

Integrated Science 34

Jose Antonio Lara-Hernandez
Alessandro Melis
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Priscila Besen *Editors*

The Dusk of Design


Exploring Multidisciplinary Approaches
and Evolutionary Biology in Architecture

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Editors

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To the curious minds who work tirelessly in multidisciplinary environments, bridging gaps between knowledge and practice. Your commitment to collaboration and innovation shapes the future of both design and research, and this book is a testament to your enduring impact.

Preface

In a world increasingly defined by uncertainties, the field of architecture and urban design stands at a pivotal crossroads. *The Dusk of Design* emerges as a vital anthology that explores the relationship between form and function, between cultural heritage and forward-looking innovation. It is within the pages of this book that readers are invited to journey through realm of thought, but also practice, engaging with ideas that challenge the status quo of architectural theory and practice.

The collection of chapters curated for this volume reflects a broad spectrum of perspectives, each contributing to the discussion on the potential and maybe responsibility of architecture to respond to and shape the human condition. From the granular details of material science to the expansive urban scales of city planning, the works presented here offer a profound exploration of how we can better understand and craft our built environment in an era of unprecedented environmental, social, and technological change.

This book is rooted in the principle that design is not merely an act of creation but a complex, diverse and multi-disciplinary response to cultural, ecological, technological, and social challenges. Recognising that each piece of architecture is a statement of hope, a manifestation of how we see our place in the world and how we envision our future within it. The diverse contributions within this volume challenge us to think beyond the traditional paradigms of architecture and to consider the broader implications of our work on the world and its inhabitants.

At the core of *The Dusk of Design* is the recognition of the need for a shift from deterministic, human-centric design practices towards approaches that are more adaptive, inclusive, and evolutionary. The chapters deepen into theoretical and practical realms, exploring how we the principles of exaptation, redundancy, and diversity can foster architectural and urban forms that are capable of adapting to changing needs and unforeseen future conditions.

The book is structured to reflect this journey through layers of understanding and application. It begins with a philosophical examination of the role of design in our society and gradually transitions into practical case studies and specific design innovations that embody these principles. This structure is designed to provide a comprehensive narrative arc that mirrors the process of transformation from theory

into practice, from concept into concrete reality. Although, it could seem as chaotic as evolution is too.

Moreover, the authors included in this volume bring a rich set of experiences and insights, drawing from a multitude of geographic and professional backgrounds. This diversity is not merely academic; it is a deliberate choice to reflect the varied ways in which architecture impacts and is impacted by the global community. Each chapter contributes a unique voice to the dialogue on how we can reshape our approaches to design in order to create environments that are more resilient, responsive, and reflective of the diverse world we inhabit.

As we face global challenges such as climate change, urbanisation, and social inequality, the role of architecture becomes increasingly complex and critical. Therefore, *The Dusk of Design* is a call to the architectural and planning communities to broaden their horizons and to embrace new methodologies. It urges professionals and students alike to think creatively about how design can influence and facilitate sustainable development, social cohesion, and enhanced quality of life.

In conclusion, these words seek to set the stage for a profound exploration into the future of design, offering a set of alternative lens through which we can reimagine our relationship with the natural and built environments. It is a guidepost for those who aspire to lead the charge in transforming our urban landscapes into more adaptive, inclusive, and resilient spaces. *The Dusk of Design* is not just a reflection on where architecture has been but an insightful forecast of where it must go, making it an essential read for anyone committed to the future of designing our world.

Auckland, New Zealand
September 2024

Jose Antonio Lara-Hernandez

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Reimagining Informality: Lessons from Naples on Growth, Adaptability, and the Value of Incompleteness in Urban Planning

Maria Simioli and Guido Robazza

Abstract

This paper explores the interplay between structured urban planning and the unpredictability of informality in urban development. At its core, it examines how cities, exemplified by Naples, evolve through informal, superfetative processes that stem from a grassroots level, contributing to their adaptability, resilience, and vibrancy. By challenging conventional planning paradigms, superfetation embodies a collective urban creativity that redefines urban landscapes in response to changing community needs and environmental conditions. The discourse is framed within the theoretical context of systems theory and biological paradigms, advocating for a planning methodology that can embrace flexibility and adaptability. This approach reflects the principles of autopoiesis in biology, where systems are self-creating and continuously evolving. The paper argues that cities can be interpreted as Complex Adaptive Systems (CAS), where informality plays a crucial role in fostering a symbiotic relationship between urban environments and their inhabitants' individual experiences, needs, and creative solutions. The paper presents case studies from Naples, specifically focusing on the practices of superfetation within this complex and rich urban settings. These examples demonstrate how informal architectural practices, while often at odds with legal frameworks, provide essential contributions to the city's architectural and social fabric. The study suggests that such practices should not only be tolerated but actively integrated into the planning paradigm to enhance urban resilience and adaptability. In conclusion, the paper calls for a re-evaluation of urban governance and planning regulations to

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acknowledge and incorporate the value of informal processes. It proposes a shift towards more inclusive planning frameworks that accommodate the fluidity of urban life and recognize the contributions of all citizens to the urban design process. This approach would not only enhance the vitality of cities but also ensure they are better equipped to respond to future challenges. The insights gained underscore the need for further research into the integration of informal practices within formal planning to maintain their essence and vitality in urban development.

