

From Form to Meta-Design: Clino Trini Castelli's Theoretical Tools for CMF and Qualistics.

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ABSTRACT

This article examines the theoretical contributions of Clino Trini Castelli (b. 1944), one of the pioneers of Italian design theory, focusing particularly on his role in the formulation of Color, Material, Finish (CMF) Design, No-Form Design, Primary Design, the Colorterminal, the Umbrella Diagram, and Qualistics. Castelli's work is distinctive in that it shifts design research away from the primacy of form toward the systemic and meta-design dimension of sensorial, material, and chromatic identities (Mitchell, 1996; Thackara, 1985). Through these frameworks, Castelli anticipated major cultural and industrial transformations, such as the ecological transition, the humanization of technology, and the strategic role of chromatic forecasting in global markets (Takehara, 1984; Raimondo, 1982). The paper argues that his methodological tools—developed since the 1970s at the intersection of industrial design, color science, and material innovation—constitute a coherent theoretical corpus that is still relevant for contemporary design culture. By reconstructing the origins and applications of these concepts, the article places Castelli in the broader context of design history, while also highlighting the continuing applicability of his instruments for current debates on sustainability, emotional identity, and the meta-design of products and environments.

KEYWORDS (CMF Design, No-Form Design, Primary Design, Umbrella Diagram, Colorterminal, Qualistics, Meta-Design)

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1. Introduction

Clino Trini Castelli (born in Civitavecchia, 1944) trained as a car designer at Fiat's Scuola Centrale Allievi and began his career at the Centro Stile Fiat in 1961, before moving to Olivetti in 1964, where he collaborated with Ettore Sottsass and became involved with the radical cultural milieu that connected Italian design, Arte Povera, and the emerging world of fashion (Trini Castelli, 2023).

During the late 1960s and 1970s, Castelli moved progressively from traditional product design toward a meta-design perspective. He played a central role in the development of Olivetti's Red Books, the first corporate identity manuals conceived at a systemic level, and since 1973, it has been a key player in the Centro Design Montefibre with Andrea Branzi and Massimo Morozzi, where he began to articulate the principles of what he later termed Primary Design (Bosoni, 2016; Castelli, 1975). These initiatives foregrounded his enduring interest in the immaterial and qualitative dimensions of design—color, material, light, sound—rather than in form alone.

In 1974 Castelli established CDM – Consulenti Design Milano, together with Branzi and Morozzi, later transformed into Castelli Design, a platform from which many of his theoretical innovations would emerge. By the late 1970s, he had founded the Colorterminal IVI in Milan, the first research center dedicated to the application of additive RGB synthesis to design and architecture, marking a turning point in color research (Trini Castelli, 1978). From this period onward, he introduced a series of concepts and tools—CMF Design, the Umbrella Diagram, No-Form, and Qualistics—that placed him at the intersection of industrial practice and design theory.

Within the broader history of Italian design, Castelli occupies a liminal yet influential position. Unlike many contemporaries who became known for objects or architectural projects, his contribution lies primarily in systematizing tools that expanded the disciplinary boundaries of design itself, also thanks to a significant commitment to reflection and writing (Oppedisano, 2015). Critics such as Thomas Mitchell have underscored the importance of his work for rethinking the relationship between design practice and theory, noting that Castelli was among the first to articulate design as a field concerned with “experience and meta-projectual processes” rather than solely with form (Mitchell, 1996). Similarly, John Thackara identified him as a pioneer of “designing without form,” capable of redefining industrial languages through immaterial qualities (Thackara, 1985). His work therefore stands out in the history of design as highly original. This is not only because he interpreted

the transition from the 'configurative' phase of design — where efforts were devoted to giving shape to products — to the postmodern phase, which is oriented towards systems and services, in an innovative way. The appeal of his work also lies in its constant comparison with the reality of major international companies, both theoretically and practically. This highlights the fact that he is a designer who interprets experimentation not as an unproductive exercise, but as an effective tool in the process from design to production to consumption.

This article highlights his central role in the evolution of design culture, where he acted as both theorist and practitioner of a distinctive approach that continues to inform contemporary debates on sustainability, technological humanization, and the sensorial identity of products, in support of an enlightened approach to how businesses position themselves in the market.

