

A CONNECTED WORLD

DESIGNING NEW METHODS, TOOLS AND SOLUTIONS TO LINK PEOPLE TOGETHER AND SAVE THE PLANET

EDITED BY

Salvatore Di Dio Mauro Filippi Benedetto Inzerillo Francesco Monterosso Dario Russo Domenico Schillaci

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Designing new methods, tools and solutions to link people together and save the planet.

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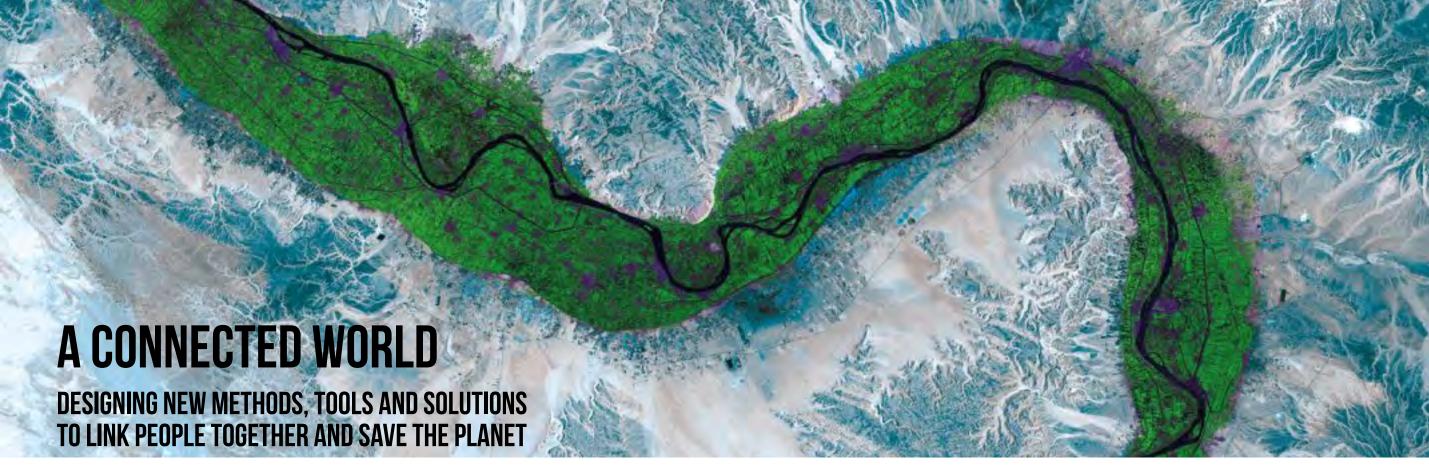
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This volume is the outcome of a discussion triggered by the 2022 World Information Architecture Day, the one-day a year event to encourage world-wide conversations about information architecture.

The 2022 topic was "A Connected World": We connect with each other in digital, physical, and blended spaces. We connect with people, products, services, content, and the world in general. This connectedness can be wondrous and yet challenging.

Information architecture uncovers and creates new connections that we weren't aware of before. It can inspire us to make new discoveries

or reveal new relationships that may urge us to take constructive action, e.g. climate change, the global health crisis, or the supply chain disruption we have experienced during the pandemic. Information architecture contributes to making connections more relevant. It helps us understand which information is important and trustworthy. It provides guidance in a mess of information and helps fight against the disinformation of fake news. It allows us to steer better who and what we are connecting with. It creates places we enjoy being in where people and information meet.

In a world where we're connected yet distanced,

how do you facilitate connectedness? How do you help make sense of connections? What new connections have you made recently? How did you support others to discover new connections? In what ways do you think information and information architecture can be used to support, define, or create environments (digital, physical, virtual, or blended) to improve the lives and experiences of people in a connected world?

The hybrid event organized on March 4th 2022 in Palermo by the University of Palermo, PUSH design lab and Arca, had the support of a international scientific committee (Marika Aakesson, Cristian Campagnaro, Salvatore Di Dio, Nicola Morelli, Chiara Lorenza Remondino, Dario Russo, Paolo Tamborrin) which selected blindly abstracts of scholars and professionals willing to contribute to the discussion.