Keywords

Superfettation • Adaptive architecture • Informal urbanism • Naples

1 Introduction

The potential for innovation that informality can bring to contemporary design, to make it more adaptive, plural, and open to the complexity of living, is fundamental to reconstituting planning as a resilient process in an increasingly crisis driven global reality. The phenomenon of urban informality is at the heart of a broad international debate that today seeks to recognize informality as the value of a new paradigm of the contemporary city [1] and the foundation for constructing a new epistemology of planning [34].

Informality has, in fact, long been an essential part of the organic design and self-construction of urban spaces, which can constitute community created shanty towns that elicit pity or anxiety from traditional planners [45] but equally generate ‘architecture without architects’, structures with often more general and enduring appeal than the divisive modernism of Le Corbusier [35]. In truth, as Ward points out, much of global urban growth in the twentieth century came in the form of ‘popular’, ‘unofficial’ growth, existing often partly or mostly outside the formal recognized economy of the cities being grown by this process [47].

The key change in a post-Quito Agenda phase is to adopt an attitude of optimism towards the idea of melding planning and informality, or rather planning for informality [23]. In this perspective, informality need not be seen as a separate and opposed process to planning, but rather planning can be used to generate space and platforms for informal innovation, the space-making to create settings for bottom up and DIY social uses which Pablo Sendra defines as ‘infrastructures for disorder’ that are “a point of departure for a continuous and open process” [39]. Such ‘minor projects’ could be seen as cracks in the ‘constellation of thoughts’ around the purpose of space allowing new and different ideas to emerge in a fertile environment [8]. The reference to this last term, “Minor Project” by Camillo Boano, reestablishes the concept of the ‘minor’ not as referring to a minority but to a difference “The project, when it clashes with becoming, with the possible, becomes imprecise, indeterminate, latent; possible because it interprets the possible not as

inventions and novelties—simply not thought of—but as differences" and to the possibility of being a de-constituting action of the project "at the centre is the generative process and not the final image".

Through superfetation, the 'parasitic architecture' [28] that sees new purposes and new structures built onto existing buildings, we may see cracks in the otherwise closed 'constellation of thoughts' of urban planning, and a possibility, if this informality is tolerated, to generate bottom-up processes of urban transformation that can see a closed city become more open.

2 Theoretical Framework: Evolution in the Design Paradigm

The attitude of city development has been shaped for decades by the perspective of The Charter of Athens [9], in spite of the creation of many competing perspectives and critiques during that period but there has been increasingly a shift in the top down, rigid approach in favour of flexibility and informality as laid out in the Habitat III Quito Agenda and models that mirror biological processes have been found to act as useful perspectives on the value of this approach.

There has long been a syncretic relationship between thought relating to the built environment and the openness and variability as witnessed in biological systems. As early as The Doorn Manifesto by Team X from 1954 [43] began to question whether housing should not be conceived as a closed system but needs to weave relationships with the surrounding environment, a few years later, in 1959, the "Open Form" manifesto by Oskar Hansen [37] encouraged participation in artistic works, considering art as a process capable of promoting flexibility and variability, deliberately seeking to limit the architect's action to the creation of a "perceptual background" where users can manage and adapt their architectures. Hansen's manifesto is influenced by Geddesian theories, which already in 1915 argued that cities must evolve together with the environment, as an open and autonomous organism [19], with the term "biopolis" indeed it supports the need for a city and a form of planning as a living and open system. The "Mobile Urbanism" manifesto by Friedman [17] also experiments with a construction system that allows occupants to determine the design of their constructions incorporated into large supporting structures, spatial frames, with low impact on the ground. In the '60s and '70s, Jorn Utzon's reflections, according to the Additive Architecture model [46], show how the concept of assembly allows at the same time to create unified organisms while being incremental, flexible, and economical. The concept underlying these considerations is that it is possible to generate an infinite variety of configurations with a modest number of elements. Finally, the provocative manifesto-experiment "Non-Plan: An Experiment in Freedom" by Paul Barker, Peter Hall, Reyner Banham, and Cedric Price [3], while recognizing the need for economic planning, opts for greater flexibility in the production of space, identifying areas, limited zones where regulations would have been removed.

These incremental approaches, building on the use and reuse of limited basic elements, lend themselves to a biological interpretation of the city, whose form can evolve, and change based on pressures and circumstances. Fundamental to this perspective is the concept of exaptation, as recently highlighted by Melis & Pievani, implying that elements with one purpose or no purpose, put to work to solve new or different problems, can develop unexpected uses that can expand the life cycle of the existing structures, vital for increasing resilience and reducing harmful environmental impacts [31]. In biology such unexpected uses are described as ‘spandrels’, a term appropriately borrowed from architecture [22] but while a spandrel is only an aesthetic imposition on a redundant space created by the necessity of form, architecture is capable creating functional forms with enough openness to allow its users to define fundamentals of how they are used or lived in, as with Alejandro Aravena’s Iquique housing project [32].

