Producing Project

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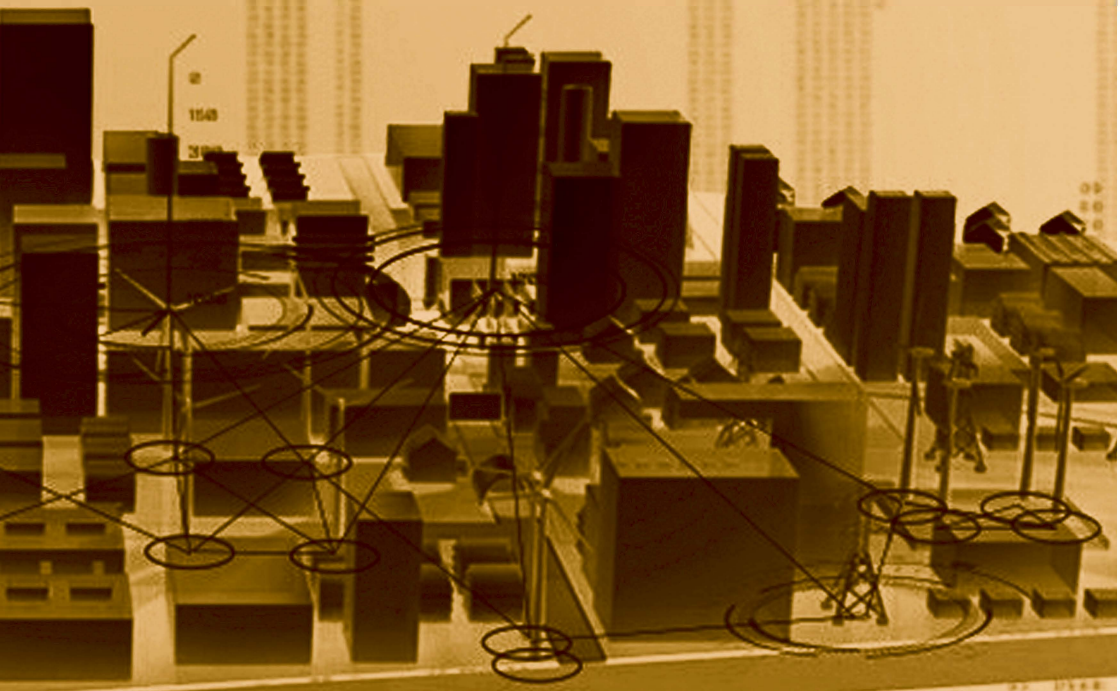

