

Habilitation Thesis:

Risk in the Era of the Machine – Tools Used in Design and Interior Architecture

Candidate

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Paper Summary

Interior architecture is a complex discipline situated at the junction between architecture and product design, yet with unique characteristics that distinguish it from these fields. Unlike product design, which focuses on individual objects, interior architecture deals with the entire spatial experience. Interior architects must integrate aesthetic, functional, and ergonomic factors at the level of the whole space.

Although it does not always require major structural interventions, interior architecture is in direct correlation with the architecture of the building. Projects must be considered both from a stylistic point of view and according to the constraints and possibilities of the existing structure. Interior spaces have specific, personalized needs and must respond to detailed aesthetic and functional requirements. In most cases, these differ from those in object architecture, especially when a change from the original style or function is involved.

Interior architecture is strongly focused on the user experience, on how people interact with the space and its elements. Interior spaces often need to be adaptable in order to meet the requirements of the various functions that may change throughout the building's lifespan. The use of solutions based on fixed elements that do not allow flexibility in layout is no longer considered viable.

There is increasing pressure to adopt sustainable solutions and integrate advanced, including digital, components.

The issue of the relationship between humans and technology is a constant topic, accompanying human evolution. New elements appear periodically, requiring a redefinition of the entire context. The large number of factors involved and the multitude of perspectives make analysis difficult.

This paper examines this relationship from several perspectives. It mainly describes the activities carried out during the completion of doctoral and postdoctoral studies, following directions related to interior architecture and furniture design.

The paper is structured into seven chapters.

Chapter 1 seeks to define the terms used, as well as the changes that have taken place in recent years.

Chapter 2 includes the foundational studies, as well as a manifesto section—the presentation of the author’s personal viewpoint on the changes brought by technological innovations, both in design and execution. These address issues related to efficiency, morality, and artistic significance. The chapter concludes with a section dedicated to speculations on possible directions of evolution.

Chapter 3 is dedicated to the description of research projects and studies in the field, materialized through published works. These focus on education and the designer’s relationship with tools, including digital ones.

Chapter 4 describes activities carried out during various workshops and presentations, which play an important role in the learning process. Their format allows learning in a system similar to apprenticeship, both through the possibility of working directly with materials and through focusing on a single subject for a longer period of time.

Chapter 5 presents personal works, which are essentially experiments initially disconnected from the rest of the works to avoid imposed limitations. These explorations occur both in the theoretical area—discussing the relationship between the designer and technology or the overlap between design and the arts—and in the practical area, experimenting with constructions and finishes. Selected elements are integrated into the research and teaching components.

Chapter 6 presents teaching activity, both instructional and related undertakings.

Chapter 7 contains the proposal for the development of the academic, scientific, and professional career. It continues to revolve around the area of interactions between design, technology, and art.

The paper is a synthesis of the activity carried out in recent years, aiming to present the activities connected to the studied field.

The preparation of this habilitation thesis followed the *Guide Framework for the Preparation of the Habilitation Thesis*, developed by the National Council for the Certification of University Titles, Diplomas, and Certificates.

Preamble

The theoretical component continues the ideas presented in the doctoral thesis, focusing on the effects of digital tools that have emerged in recent years. The emphasis is on identifying threats associated with these new tools, as well as the potential to use them to generate relevant results that stand out in terms of complexity.

Identifying a set of tools—regardless of their nature, physical or digitally simulated—necessary in interior architecture is essential for several reasons. The main motivation is the shift in work processes driven by technological changes, particularly the transition toward a form of Industry 4.0.

New design trends should not be adopted without careful analysis of their potential benefits. Integrated digital tools—such as BIM (Building Information Modeling) or VR (Virtual Reality)—are now technologies increasingly known on a wider scale, even if their use is still limited at the moment. These tools allow immersive and collaborative visualizations, facilitating decision-making and reducing execution errors. Their efficiency in interior architecture and furniture design requires thorough discussion.

IoT (Internet of Things). The emergence of interconnected smart objects makes innovative solutions in interior design possible. In this new environment, familiarizing oneself with technology becomes important, in the sense of understanding complex human-object interactions, both the beneficial aspects and, especially, the associated risks.

Generative design, parametric design, AI, additive manufacturing, and 3D printing have a major impact on the customization of furniture and interior accessories, enabling rapid and flexible production of unique or personalized objects.

The sustainable and ecological component must be revisited and understood beyond “greenwashing” approaches (the practice whereby a company or organization presents itself as environmentally friendly or sustainable without real actions to support this), often adopted for economic reasons.

Current trends must be compared with established working methods. Many of these traditional methods not only remain valid tools, but in some cases can generate superior results in terms of human perception—perhaps one of the last elements that generative, parametric, or AI-based systems will be able to address.

The paper also includes a speculative component on possible future directions that need to be followed in order to ensure the time buffer necessary for adaptation.