2. Origins of a Theoretical Approach to Design

2.1 Early influences: Fiat, Olivetti, Arte Povera and Radical Design

Castelli's formative years were embedded in the industrial and cultural transformations of Italy during the 1960s. His first professional experience at Fiat's Centro Stile (1961–1964) provided a technical foundation in automotive design, while his move to Olivetti in 1964 placed him under the mentorship of Ettore Sottsass, exposing him to a design culture that merged corporate strategy with artistic experimentation (Trini Castelli, 2023). Undoubtedly, at that moment in history, Fiat and Olivetti were two companies committed to tackling new markets, including through experimentation with new products and languages. Furthermore, these were two sectors in which colour was becoming increasingly important. In his speech at the I Congresso Nazionale del Colore in Padua (1957), Marco Zanuso recalled that a wide range of machines, technical instruments, household tools and utensils, which had been produced in black, grey or white for years, had only become colourful in recent years. This is a “chromatic metamorphosis” that began in the 1930s – “the heavy office machines remain black, monastic [...]” said Renato Zveteremich, calling for “colours and polychromy” for Olivetti machines (Fiorentino, 2022, p. 181). However, it turned into a veritable “chromatic bulimia” thanks to the development of industrial chemistry and the expansion of the production of everyday objects.

Parallel to this, Castelli engaged with the Arte Povera movement in Turin, establishing dialogues with Michelangelo Pistoletto, Piero Gilardi, and Alighiero

Boetti. The close relationship between art and design during this period is well documented, particularly with regard to its links with abstract and concrete art. In Castelli's case, these interactions fostered his sensitivity toward immaterial qualities and process-based approaches, later central to his theoretical propositions (Bosoni, 2016).

His connection to the Radical Design milieu and to the Milanese fashion world through collaborations with Flavio Lucchini and Elio Fiorucci (with whom he co-founded *Intrapresa Design* in 1967) further expanded his vision beyond disciplinary boundaries. By the late 1960s, he was already theorizing design as a cultural practice capable of anticipating societal transformations, a view aligned with broader radical discourses (Branzi, 1996).

2.2 From Corporate Identity to Meta-Design: the Red Books and the Montefibre Center

Between 1971 and 1977, Castelli coordinated the development of Olivetti's Red Books, the first identity manuals structured according to meta-design principles. These were the years when Italy began to consider the concept of image coordination, which was applied not only to businesses, but also to political parties, book series, administrations, institutions, and events. Image coordination thus became central to Italian communication design, offering a distinctive alternative to prescriptive American models (Vinti, 2012).

Unlike Paul Rand's manuals for IBM, which imposed closed sets of solutions, Castelli's manuals were "open" systems, offering flexible and generative guidelines (Trini Castelli, 1969–1973; Fornari & Turrini, 2022). This work marked a crucial step toward conceiving design not as finite form but as systemic process.

In 1973 he was called with Branzi and Morozzi to the *Centro Design Montefibre*, a research centre set up by Montefibre to develop synthetic fibres and new colour systems (Fava, 2022; see in this issue Dalla Mura & Fava) of synthetic fibers and new chromatic systems. Produced between 1975 and 1977, the *Colordinamo* and *Decorattivo* manuals were pioneering tools aimed at textile and furniture companies. They explored the relationship between materials, colour and the environment, focusing on the structural value of surfaces and colours (Trini Castelli, Branzi and Morozzi, 1975, 1977).

The *Centro Montefibre* thus became a crucible for Castelli's early meta-design experiments, situating his practice within the intersection of material innovation, industrial needs, and theoretical speculation.

2.3 The notion of Primary Design as an "extensive vision" of the design process

By the mid-1970s Castelli began to articulate the concept of Primary Design, introduced within CDM – *Consulenti Design Milano* (1974). Defined as an "extensive vision" of the project, Primary Design opposed the "intensive vision" of conventional design practice, shifting attention from form and function toward the sensorial, chromatic, and material dimensions of objects and environments (Trini Castelli, 1985; Mitchell, 1996).

Primary Design emphasized the metaprojectual exploration of immaterial qualities—light, sound, texture, and color—as the true loci of innovation. As Castelli argued, modernity had unresolved qualitative aspects that could not be addressed through traditional design approaches, and thus required new conceptual tools (Trini Castelli, 1985).

This theoretical reorientation not only influenced Italian design debates but also prefigured later international concerns with user experience and emotional design (Norman, 2004).

3. The Colorterminal and the Birth of CMF Design

3.1 Colorterminal IVI Milan (1978): RGB synthesis and digital chromatics

In 1978 Castelli founded the *Colorterminal IVI* in Milan, the first European research center for design and architecture devoted to the new possibilities of additive RGB color synthesis. Equipped with the *Graphicolor* electronic simulator, the *Colorterminal* enabled designers to visualize chromatic variations through digital processing, decades before the widespread diffusion of computer graphics (Trini Castelli, 1978).

This initiative not only reflected Castelli's experimental stance but also constituted a methodological leap: color was no longer treated as a static property but as a dynamic, computationally mediated phenomenon.

The *Colorterminal* became a hub for international collaborations, linking Castelli with color theorist Faber Birren — whose *Yale Color Library* provided historical material on diagrams of color — and introducing Italian design culture to digital chromatics at an early stage (Trini Castelli, 2021). By reframing color as an informational and systemic element, the *Colorterminal* anticipated subsequent digital design paradigms and established the epistemological ground for CMF strategies.