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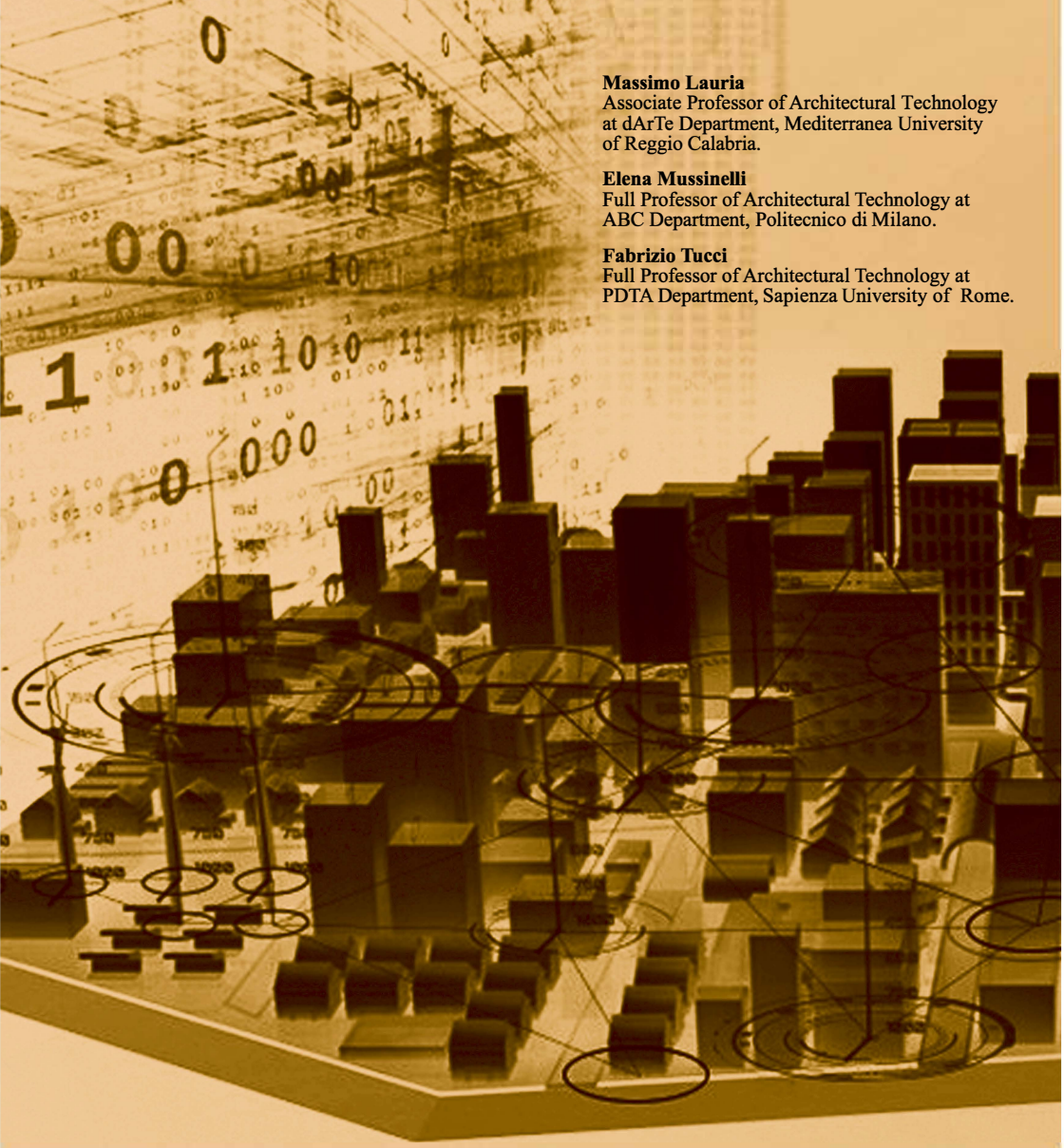

The transformations created about the design activity by the several challenges started by the economic crisis, climate change and environmental emergencies, together with the impact of the Web and ICT on social and productive systems, highlight many critical issues, but also significant prospects for updating concerning places, forms, contents and operating methods of "making architecture", at all levels and scales.
In this context, the cultural tradition and disciplinary identity of Architectural Technology provide visions and effective operating practices characterized by new ways of managing and controlling the process with the definition of roles, skills and contents related to the production chains of the circular economy/green and to real and virtual performance simulations.
The volume collects the results of the remarks and research and experimentation work of members of SIT*d*A - Italian Society of Architectural Technology, outlining scenarios of change useful for orienting the future of research concerning the raising of the quality of the project and of the construction.

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Book series STUDI E PROGETTI

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This e-book has been subjected to blind peer review process.

Cover:
adaption of
Siemens digitalization tour, Siemens, 1996-2019

ISBN 978-88-916-43087

Maggioli Editore is a trademark of Maggioli SpA
Company with certified quality system ISO 9001:2000
47822 Santarcangelo di Romagna (RN) • Via del Carpino, 8
Tel. 0541/628111 • Fax 0541/622595
www.maggiolieditore.it
e-mail: clienti.editore@maggioli.it

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3.1 DESIGN RESEARCH: FROM THE TECHNOLOGICAL CULTURE OF DESIGN FOR SOCIAL INNOVATION TO THE ANTICIPATORY AND CREATIVE FUNCTION OF DESIGN

Fabrizio Tucci[*]*, Laura Daglio*[*]

Abstract

The text has the function of providing a critical introduction to the third part of the book, which is focused on the moment of conceiving the design process, and then investigates the potentials of cognitive, experiential, and design models connected to the new forms of collective/cooperative intelligence for providing a response to the main challenges of the future: to design in a time of "crisis" in "emergency" conditions, in a state of "scarce resources" and under conditions of "uncertainty". The objective is to probe how ability to govern decision-making processes is developing – or may be developed in the near future – in what are now structural conditions shaped by the challenges raised here, by recovering the exploratory and creative aspect of the design activity and the dialogue between the different intelligences involved.