As Sennett laid out in *The Open City* [40], reflecting on Jane Jacobs’ emphasis about the importance of the ‘unexpected encounter’ and ‘chance discovery’, cities must be spaces where uses and users overlap and mix to be creative and adaptive enough to be resilient. Of particular importance is the concept of ‘incomplete form’, a condition that leaves the full uses and interpretations of the built environment open, both for reinterpretation and for future dialogue with the adjacent development which will succeed it [40]. Any design is essentially a single creative act in a persistent and ongoing process which must acknowledge the unknown needs of the future to be negotiated with and imposed upon it, in opposition to creating something that must be destroyed and replaced once its design purposes are outlived. Rahul Mehrotra perceives the characteristics of elasticity—in relation to the unimaginable uses that are inscribed in space through practices of spontaneous appropriation and re-appropriation—incrementalism, as capable with small moves, micro-actions, gradually, of improving over the course of time cycles both the image and the physical form of spaces, which are “consumed, reinterpreted, and recycled” [30]. This principle is of ancient formation, if one considers the Milanese Courtyards of the early twentieth century, spontaneous agglomerations built very often with debris recovered and leftovers from construction sites where many of the workers worked [44].

3 Superfotation as Variability

A key concept that architecture and urbanism can adopt from biology, and that has been adapted into a range of disciplines, is autopoiesis. Autopoiesis is the capacity of a system to self-generate and self-maintain. This term, created by biologist Humberto Maturana [29], has become a key influence on systems thinking. Within urban theories, the term lends itself naturally to a more organic way of conceiving of the city as a self-generating but also continuously evolving organism [31]. Evolution is not a process of design from without, where forms are created with a specific purpose in mind to adapt the organism to a purpose, rather change must come endogenously and existing forms exapted to new purposes. Conceiving of a

city in this way allows us to see not just the value of informal, bottom-up changes in self-generating change to suit the urban environment, but also to recognise the vital importance, when planning or designing, of creating forms that allow for reinterpretation, reuse, or even absence of immediate purpose, for informal use to shape. Thus, the embrace of variability emerges as a fundamental design principle, vital for producing dynamic, adaptable environments adapted to the changing human needs and contexts. The capacity to integrate change and adaptability into the built environment is essential for the evolutionary vitality of cities and their ability to respond to the citizen's needs.

From a systems theory perspective, both biological organisms and cities can be seen as Complex Adaptive Systems (CAS) [24]. A CAS consists of a dynamic network where the interactions among its parts create complexity, and its overall behaviour cannot easily be deduced from the actions of its individual components. Such a system is adaptive, meaning, the behaviour of both the individual parts and the system evolves and self-organizes in response to specific events or a series of events that introduce change. This system is essentially a large-scale collection of smaller, somewhat similar, and interconnected structures that come together to adjust to environmental changes, aiming to enhance their collective ability to endure and thrive [2, 27]. Seen and understood under this perspective, a parallel between the evolutionary processes in biological organisms and the development and adaptation processes in cities can be drawn. Recent studies on urban morphogenesis have compared them to CAS [36, 48]. By viewing urban evolution through this lens, it's possible to appreciate the nuanced and multifaceted ways in which cities adapt and transform, driven by the collective intelligence and actions of their inhabitants.

The phenomenon of superfetation plays a key role in this discourse. Superfetation, in architecture, identifies a volume extraneous to the original building, added as a makeshift element in a subsequent phase, often to respond to a functional need for which no other space was available [10]. A new built element is added to an existing building allowing new and different unplanned purposes to become part of the building, showcasing a creative adaptation to changing needs, space constraints, or aesthetic desires. More than a mere architectural extravagant addition, superfetation embodies the collective intelligence of city dwellers, their innate creativity, and their unmediated contributions to the urban fabric. It represents a grassroots form of urban evolution, where the atomization of decision-making through individual acts of design and adaptation reveals a rich, complex layer of urban intelligence.

Cities, seen through the lens of a System Theory perspective, are not static entities shaped solely by formal planning and design but are living, breathing organisms that grow and evolve, through the contributions of every inhabitant. This evolutionary process creates a rich palimpsest, a layered tapestry of historical and contemporary urban forms that embody the city's myriad phases of development and adaptation.

The informal creations by citizens, acting as ad-hoc urban designers, brings a diverse array of functionalities and forms into the urban landscape. This decentralized approach to city-making harnesses the collective wisdom and creativity of the population, contributing to environments that are more flexible, interactive, and inclusive. Such spaces offer a wider range of activities and respond to the citizens' needs but also embody the capacity to evolve, mirroring the dynamic nature of human societies.

By emphasizing variability and adaptability in design, we challenge the traditional notions of architecture and urban planning as creators of fixed, rigid spaces. Instead, we advocate for a paradigm where spaces are conceived to be as alive and evolving as the communities they serve. Naples is an incredible city that exemplifies the power of architectural and informal practices to leverage variability, creating built environments that are not only responsive to their users but also contributors to the vibrant, ever-changing fabric of urban life.