Through the opencall the scientific committee have selected abstracts from Luigi Farrauto, Danilo Costa, Roberto Anelli, Federica Ditta, Cristina Marino, Leonardo Moiso, Eleonora Fiore, Enrica Amplo, Andrea Arboleda, Antonio De Pasquale, Irene Fiesoli, Claudia Mastrantoni, Florian Myter, Caterina Bonora, Isabella Patti, Valeria Valeriano and Caterina Bonora.

The following conversation triggered by the event was therefore the starting point of a deeper discussion in the next month, and, thanks to the interest of Palermo University Press, curators of this volume invited all contributors to condense all further reflections in a fix peerreviewed paper (David Kaplan, 2005 "How to Fix Peer Review", The Scientist, 19).

All contributions discussed in this essay focus on the potential of design and innovation to address important challenges facing humanity and the importance of inclusive design and sustainability in the digital age. The common characteristics

of the texts are that they all discuss design in relation to technology and innovation. They explore how design principles can be applied to various fields, such as education, public services, and sustainability, to create new solutions and opportunities. Authors also discuss the potential of using technology, such as data analysis and digital platforms, to improve design processes and outcomes. Additionally, the papers highlight the importance of inclusive and holistic approaches to design, and the need for collaboration and dialogue between different

stakeholders in the design

process.

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COLUX. A NEW CREATIVE CONNECTION: FROM LOCAL TERRITORIES TO GLOBAL DIFFUSION

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ABSTRACT

The increasingly technological world keeps us connected to each other by removing physical and geographical barriers. Although this is effectively one of the main current innovation propositions, how can design exploit the digital transformation to create new professional connections? In other words, how can we switch from local knowledge to global collaboration?

The article questions the mentioned issues, and it proposes an innovative collaboration design project COLUX which allows the real-time connection between different professionals through the creation of virtual spaces for products/living space co-design thanks to the support of the pioneering technologies such as AR and VR.

The results of the project as well as the methodology used in the case study have been reported by highlighting the concern and the strategic role of the design in linking professionals (and more) in an increasingly connected but outdistance world, by pre-emptying users' needs thanks to its ability to observe and, above all, to predict demands.

As such, in this applicative framework, the paper aims to identify the project's potential to be replicated at different scales and contexts, by bringing great impact both in the scientific and in the territorial networking.

STRATEGIC DESIGN, CO-DESIGN, TERRITORIAL NETWORKING, COLLABORATIVE PLATFORM, VIRTUAL EXPERIENCE, SMART WORKING, NEW PROFESSIONAL CHAINS

We thank **Prof. Giuseppe Lotti** - Department of Architecture, University of Florence - and **Marco Marseglia** - Department of Architecture, University of Florence - for their careful review of the paper.

1. INTRODUCTION

The emergency situation generated by the SARS-CoV-2 coronavirus pandemic has had and will continue to have significant repercussions on consumption and the production system, both at a global and local level. In recent years we have witnessed a slight, but progressive, drop in the production of goods and in the last period we have also seen a drastic reduction in demand itself. These negative impacts are mainly determined by the logistical difficulties in moving goods, with particularly serious repercussions in the import-export sector, with 84% of companies declaring that they are suffering in ordinary management, also due to a general drop in orders [1]. Finally, among the most relevant phenomena of a transversal nature is the increasingly complex functioning of supply chains, due to the increase in production costs, the reduction in work capacity, the greater difficulty in supplying raw materials and delivering products, and the new smart working methods that were not immediately possible to activate and that still show some gaps.

The severe lesson learned from this dramatic event must, however, lead us to carry out a careful analysis of the various criticalities caused by certain production models

become dominant - and by unforeseeable distortions of behavior, which in recent years have dangerously increased their incisiveness. The crisis generated by the pandemic must therefore be a stimulus to reduce the use of overly intensive models of work - which lead to loss of sociality, reduction in life quality. consumption of resources, and high emissions of greenhouse gases - and increase the spread of principles and practices typical of the green economy, able to improve welfare and social equity in the long term and increase the ecological quality of territories. The consolidation of these practices represents an opportunity to enhance and protect the typicality and national excellence also in terms of traditional knowledge bringing skills more and more on the verge of extinction, providing national companies with useful elements to strengthen their competitiveness in international