Keywords: Technological culture of design, Social innovation, Technological design, Predictive approach, Anticipatory function

Framework

The reflections collected in the third part of this book start from an assumption: the evolving modes of access to information, marked by continued mobilisation of skills and by the expression of a widespread intelligence coordinated in real time, are leading us to rethink the cognitive statutes and the factors driving design, by valorising the relational dimension of knowledge and its management implications.

This third part focuses on the moment of conception of the design process, to investigate the potentials of cognitive, experiential, and design models connected with the new forms of collective/cooperative intelligence in providing a response to the main challenges of the future, which were also discussed in the Introduction: designing in a time of "crisis" in "emergency" conditions, in a state of "scarce resources" and under conditions of "uncertainty".

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The objective is to probe how ability to govern decision-making processes is developing – or may be developed in the near future – in what are now structural conditions shaped by the challenges raised here, by recovering the exploratory and creative aspect of the design activity and the dialogue between the different intelligences involved. The possible topics that we may take as a reference to reread the meaning and reflections contained in the contributions are essentially three in number:

1. design culture and social innovation;
2. research and the predictive and anticipatory function of design;
3. which creativity for architectural design.

The considerations made by Schiaffonati and Ferrara introduce all the issues in a cross-cutting way, on the one hand with a theoretical/guiding contribution, and on the other through the possible articulation and exemplification of these perspectives in the specific dimension of a real case that stands out for the specific nature of the methodological contribution.

The central nature of the role of the architect active within the society in which he or she works, and to whose needs he or she attempts to respond, is achieved through an integrated conception of design that becomes a tool of research and knowledge, joining together scientific and humanistic aspects, an analytical and speculative dimension with a synthetic one more of the operational and experimental type – combined with an ability to anticipate problems that also requires innovating the very statutes of the design, in order to act proactively in the real world. The experience illustrated by Ferrara represents a possible (successful) road towards this renewal process which, through participatory processes among the stakeholders involved in the various phases of design development, introduces a new, shared and strengthened creativity, able to extend the horizons of exploration, thus heralding scenarios, even remote ones, but well rooted in a concrete economic and productive feasibility; it is the innovation of the process based upon broadening interrelationships and therefore upon the possibility for design to reinterpret the setting's demands.

Design culture and social innovation

The topic, on "Design culture and social innovation", opens with the contribution by Ferrante, reaffirming the central importance of the technological design approach, both from the historic point and, even more, from that of a contemporariness, marked by a new social demand and by the construction sector's transition to Industry 4.0. This is a design culture centred upon the designer's responsibility and upon the relationship that the designer establishes with the social context, customers, and business, aimed at satisfying the needs of society at large, also through forms of participation that are now extremely current in the development of programmes and projects for services and infrastructures.

In this sense, it is necessary to overcome national policies that reduce funding to university, research, and innovation, and instead to promote coordinated plans and strategies to relaunch collaborations between industry and university research in strategic sectors, at the service of society at large, in order to bring research and social innovation together.

A strong emphasis on some of the risks and problems characterising the topic may be seen in Ridolfi's contribution, which discusses the formation and transmission of design for which Ridolfi identifies certain critical areas particular to the rise of the digital era. Starting from a brief reconstruction of the evolution of information technologies in the postmodern condition, until the most recent repercussions on contemporary society, the author casts a light on the risks derived from the spread of computer tools simulating design practice and teaching, thereby signalling how it can in fact be reduced to an automatism where "knowing how to do" can be confused with "knowing" and with "knowledge" until even eclipsing them, losing the centrality of shared human and social feeling, also in spite of the evidence of the data.

Battisti deals with the issue of the complex relationship between "Design Culture and Participation" which provides the title for the contribution and is central to the topic's critical development. Probing the condition underpinned by issues for which there has been talk of the "end of the social" with reference to forms of relationality in contemporary communities in the age of globalisation, the paper analyses the development of inclusive processes, which during these years has been accompanied by their diversification, identifying their main variations: the inclusive processes inspired by the principles of participatory democracy; those inspired by values of deliberative democracy; and hybrid ones, that fuse participatory with deliberative aspects. This combination of legislative measures and axes of actions can bring interesting impacts, in the search for innovative processes, thanks to which design can less and less resemble a preset programme, and more and more multiply the players to be networked, in the conviction that only a polyphony of interests can yield appropriate solutions.Some contributions underscore methodologies and approaches of design for social innovation by way of research and experimentation projects that explore solutions for the regeneration of degraded settings, through the introduction of new public functions, different models for involving the community in the participation processes, and a rethinking of public space to amplify its role is theatre of social exchanges. In the essay by De Biase, Franchino, and Frettoloso, the relationship between the culture of design and social innovation takes concrete shape in the real case of regeneration of a neighbourhood in Castel Volturno, dealing with the issue of urban quality as an outcome of a systemic approach to design. The proposals, in fact, attempt to offer a response to the challenges of the multiethnic city through interventions on technological quality that also include endowments of public spaces and services for reception, integration, and intercultural exchange, able to adapt to continuous social

changes, without neglecting environmental quality through specific attention with regard to green infrastructures, biodiversity, and the protection and conservation of natural areas.

