional era.

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Extended abstract

The building stock is a crucial issue in the circular economy and plays a crucial role in sustainability (Merlino, 2018). The construction industry has the unfortunate primacy of being the largest consumer of resources and raw materials (Foster 2020). Central to the contemporary architecture debate is the adaptive reuse of existing buildings; within the preservation debate, also prominent architects argue that the total demolition of any historic building to make way for new architecture seems unthinkable. (Koolhaas et al, 2014)

Stemming from the roots of the preservationist debate, the research embraces the contemporary theories both related to the adaptive reuse practice (Wong, 2010; Byard, 2005; Douglas, 2006), and as to the most innovative approach of ‘Experimental Preservation’ (Otero-Pailos, 2016), ‘Postpreservation’ (Desilvy, 2017), and ‘Counterpreservation’ (Sandler, 2018).

The concept of *potential* emerges as a commonly used term in this literature, and yet its univocal meaning is questionable. Evidence suggests that the amount of *potential* is among the most important factors for design within the existing buildings. Although the term *potential* varies in the literature, there appears to be some agreement among the adaptive reuse field that *potential* refers to the ‘unexpressed transformability’.

The research aims to define, decode, and assess the concept of *transformative potential* in the existing buildings through a post-functional perspective. The work intends to define the nebulous concept of *transformative potential* in an operative perspective through its generative elements in the architecture realm.

At first, the literature review links the notion of *potential* in post-structuralist philosophy (Delanda, 2002; Jullien, 2002) with the prominent theories from hard sciences -starting from the Galilei’s gravitational theory- in shaping the *potential* as a secular concept.

The first essay attempts to provide a broad definition of *potential*, stemming from the roots embedded in other disciplines, the previous analysis and the investigation of such meaning within the architectural field allow us to propose a set of behaviours of the *transformative potential* in architecture.

The *potential* acts in a detected force field, and it may be positive or negative, it is multiple and not unique, acting as a function or a flow that needs a trigger element in order to be activated.

Secondly, references to the *potential* related to existing buildings (Douglas, 2006; Byard, 1998;) -involving the concept of flexibility (Schneider and Till 2007, Habraken 1990, Kendall et al. 1999) and morphological patterns (Clark and Pause 2012, White 1999, Ching 1943, Stone and Brooker 2004)- underlines the main elements consisting the concept of *transformative potential* in architecture.

The literature review in architectural studies suggests the *transformative potential* composed by endogenous elements affected by exogenous conditions. The *transformative potential* may express the relationship, both qualitative and quantitative, between multiple elements. As spatial elements –size, height, the geometry of the plan, configuration pattern, and tectonics of structure– and matter elements –materials and embodied energy– in a trans-scalar and diachronic perspective.

Building's location both in space –centrality, connectivity, 'urbanity,' open-space– and in time –physical obsolescence– structures the exogenous conditions of *transformative potential*.

The research will analyze 20 adapted buildings across Europe, North America and Asia as cases study through the *starting potential* elements and the reuse intervention.

The cases studies selection will consist of studies within a variety of morpho-structural types, as Weberian ideal types (Weber, 1949).

The classification of buildings in typologies crossed the classical treatises spanning from Vitruvius to Durand. (Cesariano, 1581; Durand, 1809) Here, the proposal is to unbuild the classical typological classification in place of a morphological one, assuming the questionable role of the *new* building over the present sheer amount of built stock.

Such buildings faced diverse adaptive reuse approach, from radical to minimal, that started from a diverse state of decay of the original building. The cases selection includes the primary structural materials, such as bricks, concrete, steel and timber.

The research method follows a multidisciplinary approach integrating the *Research-by-Design* method with the retroactive-embodied energy assessment of the existing structure. A critical re-drawing of original buildings –highlighting dimensional features and configurational aspects– and graphical analysis of the adaptive reuse project will underline plausible links between them. The embodied energy analysis will show the amount of added, removed or displaced in each reuse activity. (Jackson, 2005; Benjamin, 2018). *Exogenous conditions* assessment follows the Space Syntax's theory that will measure the connectivity of the former building (Hiller, 1984; Marshall, 2008) and the *ARP model* for the obsolescence calculation (Langston, 2013).

The results may underline a correlation pattern between the formal starting conditions of a building and its adapting reuse intervention.

Some sub-questions emerge. Such *transformative potential* increases in the balance between the usage options and the intervention of adaptive reuse. Through which characteristics does an existing architectural object underlie its options for use? The concept of *transformative potential* may link morphotype and possible use inherent in the existing form and materials. Both conscious decay approaches and radical design projects may show an analogous *potential* average? May exists several kinds of *transformative potential* in the built environment?

The theoretical objective is to add the concept of *transformative potential* to the current preservationist debate. The novel notion may enlarge the preservation theory following a post-functional perspective in the evaluation of existing buildings.

The task is to express the *transformative potential* as a relationship between computable elements, capable of giving weight to multiple use-options in existing buildings.

The case studies are all kind of relevant buildings in architecture panorama, as 'monuments' in adaptive reuse practice. Further research should focus on 'anonymous' buildings, that faced a process of decay and change of use even if not under the adaptive reuse label.

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Design Driven Research

The research aims to impact on sustainability issues of buildings, rescuing the central role of architecture in orientating the future while addressing the environmental awareness. The process follows an interdisciplinary methodology, as fundamental in dealing with complex systems such as the built environment. The research path follows the Research by Design method as the main drive. By analyzing several buildings, the first instrument is the drawings of the two main steps recognized as crucial; the original project and the adaptive reuse one. The redraw of the existing allows rediscovering the buildings through the lens of the research questions. The relationships between information already present emerge by diagrams and schemes. The quantitative data analysis lead by the embodied energy assessment and the quantitative dimensional factors ingrate the qualitative findings. The spatial network analyses integrate both qualitative and quantitative results.

Keywords_ adaptive-reuse, transformative potential, morphotype

Bio

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She is an architect and a PhD fellow at 'Future *Urban Legacy* Lab'. Her PhD research focuses on the *transformative potential* in existing buildings. Until 2018 she keeps working both as a freelance architect and as a teaching assistant in the Design Lab at UniFe, taking part in the organization of EARN international workshop in Sarajevo. During 2017 she worked in *Zimoun Contemporary Art Studio* in Bern. In 2017 she graduated at the Faculty of Architecture of Ferrara, with a thesis focused on design strategies for a post-industrial site in Porto, in collaboration with the FAUP.



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