3.2 From Color Matrix to CMF: the Herman Miller project (1980–81)

Building on these explorations, Castelli introduced the Color Matrix in 1978, first applied in the Lancia Color System and later extended to international contexts. The Color Matrix represented a departure from intensive color charts by offering extensive, systemic combinations of chromatic families. This model culminated in the collaboration with Herman Miller in 1980–81, where Castelli coined the acronym CMF—Color, Material, Finish—to define an integrated approach to the sensorial and qualitative dimensions of design (Trini Castelli, 1983; Takehara, 1984). Once again, Castelli has anticipated the design trend of focusing not on individual products, but on systems of objects related to the environment.

The Herman Miller CMF project marked a paradigm shift: rather than focusing on isolated stylistic choices, it framed CMF as a strategic layer of meta-design, aimed at constructing coherent languages across products and environments. The project was awarded “Best in the Mart” at the XV Neocon in Chicago (1983), recognized as exemplary for introducing a “High Touch” sensibility into office design, in contrast to the prevailing “High Tech” trend (Naisbitt, 1982; Mitchell, 1996).

3.3 CMF Design as a metaprojectual methodology

The emergence of CMF Design confirmed Castelli's ambition to redefine industrial design through metaprojectual tools. CMF strategies, first developed in the automotive sector with Fiat and later extended to Herman Miller, Vitra, Mitsubishi, and Louis Vuitton, offered companies a way to anticipate cultural shifts and consumer expectations through chromatic, material, and surface innovations (Trini Castelli, 2023).

By considering CMF as an independent design dimension, Castelli challenged the form-centric paradigm of modernist design. As John Thackara noted, Castelli's approach amounted to “designing without form,” privileging sensorial and emotional identities over volumetric composition (Thackara, 1985). CMF thus became a methodology for designing languages, capable of articulating corporate identity, forecasting trends, and aligning products with evolving sociocultural contexts.

4. The Concept of No-Form Design

4.1 From reactive surfaces to capacitive and dematerialized interaction

The origins of No-Form Design can be traced back to Castelli's research on reactive surfaces in the early 1970s, when he experimented with photoluminescent

laminates such as Print Lumiphos 14-580 for Abet Laminati (1973). These materials anticipated later capacitive interfaces by exploring the immaterial qualities of light and surface rather than the volumetric definition of objects (Trini Castelli, 1973; Bosoni, 2016). Castelli argued that the dematerialization of products—reducing them to neutral material forms that could mediate interaction—was a liberating gesture, shifting focus from anecdotal form to experiential engagement (Trini Castelli, 2019). Decades later, this vision was realized in projects like Smooove, a wireless capacitive control panel for Somfy (2008–2011), directly connected to his earlier theoretical explorations (Trini Castelli, 2021).

4.2 No-Form as synthesis of Castelli's design research

By the 2000s, Castelli consolidated these strands under the notion of No-Form Design, defined as a synthesis of his theoretical and practical investigations across CMF, Primary Design, and Qualistics. No-Form does not negate form altogether but seeks to transcend its centrality by prioritizing sensorial, emotional, and environmental qualities (Trini Castelli, 2019). In his book “No-Form 2020. Ten Stories Beyond Design”, he framed it as a horizon where surfaces, materials, and colors themselves become the primary conveyors of meaning, while form retreats into a latent, background condition (Trini Castelli, 2019).

This perspective resonates with broader postmodern and contemporary debates that questioned the modernist dogma of form follows function. However, Castelli's research did not adhere to the most common design methods of the time. By moving beyond the outdated form-function dichotomy, the No-Form project once again demonstrated Castelli's originality and foresight.

4.3 No-Form in relation to contemporaneous postmodern design languages

The No-Form paradigm can also be understood as Castelli's response to the international postmodern turn in design. While movements like Memphis experimented with exuberant forms and decorative motifs, Castelli pursued the opposite direction, privileging the absence of form as a critical stance against stylistic formalism. John Thackara's early essay *Designing without form* (1985) highlighted Castelli's role in introducing immateriality as a design principle, positioning him as a counterpoint within the postmodern landscape (Thackara, 1985).

No-Form thus emerges not as a stylistic current but as a meta-design philosophy: an invitation to design through invisible qualities—light, sound, tactility, chromatics—rather than through visible shape. In this sense, Castelli expanded the legacy of Italian radical design by offering

an alternative trajectory, one that anticipated the immateriality of digital interaction and the ecological critique of material excess.

5. The Umbrella Diagram as Forecasting Tool

5.1 Historical premises: diagrams of color from Kircher to Birren

The Umbrella Diagram (1978–81) emerged from Castelli's longstanding interest in diagrams as meta-design tools and (Trini Castelli, 2021). It comes at a time in history when design culture is becoming increasingly interested in schematisation. Some have suggested that these are design aids suited to 'an increasingly fluid and dynamic time, which is beginning to distance itself from formal completeness and authorial requirements to slide from the architectural object to the design process' (Amore, 2023, p. 44). Castelli uses the diagram not as an analytical tool, but as a 'generative' one.