City planners, with good reason, often oppose this phenomenon, as it is frequently illegal and carried out in disregard of planning rules and building regulations. Indeed, there are profound ethical considerations; these illegal activities cannot be condoned when they harm health and safety or infringe upon the property of others. However, to focus solely on their illegality, without nuanced consideration, would be to fail to recognise the essential and historic nature to such incremental and informal repurposing that has contributed to create the fabric of cities in the global north and south.

Superfotation, as a manifestation of the collective intelligence of urban inhabitants, offers an alternative narrative on the biological evolution of cities. It highlights the significance of variability in the evolutionary process, presenting a city's ability to adapt and transform as a direct reflection of its inhabitants' capacity for innovation and creativity. Through this process, cities evolve not as monolithic entities but as vibrant ecosystems of human ingenuity and adaptability.

4 Case Study: Naples as an Urban Palimpsest

Discussing informality in Naples, the city par excellence of the “art of *arrangiarsi*”.¹ requires a necessary clarification. “*Arrangiarsi*,” derived from the French “*arranger*,” meaning “to adjust, combine, organize,” assumes a significant meaning and implies an attitude that oscillates between legality and illegality, translating into the creative capacity, flexibility, and adaptability of a community whose sole imperative is survival. Exaptation [21, 22], Naples becomes “arrangement” as the optimization of the potential of available resources through an adaptive and creative process to new developed conditions. This characteristic not only roots itself in the lifestyles of a community but also becomes an expression of the culture, history, and form of the city stratified over centuries. It builds palimpsest [11]

¹ The title of the 1954 film by Luigi Zampa.

a long process wherein not everything found on the surface corresponds to the most recent layer, and vice versa [38]. This represents that mode of arrangement, capable of compensating for the deficiencies of basic services according to a model of “informal welfare” [12]. The metropolitan area of Naples is configured as a set of forms built between the planned and the unplanned, which refers to an informal growth of and cities seeking solutions that go beyond traditional modes and organizational systems: from practices of political and social squatting, including processes of occupation of buildings and public spaces for forms of community self-organization [13] to the privatistic one of building abuse [14]. This issue highlights the different dimensions of informal and abusive phenomena, one as a creative mode capable of generating commodities, the other as a process of undue appropriation of resources aimed at increasing one’s profit.

The superfetation, synonymous with makeshift spontaneous architecture, loses its negative connotation and becomes a vehicle for new design values [20]. Superfetation is a sort of spontaneous evolution of the building, uncontrolled in terms of design and unforeseeable at the time of construction. If we trace a sort of history of Neapolitan architecture, alternative to the official one, less ostentatious and closer to the narrative of the real use of spaces by people, additions often fulfilled a specific need: the addition of a sanitary service, a small storage room, or a kitchenette. In the plans for the recovery and enhancement of the city’s architectural heritage, particularly in the historic center, superfetations end up conditioning the writing of subsequent chapters of the project and determining the city’s external image [4]. Often, superfetation, viewed from a purely regulatory perspective, is an element to be eliminated, but there are exceptions that can create an opportunity for rethinking and awareness of different valorisation possibilities. Emerging as an example of this form of attractiveness and local assertion are the “bassi” of the city, now protagonists of a new vital dimension thanks to the tourism boom, thanks to spontaneous actions by groups of people that have led to a regeneration of the “bassi”, conferring on them a growing and innovative importance identified as “laboratories of change” [6]. Resuming Benjamin’s words that define Naples, “porous as this stone is architecture. [...] Everywhere, vital space capable of accommodating new, unforeseen constellations is preserved. The definitive, the characterized are rejected” [5]. Superfetation, therefore, serves as a useful device to express differences, understood as the functional needs of the communities that inhabit them, as an architectural element made of makeshift, recycled materials, constantly changing, adaptable, and modifiable, which places the citizen as an active user of transformation. These realizations, based on individual initiative, cannot be considered simple abusive works to be eliminated, as they have responded to a latent demand for basic functions and services that the original projects had failed to intercept or that have matured in recent years and represent modes of spontaneous adaptation. In contexts of illegal construction, on the other hand, superfetation has often become a useful element for subsequent transformations over time, becoming, in its redundancy, a local characteristic of the places. The theoretical background of this new forms of informal planning [7, 26], or DIY urbanism, which delineate the geography of the

infinite design variations of bottom-up practices. The real success of these initiatives lies in their unique potential to intertwine with longer-term renewal processes and a greater sensitivity to the reading of local specificities: cultural, social, and ecological. They promote new forms of participation and the interaction of new social and ecological competences and awareness [33], today ecology itself represents the field through which many of the mentioned approaches are trying to overcome the conflicts and dichotomies that characterize the design of the existing city, placing landscape design at the centre. The influences between the world of DIY urbanism and Ecological urbanism [25] are evident appropriation, finds its maximum expression in common goods [18], the former Asilo Filangieri and Scugnizzo Liberato; but also practices of reappropriation of open space, such as of the urban gardens in Ponticelli, as a form of reuse of a large green space in the heart of the public city. In this essay, we examine the role of superfetation as an architectural device capable of producing diversity and accommodating the unexpected, in the contexts of public residential construction and in the Municipality of Lacco Ameno on the island of Ischia.