- which have progressively

competitiveness in international markets.
How to do that? Certainly, starting with a change of mentality that must lead the world of design and production to a radical rethinking of the paradigms that have governed contemporary society until now. As architects and researchers from an ethical point of view, we must take responsibility for the implications of these considerations and be aware that - as Fabio Tucci explains [1] - we are faced with an epochal

basic question: can we think that all this - even and above all if we are explicitly positioned in a perspective of environmental design and green city approach - does not have repercussions on the way we conceive the spaces that host this changed way of living and thinking, the objects that populate it, the means that connect its parts? And doesn't this change, probably and potentially profound, have an indissoluble interface with the themes of design, also in the hope that these renewed modalities can significantly provide answers to future problems? In this sense, technologies clearly emerge as one of the positive aspects of the pandemic, as they have succeeded in the difficulty of allowing us to carry on a sort of working and social normality that has allowed us, perhaps, not to sink completely into a global crisis. The technological world, therefore, has effectively kept us connected to one another by eliminating physical and geographical barriers, albeit with some limitations. In this space in between the problems highlighted by the pandemic and the possibilities offered by the relentless progress of new technologies, designers, thanks to their ability to see, show, predict [2], and plan for the future, have the duty and the opportunity to help meet the challenges posed by this moment of evolution and change; almost trying to "force" people to

experience and rediscover a different dimension of their time, suddenly opening a window on new ways of living, working and managing the resources at the basis of life. This was the starting point from which the COLUX project was born, in which a collaborative platform of virtual co-design is developed, which thanks to the support of AR and VR allows the creation of virtual spaces for the co-design of products and living spaces. The project starts from the desire to facilitate the working practices "at a distance", redesigning the workspaces - especially related to the world of design and production - in virtual mode, creating a metaverse in which to develop all phases of the creative process in real-time with the various actors involved, thus optimizing time and costs. In this search for answers and alternatives, we must be aware that we may be "forced" to make definitive changes due to the continuation or cyclical return of the virus problem in the future, considering that the world even before the pandemic was already moving towards fluid borders and globalized frontiers. In any case, we could live this incredible period of forced collective experimentation as an opportunity to be seized to produce new forms and new design spaces, better for the community, fairer and more inclusive, and more in line with the objectives of what Tucci calls "green city approach"

[1]. The range of potential implications is enormous but it is our task as designers, scholars, and researchers to try to think about it and formulate our own - even provocative - proposals.

The article offers an innovative approach to transform the limits that the pandemic has placed in front of us, such as distance and separation from work as well as social, into design opportunities, through which we can also try to redesign practices that are now obsolete and harmful to our environment. related to the production chain, its waste and the production of huge amounts of data that pollute the network, creating a dramatic parallelism between the virtual world and the real ecosystem.

2. A CRITICAL APPROACH TO THE RESEARCH CONTEXT

The research context stems from the intention to respond to the current challenges of increasing digitization and the resulting antinomian problem of connection-detachment. Through the adoption of a critical approach, the paper moves from the desire to understand how design, and specifically the proposed project, can play the role of catalyst and contribute to "make the connections more relevant, focusing on who and what we are connecting with", strengthening not only

the territorial networking but also acting as a stimulator of relationships reproducible at different scales and replicable in different contexts. For this reason, the starting point of the reflection was firstly the analysis of the stimulating ideas proposed in the call and, secondly, the attempt to answer these questions through the virtuosity of the COLUX research project. This section of the paper is therefore structured by alternating these open questions with their simultaneous attempt to answer them.

How do you facilitate connection?

The health emergency that

has involved us in the last two years has highlighted how the problem of distancing sometimes obligatory as in the case of the recent pandemic crisis - can be overcome through increasing digitalization that has presented unexpected opportunities [2]. Although in this sense technology has been a fundamental element in guaranteeing a connection that would otherwise not be feasible, the theme of the relationship between it and the strengthening of networking is different. This aspect was then dropped in the specificity of the proposed project trying to understand how to connect macro-areas, mostly disconnected, within a given territorial context. In this regard, the project started from the specificity and characterization

of the territorial realities of interest trying to define their know-how and acting on several levels, conducting a careful analysis that involved: companies, innovation scenarios of Industry 4.0, ICT, marketing, and communication up to include the science of psychology as a prevalent methodology of investigation. Consequently, the answer to the initial question - "how to facilitate the connection" in such a scenario? - was through design. In fact, design has played a key role in ensuring the relationships and interrelationships between different knowledge by becoming the catalyst: it has given rise not only to a tangible development of the project through the analysis and the methodology of investigation used but has also played a fundamental role through the definition of the output of the project itself. In this research context, design plays the role of both Facilitator and Mediator [3], able to analyze the territorial connections and increase their networking.