Bagnato and Giusto recognise a major role of social innovation in a new design culture that concentrates on redesigning and rethinking the public spaces of the street. The objective of this design commitment is to go beyond a construction of the city that impedes relations between the individual and the environment, denying the socialisation above all of "weak users" and to be oriented towards a cross-cutting approach that considers open space as a place of integration, of exchange, of easy, pleasant pedestrian availability for all users, with a view to Universal Design, aimed not only at residents but at Tourism for All.

Fabbricatti and Viola illustrate the outcomes and methodologies developed in the context of a project to recover the historic urban fabric of Torre Annunziata, promoted within a PRIN (2010-2012) research effort. Starting from the adoption of protocols mapping the resilience of the settlement system to define the potential of adaptability/transformability derived from the critical reading of the social, environmental, and productive resources and the resources of the constructed elements, from the scheduling of meetings with stakeholders and facilitators, and from dialogue with good international practices, design can generate social innovation with a shared vision of promotion of the built environment's production/business, through which to agree upon scenarios for progressively implementable urban and construction recovery.

Following the principles of the circular economy in a regenerative and systemic perspective, the research illustrated by Bosone and Ciampa casts light on the adopted methodology and the results of a recovery project for the city of Ercolano. The proposed degree of innovation resides in defining solutions not only on the physical, social, economic, and cultural level to create circular relationships and dynamics among local resources, but also in the players' involvement and in the interaction among decision-makers, stakeholders, users, and designs in all phases of the information and decision process.

This also makes it possible to strengthen the relationships among users and with the setting in which they live, through a process that raises individuals' capacity building and their sense of responsibility towards cultural, tangible, and intangible heritage, thus becoming an occasion for social learning and training.

Research and the predictive and anticipatory function of design

Of the various contributions in the subsequent part that may be related to the second topic, Angelucci's has the explicit objective of providing some possible responses to the complex question of the "predictive and anticipatory function of design" and deals with the theme of technologies for urban liminal

systems between inheritance and disciplinary evolutions, in which the main players in the reflections are in fact the "urban liminal" ones that, in their state of incompleteness, must be interpreted as thresholds of dynamic dialogue between technological and biospheric systems.

In these instances of unresolved spatiality, technological disciplines can contribute towards providing responses, thus determining outcomes important for the project's practices; tracing reasons and implications to link – through infrastructural, tangible, and intangible technologies – the cities' socioeconomic development with the connectivity and attractiveness of the territory and landscape; and operating for the reactivation of economic circularities, for natural recapitalisation, and for the qualitative reconfiguration of the very parameters of beauty.

In the essay by Ginelli and Pozzi, the productive dimension of design is understood as the ability to take on change as an intrinsic characteristic, to include an "adaptive/active" resilience capable of providing adequate responses to change through its own systemic nature of reaction to the transformation phenomenon.

The conception of "technological design of architecture", which by its very nature incorporates a specific attention towards feasibility and management, expands to include the functional transformability of the architectural work for a dynamic reuse. This definition of "design for time", understood as the design of intrinsic and continuative transformation, is in fact illustrated through numerous case studies and research projects.

Baiani deals with the issue of the relationship between speculative and design activity. In fact, given the transformations induced by post-industrial societies in the creative professions, design becomes part of the research activity, as a moment of critical synthesis for the elaboration of physical models, possible visions, and real images, to transition from the analytical/exploratory phase of research to the constructive/intentional one capable of heralding transformations.

It is also the task of training to transmit this notion of design as a multidimensional, synergistic setting among different technical knowledges and between theory and practice – a setting that may give rise to a degree of innovation capable of providing some responses to society's pressing new needs.