The theoretical premises of this work lay the foundation for conducting an exploratory analysis on the role of superfetation as an informal device in the city of Naples, specifically aimed at the creation of new and diversified forms of territorial engagement. In particular, informality is here assumed as a value field to reorient the project, capable of enabling harmonious relationships and more accessible and adaptable transformation processes, while related to the economic feasibility of private actors. This approach, besides being more sustainable, ensures the necessary openness towards incremental, organic, and grassroots development. Specifically, the solutions identified stem from the observation of informal practices, highlighting their collective value, and seeking to understand the methods, processes, and interventions through which the phenomenon can be brought into the legal sphere of use. This work was conducted through an inductive methodological approach, which, starting from sensory experience, was able to recognize informal uses and define their collective value, aiming to understand the methods, processes, and interventions through which the phenomenon can be brought into the legal sphere. The choice of the study area, the complexes of public housing and the unauthorized buildings on the island of Ischia, was supported by the intention to record and interpret superfetation as an expression of informality in both planned contexts, the first case study, which evidently failed in its observance and compliance, the result of a top-down project, and in an unplanned context, the unauthorized one of the second case study.

5 Superfetation in Public Housing: Domitian Coast and Island of Ischia

5.1 Public Housing on the Domitian Coast

Public housing in Italy, *Edilizia Residenziale Pubblica* (ERP) has often been subject to unauthorized alterations and spontaneous modifications of private and collective spaces, known as abusive superposition, which have often been considered synonymous with urban decay and functional obsolescence, as they are constructed with poor materials, quickly and by unqualified individuals within the family network. However, if superposition is assumed as an expression of individuality, as a possibility for personalizing the living environment, and as a mode of local construction and cultural memory of the territory, then these elements become design tools in the construction of knowledge. Working from the observation of places and listening to communities re-centralizes the figure of the end user as a “user in the meantime”, allowing us to define an open project “that welcomes conflicts and dissonances” [41], because while it is true that this type of spontaneous work forms a strong bond between inhabitants and site, a process that we could define as “appropriation”, on the other hand, it entails the “privatization” of common spaces, ending up exacerbating differences and asymmetries in access to certain types of services connected to residence. The case study presented here does not represent the expression of how superposition is an architectural device that allows variability, but how it is a tool for reading differences, allowing the regeneration project to explicitly express plurality, flexibility, and the indeterminacy of solutions in legal forms. Below are the results of the experimentation conducted within the PINQuA² project on the ERP complexes of four municipalities on the Domitian Coast: Castel Volturno, Cellole, Mondragone, and Sessa Aurunca [16]. We will show the work on the Duca degli Abruzzi neighborhood is located on the historic center of Mondragone (CE) [15]. The external space of pertinence of the buildings is devoid of green areas and is made of impermeable materials used for parking, the few existing permeable spaces located behind the buildings are in a state of neglect and abandonment. The ground floors of the buildings originally built on stilts have been illegally occupied over the years by the construction of tuff masonry walls between the pillars of the ground floor, to create private garage boxes, while the balconies of the facades, enclosed with aluminium verandas (Fig. 1). Based on these factual conditions, improper uses and

² PINQuA “Innovative Housing Quality Program” conducted by the Department of Architecture of (DiARC), University of Naples Federico II, financed with PNRR funds and currently undergoing the executive design phase. Scientific director: Filippo De Rossi, Michelangelo Russo; scientific coordinator: Enrico Formato, Alessandro Sgobbo; Project coordinator: Giovanni Multari. Project team: Eduardo Bassolino, Gilda Berruti, Claudia Colosimo, Salvatore Della Corte, Cinzia Didonna, Nicola Fierro, Giovanni Laino, Cristina Mattiucci, Eugenio Muccio, Giuliano Poli, Maria Simioli, Federica Vingelli.



Fig. 1 Identification of informal uses of public and private space

unauthorized superpositions have been identified: Verandas, covered and uncovered car boxes, garages, gardens, spaces for worship, dog areas, collective spaces, shops.

The location of these practices suggests their collective value, whether they occur in public or private places, enclosed or open spaces, collective or individual use, whether they generate profit or not, as criteria for understanding which of these elements can be recomposed in a systemic overview of the project.