How do you help give meaning to connections?

Internet and technological advances have transformed the way people communicate and interact with each other [4]. According to Rheingold [5], these virtual interactions could lead to many social consequences, including the formation of new communities and expressions of online

identities. In this perspective, the research project plays a strong innovative role: compared to the platforms currently developed and released in the market. Colux creates a collaborative and interdisciplinary platform model with a non-hierarchical structure. in which each member is part of a community dedicated to design. Each user is strongly involved and has direct responsibilities in some aspects of the system through the equalization of the standard roles of manager and user. Specifically, COLUX is aimed at the application of AR/VR solutions within the furniture production chain and the interior design macro sector; with the objective of bringing benefits along the entire Product/Process/ Factory lifecycle: from conception, design, production, to sales and after-sales. ensuring added value both for the user companies (cost/ time reduction and quality improvement) and for the enduser who receives value-added services on the product.

What connections have you established?

Regarding the type of connections established, they fell within the territorial reference framework with the specific goal of developing an efficient network that would move from local to global [6]. This can be deduced from the ecosystem map of the actors involved where there

are 4 macro areas: production chain, training and research, promoters, and builders. In parallel, the actors involved were included in a map that would tell the level of influence and the level of interest for each of them. This was fundamental in order to analyze the players on the basis of their involvement, information, management, and ability to anticipate with the aim of satisfying the end-users' needs, showing - and herein lies the strength - also their limits and future needs.

How do you create digital and virtual environments to enhance the experience in a connected world?

Finally, how do you create digital and virtual environments that are enriching tools to enhance the user experience [7]? From this perspective, the project acts on two main levels. The first one is related to the removal of geographical and temporal barriers that allow users to participate in the various stages of design involving them regardless of where they are and their time zone. The second level concerns the reduction of problems related to the type of language used by professionals from different disciplines, such as the simplification of language between designers and engineers. At a macroscopic level, the simplification of the technical language is also reflected in the collaboration between

designer and end-user, a necessary aspect considering the collaborative and intuitive nature of the platform.

3. METHODOLOGY AND RESEARCH OBJECTIVES

The project COLUX - COdesign platform with the use of MixedReality for the LUXury interiors sector (Project funded in the context of the Second Call POR FESR 2014-2020. Region of Tuscany) - as also mentioned in the previous chapters - aims at the creation and development of an innovative digital platform that, through the use of interactive AR and VR technologies, leads to the creation of virtual spaces for the co-design of products and living environments. The overall system of this project works by connecting different professionals in real-time in a shared virtual workspace; a direct and fast channel that can exchange information about the development of the design project in a consistent way. The methodology used as the basis of design development was that of co-design, now recognized as a necessary methodology to create shared and functional results, within the processes of definition and development of products and services. The involvement of designers, clients, and a wide range of stakeholders in addition to the project partners themselves, has demonstrated

meaning compared to traditional problem-solving methods. The active collaboration between the various actors requires an adequate level of communication and, consequently, tools capable of supporting these interaction procedures: for these reasons it was necessary to employ and explore the potential of new technologies, applied to the practice of participatory design. Therefore, the functionalities made available by COLUX allow, precisely from the perspective of co-design, to support the growth of manufacturing companies in the Made in Italy sector, improving or solving the critical issues that drive production and sales in terms of:

that it can offer new paths of

- high quality to be maintained;
- need to increase the added value of the product through the development of complex service systems (design, sales, related aftersales processes);
- increasing company proactivity in the contract design process;
- increasing the level of visibility;
- increasing the companies' innovation capacity;
- increasing the loyalty of intermediaries.

Based on what has been outlined above, we hypothesize an iterative process involving the following phases:

- Engagement phase, related to sending the various stakeholders an invitation to participate in the co-design session:
- Linkage phase to the Colux design service and creation of the waiting room;
- Beginning experience phase, where there is the actual virtual presence of all stakeholders within the virtual design environment;
- Phase of interaction and co-design among the actors to define the project, identify the eventual problems, and define the useful solutions to resolve the emerged ones.
- Phase of saving progress for revision and/or continuing the co-design phase.
- Review phase, in which you have the opportunity to review, in single mode, the progress of the project, make changes, and provide suggestions.