The contribution by Cellurale and Clemente raises questions on technological design as an instrument of simulation and of cognitive prefiguration. The reflections start from a question: What cognitive and conceptual abilities will have to be acquired or strengthened by the discipline of technological design, in order to sustain the role of interpreter of the built environment?

To try to provide some answers, the contribution dwells on the aspects connected to the modelling of the energy users' behaviour, in the processes of requalifying the existing heritage, and on assessing the weight of this variable in general structure of design.

The reasoning will be applied to a study in progress, the results of which will be presented, centred upon innovation in the use of spaces and upon the environment's impact in the cognitive strengthening of the occupants.

Gallo and Romano investigate the repercussions on design, on its capacity for viewing and rearticulating the problem, as the outcome of the introduction of digital technologies and of the new modes production connected to Industry 4.0, above all in order to grapple with environmental challenges. It is a matter of the possibility, thanks to BIM tools, of simulating and thus of assessing, contemporarily, geometric/formal characteristics, energy/environmental performance, and the cost for constructing and operating the building, as early as the preliminary and conception phases of the architectural work.

From an analysis of the possible impacts on the design of adaptive, high-energy-performance envelope systems, the text highlights the need to evolve from "collective" to "connective" intelligence, in which the designer is bearer of the knowledge connected to the operative and decision-making processes of horizontal skills capable of foreseeing, anticipating, and optimising solutions able to respond to scenarios in continuous change.

Cecafosso's contribution concentrates on expanding the possibilities for foreseeing, projecting, and anticipating the decisions provided by the introduction of the new digital technologies. In fact, the essay analyses both the potentials offered by software for building performance simulation, BIM, and parametric design, and the actual developments in progress in terms of parametric design and simulation of energy behaviour.

These developments are making it possible – and will make it possible with ever more efficiency – to control the technical/morphological variables of buildings in order to implement their energy performance in relation to the characteristics of the context.

It is an interesting and in certain ways fascinating exploration of the selected alternatives, based on comparisons, in measurable terms, of the respective performance profiles, for which the final choice always lies at any event with the architect.

Given the challenges of contemporary life, Rotaru identifies, as an important setting for expressing design activity particularly similar to the systemic approach of technological culture, "network design" also as an alternative to the traditional way of designing cities, and above all as the possibility of uniting theory and practice, individual thought and community action, research and reflection in action. In fact, "Network Urbanism" for the principles of flexibility and combined use of resources that it requires, represents a model to accentuate the holistic dimension necessary for designing the city.

Through the experience of a European research project in progress (*Civitas Prosperity*), obstacles and opportunities are highlighted, and the systemic and adaptive dimensions of the technological approach to design are confirmed, to guarantee the effectiveness of the transformations foreseen for the future.

Which creativity for architectural design

The series of contributions that may be related to the 3° topic, revolving around the search for new forum of creativity for the future of architectural design, focuses on the evolutionary dimension of the design activity in light of the environmental, social, economic, and cultural transformations in progress. There are two key concepts for interpretation that appear to emerge from the contributions: an initial one explores the possible future developments of the relationship between design and community, both understood as a collective and shared production, and as a commitment to society; a second one examines the ability/need to intervene on the environment in the future.

An interesting aspect emerging from the standpoint represented by the 1° topic is the one that wonders about the new responsibilities and the new roles and governances of technology in design *versus* the collaborative city, as investigated in Maspoli's contribution which stresses that, with a view to a city that is fairer, more resilient and democratic, the culture of technological design must deal with new, transdisciplinary scenarios and new instruments, and that it may play important roles of "qualification for design" with particular reference to the following three roles:

- an initial role, which regards accompanying citizen in realising possible and tangible technical results of his or her doings in the new way of dwelling;
- a second role, which concerns interactions with bearers of active citizenship in the design of public spaces or shared "third spaces";
- and a third role, which concerns the competences of public management and coordination of associationism and innovationism, in relation to spatial factors and putting into play complex competences and ethical responsibilities in choices involving future generations.

A possible contextual interpretative framework, the Anthropocene, traversed by epoch-making innovations, but still without a shared cultural positioning, is offered by Rigillo's essay, which outlines the significant characteristics of the change, as made clear in the contribution, in that they are capable of bringing about some impacts upon the configuration of space and upon lifestyles. At the same time, some lines of behaviour are identified, and some possible approaches are outlined, that might reassign centrality to design and to the technological culture that supports it. This is required to reformulate the logical structure of the design process, of the expected performance, and of the parties involved, in addition to new strategic alliances between the world of research and that of production, in order to develop new hardware and software, but also innovative practices of technology transfer.