Based on these considerations are identifies some design actions according to two macro-categories of intervention:

- (a) Buildings: It is involves not only the redevelopment of the properties and energy efficiency improvements but also the construction of a structural framework, in addition to the original building, as a space that offers freedom of use and generates possibilities for evolution; on the roof, as well as on the ground floors, volumes will be identified in which it will be possible to establish a variety of temporary uses, subject to change according to needs (Fig. 2).
- (b) Open spaces: Interventions for the regeneration of open spaces involve the integration of some functions and uses of collective space, particularly the redesign of public space through the rationalization of pedestrian and vehicular paths. Furthermore, in spaces identified as “Playgrounds”, these are imagined

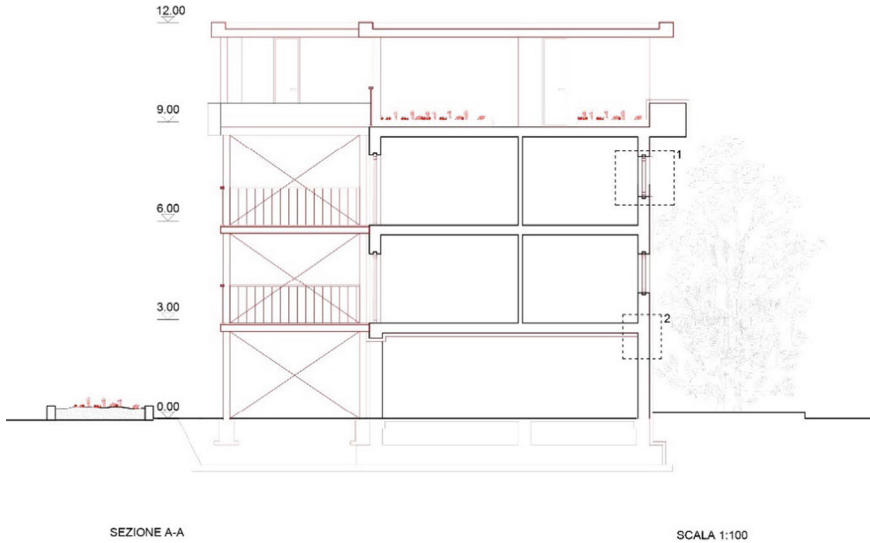


Fig. 2 Addition of volume on the facade for flexible and adaptive uses

as “blank squares”, i.e., places for which no specific use, spatial configuration, or user typology is defined, but rather unplanned places left to the indeterminacy of future actions, capable of accommodating “perturbances” (Fig. 3).

6 Island of Ischia

The case study of the island of Ischia examines how spontaneous practices of territorial modification have translated into adaptive architectures concerning the morphological characteristics of the local landscape, incrementally expanding in response to the capacity for enlargement, and flexible in accommodating new uses with variations in family and market dynamics. The study of superfetation, as an element of local architecture, was conducted as part of the studies supporting the Reconstruction Plan of the island of Ischia (PdRI) following the 2017 earthquake, by the DIARC, Univeristy of Naples Federico II [15]. The study aims to establish guidelines for an “informally designed” approach through the definition of minimal rules and the identification of informal architectural characteristics.

The case study of Ischia provides a fascinating insight into how spontaneous architectural practices can adapt and respond to the evolving needs of a community, particularly in the aftermath of significant events like earthquakes [42]. Let’s break down some key points from the study:

and sustainability, aiming to create a resilient framework for development while respecting existing natural and built environments. By emphasizing principles like incrementality, elasticity, and circularity, the plan seeks to foster organic growth and minimize environmental impact.

The concept of "minimal rules" suggests a light-touch approach to regulation, allowing for flexibility and innovation within set parameters. This approach seems well-suited to accommodate diverse needs and contexts, particularly in areas where existing infrastructure may need to be repurposed or where community-led initiatives are encouraged. The emphasis on preserving permeable areas aligns with contemporary priorities around green infrastructure and biodiversity conservation. By prioritizing the reuse of existing developed areas and minimizing soil consumption, the plan promotes resource efficiency and helps mitigate the urban heat island effect.

The allocation of space for self-construction within planned developments reflects an understanding of the value of vernacular architecture and community involvement in shaping the built environment. This approach not only empowers residents but also fosters a sense of ownership and continuity with local traditions. Furthermore, the focus on public and collective functions in areas earmarked for relocation underscores a commitment to fostering social cohesion and enhancing quality of life. By prioritizing amenities like parks, gardens, and communal spaces, the plan promotes inclusive urban development and addresses the needs of diverse communities.

The experience of the Island of Ischia demonstrates the intention, on a territorial scale of vast area, to delineate a planning tool capable of accommodating "perturbances" and guiding transformation.

7 Conclusions and Implications for Urban Governance

The paper explored the interplay between the structured world of urban planning and the chaotic beauty of informality in urban design. By delving into examples such as Naples' public housing, it explored the value of informal, superfetative processes from bottom-up practices, which are indispensable for city adaptability, resilience, and liveliness, and identified potential design and regulatory frameworks to accommodate them. Superfetaion processes, often operating on the fringes of legality, embody a collective urban creativity that challenges conventional planning creativity, and being able to include them in the ecology of the city can propose a paradigm where cities evolve organically, mirroring the complexity and adaptability of natural ecosystems.

This study thus identifies informality to play the major key role in fostering a deep, symbiotic relationship between the city and its people, one that is active every day, where urban fabric finds weaving threads of personal experiences, needs, and creative solutions. This perspective enriches the urban milieu and at the same time suggests one more layer of flexibility and resilience—something

that is most critical for a city under continuous change and battered by all kinds of unexpected circumstances.