The clear advantage of the solution proposed by COLUX compared to the current design process lies in the possibility of having more

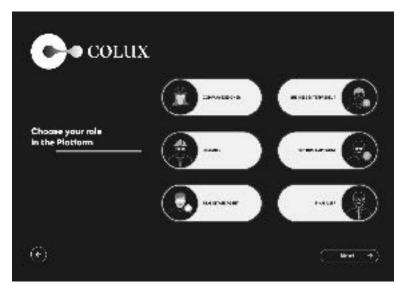


Figure 1. Platform's users, equivalent to Personas.

moments of confrontation with the different actors, reducing uncertainties and problems related to communication and data exchange through intermediaries (mail, photos, reports), the ability to see in real-time the different solutions proposed and analyze any problems related to a choice. all this without the need to physically go to a real place. Just the user will be able to view in VR the designed space and interact with it by leaving comments or making small changes in setting, positioning, and verification, which will allow him to better understand the problems of the project and see the details in a preliminary phase compared to the executive realization.

Starting from this level of development, the COLUX project expands and aims to develop a truly integrated system for which the co-design between the various actors involved and the management of uploaded content is actually accessible to a user without "skills". In fact, COLUX will allow the involvement of both internal and external designers; it will also allow the involvement of different departments that are not directly linked to design but that affect sales (e.g. marketing department, public relations, etc.). Finally, it will allow the buyer to be involved from the first design phases and to collaborate with designers and companies in the realization of the requested product. The activity, directed to define the users of the system, moves from these initial reflections and is developed following a phasegate process:

 The first was characterized by meetings with the project partner companies

- to understand their main desiderata;
- The second research phase led to a first draft of the user analysis report, starting from the elements that emerged from the meetings in the company and from research carried out by the researchers of the development team;
- The third phase was characterized by the carrying out of semistructured interviews in order to better investigate aspects related to the project to be concretely developed for the COLUX project and to fully understand the needs and expectations of functionality that companies expected from the system;
- The fourth phase was useful to define the personas, generated from the groupings of users made in parallel with the first part of the technical development of the system and defined the types of users of the COLUX platform (D1.2).

The final personas represent the types of users of the platform and are internal designer, external designer, vendor, entrepreneur, investor, and end-user.

Once the users and their roles within the digital system of the

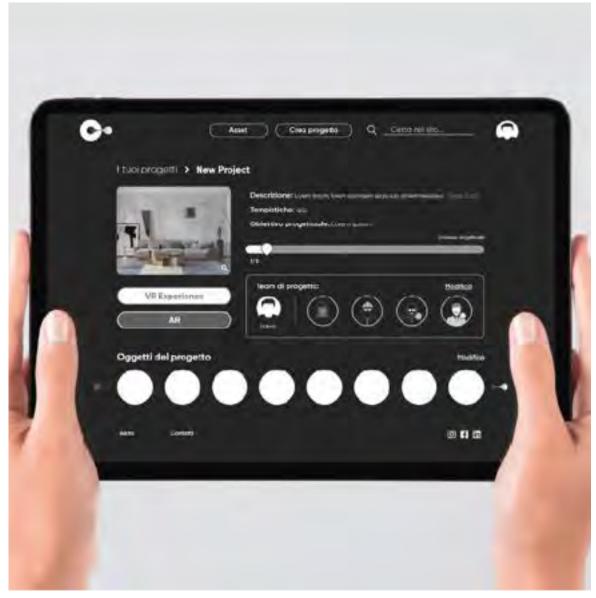


Figure 2. Project page with AR/VR enabled features.

platform were defined, it was also important to understand and define how the various technological and IT tools interacted with each other.

In fact, COLUX makes it possible to create a web platform that facilitates the visualization of the created products, generating a virtual catalog to which the community of the project can access and which can be used in experimental and innovative ways for the development of unpredictable as well as innovative processes.

4. PLATFORM STRUCTURE

Summarizing what has emerged from a technological point of view, the COLUX system aims to implement various technological and strategic solutions:



Figure 3. Phase of asset placement (object) in virtual space.

- A Beta version of a complete, working, and integrated platform with UX and UI (Design) of both the website and related service modules.
- Activation of all system management features

- with multi-user and multiplatform mode.
- Study of a new business model (Innovation management).
- Creation of a collaborative virtual laboratory, which

involves the creation of a virtual environment in which different designers can collaborate on the project in 3D simultaneously.