In the paper by Celaschi, Fanzini, and Formia, design is "ongoing", interdependent, and collective, and represents one of the characteristics, along with enabling technologies, thanks to which the city can change and evolve in rela-

tion to the setting and to the needs of its inhabitants, and can monitor and analyse itself through the representation and social sharing of the elements of transformation. A widespread, aware, and responsible creativity is therefore possible, a collaboration through the shared design that not only responds to the requirements, but defines the framework of needs in order to overcome the functionalist paradigm of the smart city and top down governance models still based on setting the parties against one another.

Bucci and Starace, in the face of the condition of uncertainty characterising the contemporary world, also refer to a similar paradigm shift in design practice and the role of the architect, a figure no longer isolated, but part of a team capable of interpreting the context in a multidimensional, multisectoral way, with a systemic and dynamic approach, open in this case to collective, shared design as exemplified through the study case of the international *CivicWise* network.

Similar, but based on a more pessimistic reading of the current misalignment between design culture and society, is the position of Valente, who all the same appeals to the reaction through a renewed, active role of the architect, starting from an educational approach for a sensitisation that cuts across the strata of society. This refounding of the professional practice of designer, made possible in an epistemological sense through a theoretical speculation that accepts and cultivates uncertainties, means an ethical and concrete operativity in the real world, that is articulated in research applied to profession and in committed proactivity, both of which accompanied by the academy's formative and supporting role through the proposition of a strong and assertive cultural line.

Violano, through an assessment of the performance/environmental costs ratio of three different construction systems, highlights the efficiency of the new approach of "generative design", which goes beyond the notion of sustainability, proactively intervening in restoring/improving the ecological conditions of the habitat through the use of materials and components in synergy with the natural biological cycle, and with a limited ecological footprint.

In Block's contribution, environmental design, in dealing with the demands of climate change, is moved, expressed, and developed in the multiscale and multidisciplinary approach of adaptive design, finding solid bases in research and scientific activities in progress in the international setting including, as she cites, the evolutions of the proceedings of the States General of the Green Economy in Architecture, from the production of the "The City of the Future" Manifesto to the recent issuance of Green City Guidelines. Starting from a knowledge of the specific nature of the setting on an optimal scale of the urban district, through simulation of possible scenarios in a perspective of predictive and proactive design, Block's contribution sets out the possibility of making the delicate identification of the most critical factors that alter the city's space, and the impacts on the users and their behaviours, providing instruments and adaptive solutions directed towards responding to these alterations and optimising the cycle of urban metabolism.

Conclusions

Through theoretical explorations and critical reporting of applicative experiences in the field, the collected contributions offer a significant wealth of points for reflection relating to the evolution of the statutes of design in light of the rapid developments of the contemporary context. A dilated and strengthened dimension of the design activity emerges, thanks also to digital technological innovation that amplifies the architect's operativity, all round. The possibilities of intervening in the real world, of being a militant architect, and of developing social innovation therefore multiply, for example, in the different and new connotations of the participatory dimension, to include all the different phases in the building process, all the stakeholders, from defining demand to executive implementation and to the financing of the works, thanks also to the simplification of the connections of interrelationship and networking introduced by computer technology. This availability of means makes it possible to reinterpret creativity as a collaborative and widespread product, as a multisectoral and multidisciplinary synergy also in dealing with complexity as a trait of contemporary society.

And lastly, its anticipatory capacity is emphasised, both to respond in the most appropriate way to the inclusion of the time variable in design, and for the possibility of simulating and foreseeing the behaviour of buildings, of inhabitants, and of the reactions of the environment, in order to correct and refine intervention choices.

This expansion of the capacities of design, which finds itself having to govern a systemic dimension of growing complexity, refers directly to the approach of technological culture in its disciplinary assumptions, the functions of providing direction among different sectors and monitoring of feasibility for the real context. However, as clearly underscored in the contributions, it requires above all a concrete commitment, availing us of these capacities for society while overcoming a speculative, abstract dimension or "formalistic drifts" emphasising a "peripheralisation" of the design in progress. In the second place, reflection is needed on the ends connected to the means, on ethical action, and on the greater responsibilities that this entails, especially in a formative setting affected by the introduction of digital innovation, also as pertains to the evolution of cognitive and learning models.