Urban planning could embrace an open project methodology, capable of accommodating conflicts, diversity, and indeterminacy. This requires a shift towards frameworks that prioritize flexibility, adaptability, and the capacity to evolve over time, reflecting the organic nature of urban growth and the variety of human needs. Planning systems can comprise flexibility, allowing the city to stretch and change without losing its identity or functionality. This implies that urban planners will have to encourage the design of infrastructures and public places that can adapt for more than one kind of purpose or activity and answer the community's changing needs. There is a pressing need to redefine urban regulations in a manner by which informal and bottom-up processes should be recognized and absorbed in official planning paradigms. This involves developing new forms of regulatory inclusion that recognize the value of superfetation and other informal practices, transforming them from liabilities into assets for urban development.

The insights gained from this research have profound implications for urban policy, practice, and theoretical frameworks. Policymakers and urban planners are, therefore, invited to revisit the question of informality in urban development, probably through lenses that would bring forward its potential as a source of urban innovation, adaptiveness, and resilience. The result would support a call for a review of current planning regulations and practices, including a more inclusive approach that acknowledges the contribution of all city dwellers to the urban design process.

This is an area where future research must delve deeper: how these practices can be integrated with efficacy into formal planning without losing their essence. The works also establish the potential role of technology and new design methodologies for a more participatory and inclusive urban design process. Comparative studies across the cultural and geographical contexts may, therefore, shed more light on the universal and unique characteristics of informality and superfetation in urban development.

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Table 1 Practices and Locations

Practices	Public/Private	Open/Closed	Collective/individual	Profit
Veranda	Private	Closed	Individual	No
Parking	Public	Open	Collective	No/Yes
Garage	Public	Open	Collective	No/Yes
Shop	Public	Closed	Collective	Yes
Gardens	Public	Open	Collective	No
Playground	Public	Open	Collective	No

contributed to the *Introduction, Theoretical Framework: Evolution in the Design Paradigm, Superfetaion as Variability*, and *Conclusion*, while Maria Simioli contributed to the *Case Study: Naples as an Urban Palimpsest and Superfetaion in Public Housing: Domitian Coast and Island of Ischia*.

References

1. AlSayyad N, Roy A (2003) *Urban informality: transnational perspectives from the Middle East, Latin America, and South Asia*. Lexington Books
2. Anish S, Gupta A, (2010) *Insights from complexity theory: Understanding organizations better*. Indian Institute of Management
3. Barker P, Price C, Hall P, Banham R (1969) Non-plan: an experiment in freedom. *New Soc* 338
4. Becchi A (2001) *Napoli sostenibile? Logiche di sopravvivenza e modelli di sviluppo*, Napoli Sostenibile
5. Benjamin W (1978) *Reflections: essays, aphorisms, autobiographical writings*
6. Berritto A, Mazza R, Gabriella P (2018) Tradizione, informalità, innovazione: i bassi e il turismo a Napoli tra dimensione esperienziale e nuova forma di rivendicazione del locale. In: Fasolino, I. (ed), *Arte, Artigianato, Prodotti Locali, Turismo, Creatività*. pp 6–12
7. Bishop P, Williams L (2012) *The temporary city*. Routledge, London
8. Boano C (2021) *Progetto Minore: Alla ricerca Della minorità nel progetto urbanistico* (ed) architetonico. LetteraVentidue Edizioni
9. Burdett R (2018) *Contemporary Urbanism. The Quito papers and the New Urban Agenda*. Routledge, New York, pp 140–149
10. Coppola A (2017) Roma: la metropolizzazione parassitaria e i suoi modi informali. In: Cellamare, C. (ed), *Fuori Raccordo. Abitare l'altra Roma*. Donzelli, Roma-Bari
11. Corboz A (1985) Il Territorio come Palinsesto. *Casabella* 516:22–27
12. De Nicola A (2022) L'emergere del "Welfare informale", tra possibilità e contraddizioni. In: Gissara M, Percoco M, Rosmini E (eds), *Città Immaginate. Riuso e Nuove Forme Dell'abitare*. Manifestolibri
13. Esposito E (2020) L'occupazione informale di uno spazio di edilizia popolare come tappa di passaggio: la dimensione materiale Del percorso abitativo Di Un occupante abusivo nella città di Napoli. In: *Atti Della XXII Conferenza Nazionale SIU/ L'urbanistica Italiana Di Fronte All'Agenda*. p 202
14. Formato E (2020) Learning from do-it-yourself Naples. *Imparare dalla Napoli fai-da-te. Proyecto Y Ciudad* 11:69–80
15. Formato E, Di Iorio F, Giofrè V, Russo M (2023a) Un Cretto abitato. Ricostruire sottraendo. In: Galderisi A, Mininni M, Presta IG (eds), *La Declinazione Della Sostenibilità Ambientale Nella Disciplina Urbanistica. Atti Della XXIV Conferenza Nazionale SIU: Dare Valore Ai Valori in Urbanistica*. Planum Publisher, Roma—Milano
16. Formato E, Simioli M, Fierro N, Vingelli F (2023b) Abitare il territorio periurbano. Una proposta metodologica di rigenerazione per l'edilizia residenziale pubblica. In: Perrone C, Marchigiani E, Savoldi P, Tosi MC (eds), *Forme Di Welfare e Dotazioni Di Servizi, Un'eredità in Continua Evoluzione. Atti Della XXIV Conferenza Nazionale SIU: Dare Valore Ai Valori in Urbanistica*. Planum Publisher, Roma—Milano
17. Friedman Y (2022) Yona Friedman/pro Domo. *Actar D, Inc*
18. Gargiulo E, Cirulli A (2016) Gli spazi occupati a Napoli: informalità, trasformazioni urbane e discorsi Sui "beni comuni." Punziano G (a cura di), *Società, Economia e Spazio a Napoli Esplorazioni e riflessioni* 83–94
19. Geddes P (1915) *Cities in evolution: an introduction to the town planning movement and to the study of civics*. Williams, London