The proposed system should allow users to participate in the



Figure 4. Phase of asset customization before VR experience.

same co-design process by sharing a unique design space that turns into a collaborative virtual lab through the application and immersive visualization, allowing the creation of a common augmented perspective of work.

In the field of industrial production and planning/ design, objects were usually presented to end-users through technical drawings, sketches, renderings, and prototypes.

Today, however, new interactive and highly innovative modalities are gaining ground, among

which those already present on the market - but still to be explored in terms of their potential use - are certainly augmented reality and virtual reality. They allow to instantly verify the answer of the project, bringing out, contextually, research directions that better frame the role of designers and the indispensable acquaintances to support these new creative and planning procedures.

For these reasons, they still appear today as the main enabling technologies useful to achieve the goal set by the

project.

As it has been widely demonstrated in literature, immersive virtual reality is closely connected with sight, hearing, and touch, that is, with perceptual/sensory mechanisms, able to directly indicate the guidelines of the design of objects dedicated to end-users.

Therefore, the digitization of the artifact, together with the possible user experience connected to variable application scenarios, can put the users themselves in a position to quickly evaluate

both positive and negative aspects, from an aesthetic, ergonomic, and functional point of view.

The application of such innovative technologies, directed towards a collaborative approach allows the effective management of the feedback process, thus becoming a tool not only to realize new scenarios but also to innovate existing ones or to adapt to the changing needs of users and create a dense design network. For these reasons, collaborative design in virtual environments is based on the idea that consumers/customers are active players, co-creators of value, and co-developers of their own personalized experiences.

territorial development, and technological innovation. The presented project solicits the debate on the importance of the role of design as a catalyst capable of joining territories - physical and virtual - companies, professionals, end-users, and other stakeholders. This result is guaranteed through the activation of dialogues able to combine traditional knowledge and digital innovation. From this, derives a fundamental social, strategic, and innovative development to build a system of interactions that moves from micro to macro, stimulating local and global connections. The element of design innovation lies in the collaborative ability to communicate and connect

different territorial actors through the simplicity of language used. Faced with the current issues of digital transition, the project fits into the framework of territorial innovation by developing a double level of networking: digital and physical. The impact on the scientific community is, therefore, to be understood in reference to the theoretical and applicative influence replicable in different areas and scales of implementation. The methodology used in the case study linked to the practicality derived from real needs and easily implemented, as well as the resolution of the arisen problems, represent the core of an innovation reproducible in the international scientific context.

5. CONCLUSIONS

The project was born in response to the current local challenges related to increasing digitization. Specifically, the research solicits debate on the importance of developing territorial and extraterritorial connections through the adoption of a scalar and replicable design approach. The urgency to develop and test a methodology of co-design able to involve and consequently - connect different territorial actors is declined through the design of a collaborative platform ensuring social innovation,

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DICHIARAZIONE SOSTITUTIVA DELL'ATTO DI NOTORIETA' (Art. 47 del D.P.R. 28 Dicembre 2000, n. 445)

La sottoscritta Irene Fiesoli nata a Firenze (FI) il 26/10/1991, residente a Prato (PO) in via Etrusca n. 31, in qualità di co-autore della pubblicazione Fiesoli I., D'Ascenzi E., "COLUX. A new creative connection: from local territories to global diffusion", in Di Dio S., Filippi M., Inzerillo B., Monterosso F., Russo D., Schillaci D. (eds) (2022), A Connected World. Designing new methods, tools and solutions to link people together and save the planet, Palermo University Press, Palermo, 2022, ISBN 978-88-5509-484-9, pp. 30-39., consapevole delle sanzioni penali richiamate dall'art. 76 del D.P.R 28/12/00 n. 445 in caso di dichiarazioni mendaci e della decadenza dei benefici eventualmente conseguenti al provvedimento emanato sulla base di dichiarazioni non veritiere, di cui all'art. 75 del D.P.R. del 28/12/00 n. 445; sotto la propria responsabilità

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La sottoscritta dichiara inoltre, ai sensi dell'art. 13 del D.Lgs.n.196 del 30 giugno 2003, di essere stata informata che i dati personali contenuti nella presente dichiarazione saranno trattati, anche con strumenti informatici, esclusivamente nell'ambito del procedimento per il quale la presente dichiarazione viene resa.

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