20. Giovanni Di A, Ranzini A (2022) I valori dell'informalità abitativa. In: Atti Della XXIV Conferenza Nazionale SIU Dare Valore Ai Valori in Urbanistica
21. Gould SJ, Vrba ES (1982) Exaptation a missing term in the science of form. *Paleobiology* 8:4–15
22. Gould SJ, Vrba ES (2008) Exaptation. Il bricolage dell'evoluzione, *Paleobiology*. Bollati Boringhieri
23. Haas T, Mehaffy MW (2019) Introduction: the future of public space. *Urban Design International* 24
24. Holland JH (2006) Studying complex adaptive systems. *J Syst Sci Complex* 19:1–8
25. Lentini M (2020) Il Progetto di Paesaggio come modalità di lavoro nei contesti urbanizzati contemporanei. Ricomposizioni di antinomie ostinate. *Ri-Vista. Ricerche per la Progettazione del Paesaggio* 18:38–61
26. Lydon M, Bartman D, Garcia T, Preston R, Woudstra R (2014) *Tactical urbanism*. Street Plans, New York, US
27. MacLennan B (2007) Evolutionary psychology, complex systems, and social theory. *Soundings Interdisc J* 90(3):169–189
28. Marini S (2015) *Architettura parassita Strategie di riciclaggio per la città*. Quodlibet, Macerata
29. Maturana HR, Varela FJ (1991) Autopoiesis and cognition: The realization of the living. *Springer Sci Bus Med*
30. Mehrotra R (2010) Simultaneous modernity. *Ruins of modernity* pp 244–250
31. Melis A, Pievani T (2022) Exaptation as a design strategy for resilient communities. In: *Transdisciplinarity*. pp 307–327
32. O'Brien D, Carrasco S, Dovey K (2020) Incremental housing: harnessing informality at Villa Verde. *Archnet-IJAR Int J Architect Res* 14:345–358
33. Robazza G (2020) Build art, build resilience. Co-creation of public art as a tactic to improve community resilience. *J Publ Space* 5
34. Roy A (2005) Urban informality: toward an epistemology of planning. *J Am Plann Assoc* 71:147–158
35. Rudofsky B (1964) *Architecture without architects. An introduction to non-pedigreed architecture*. The Museum of Modern Art, New York
36. Rybski D, González MC (2022) Cities as complex systems—Collection overview. *PLoS ONE* 17:e0262964
37. Scott FD (2014) Future Adaptability. In: Wieder A, Zeyfang F (eds) *Open form space, interaction, and the tradition of Oskar Hansen*. Sternberg Press Ltd., London, pp 34–46
38. Secchi B (2000) *Prima lezione di urbanistica*. Gius. Laterza & Figli Spa
39. Sendra P (2016) Infrastructures for disorder. Applying Sennett's notion of disorder to the public space of social housing neighbourhoods. *J Urban Des (Abingdon)* 21:335–352
40. Sennett R (2018) *The open city*. In: *The Quito papers and the New Urban Agenda*. pp 90–95
41. Sennett R, Sendra P (2020) *Designing disorder: experiments and disruptions in the city*. Verso Books
42. Simioli M (2024) L'informalità come struttura d'azione nel progetto dei paesaggi dell'abusivismo. In: Bricocoli M, Pezzagno M (eds), *Servizi, Dotazioni Territoriali, Welfare e Cambiamenti Sociodemografici*. Atti Della XXV Conferenza Nazionale SIU: Transizioni, Giustizia Spaziale e Progetto Di Territorio. Planum Publisher, Roma—Milano
43. Smithson A (1982) *The emergence of team 10 out of C.I.A.M*. Architectural Association
44. Staid A, Aime M (2017) *Abitare illegale: etnografia Del vivere ai margini in occidente*. Milieu
45. Turner J (1976) *Housing by people. Towards autonomy in building environments*. Pantheon Books, New York
46. Utzon J (2009) *Additive architecture*. Mogens Prip-Buss
47. Ward C (1996) *Anarchy in action*, Second Edition. (ed). Freedom Press
48. Wohl S (2018) Complex adaptive systems and urban morphogenesis: analysing and designing urban fabric informed by CAS dynamics. *A+ BEI Architecture and the Built Environment* pp 1–238

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