His research drew upon precedents such as Athanasius Kircher's *Ars magna lucis et umbrae* (1646), which visualized color relationships through arc-like structures, and Faber Birren's studies on color perception and human response (Birren, 1978). By revisiting these historical models, Castelli positioned his diagram as a continuation of a lineage in which visual schemata were employed not only to describe but also to predict chromatic phenomena (Trini Castelli, 2021).

5.2 Structure and parameters of the Umbrella Diagram

The Umbrella Diagram is constructed as a cyclical representation of chromatic and material trends, structured in decades rather than as a linear timeline. Large arches indicate long-term historical trends, while smaller arches correspond to short-lived fashion languages, often in conflict with the broader currents (Trini Castelli, 2021). This cyclical representation reflected Castelli's conviction that color and material cultures evolve in discontinuous shifts, often triggered by socio-political or ecological crises—as exemplified by the “Color Fever” chroma survey of 1973, which recorded a saturation peak in automotive paints immediately before the oil shock (Trini Castelli, 2023 and 2024).

The diagram's parameters—Iconic vs. Syntactic Colors, Color Presence vs. Color Distribution—enabled a systematic mapping of chromatic identities. Rather than limiting itself to cataloguing shades, the tool described how entire cultural atmospheres were encoded in color-material languages.

5.3 Decadal cycles, Iconic vs. Syntactic color, Presence vs. Distribution

Through retrospective application to the 1950s–70s and prospective projections for subsequent decades, the Umbrella Diagram demonstrated predictive power. For example, the shift from the highly saturated primaries of the 1960s toward the natural, ecological tones of the late 1970s and 1980s was prefigured within the model (Trini Castelli, 2021). The “Iconic” dimension captured emblematic hues of an era (e.g., Ferrari red, Olivetti orange), while the “Syntactic” dimension referred to structural chromatic grammars that organized multiple product families. Likewise, the distinction between “Presence” (the dominant surface color of a product) and “Distribution” (secondary chromatic details across parts) offered a nuanced method for CMF planning (Trini Castelli, 2021).

5.4 Applications and anticipations: from Memphis to ecological trends

Initially a proprietary tool for Castelli Design clients such as Louis Vuitton, Herman Miller, and Mitsubishi, the Umbrella Diagram was employed both in industry and education, often confidentially until its first public presentation at the AIC Milan Congress in 2021 (Trini Castelli, 2021). By mapping decadal cycles, it anticipated shifts such as the rise of “natural” and “ecological” palettes in the 1980s–90s, as well as the growing role of digital chromatics in the 2000s.

While contemporaneous groups such as Memphis emphasized experimental decoration, Castelli used the Umbrella Diagram to forecast systemic cultural changes, offering companies a way to navigate uncertainty. In this sense, the diagram not only visualized trends but also functioned as a decision-making device—part of a broader qualistic orientation that sought to align design with emerging sentiments of color and material culture (Trini Castelli, 2023).

6. The Development of Qualistics

6.1 Origins: Fiat Qualistic Center and the concept of perceived quality

The term Qualistics was first articulated by Castelli in the mid-1980s to describe a new field of research dedicated to the perceived quality of products. From 1984 to 1989, he directed the Fiat Qualistic Center, the first laboratory explicitly focused on the subjective evaluation of automotive interiors and exteriors. Unlike traditional quality control, which was based on measurable technical standards, Qualistics emphasized users' emotional and sensorial responses—texture,

color harmony, light reflection, even acoustic comfort—as essential factors of product identity (Trini Castelli, 1986; Marberry, 1988). This shift resonated with the rising awareness that design could no longer be reduced to functionality and form, but had to integrate experiential dimensions (Bosoni, 2016).

6.2 From Qualistic Diagram to “ecology of emotional consumption”

Building on these premises, in the 1990s Castelli developed the Qualistic Diagram, a patented tool for the emotional positioning of images and products, later adopted by companies such as Mitsubishi, Michelin, and Honda. This diagram functioned as a cartographic device, mapping subjective perceptions of products within a structured framework of emotional attributes (Trini Castelli, 2000).

Castelli initially defined Qualistics as an “ecology of emotional consumption,” aimed at counteracting the obsolescence caused by superficial stylistic changes and promoting a more sustainable relationship between products and users (Trini Castelli, 1992; Kuranishi, 1990).

By emphasizing qualitative rather than quantitative criteria, Qualistics proposed a reorientation of design strategies. In this sense, it anticipated contemporary debates on affective design and experience-driven innovation, while also aligning with ecological concerns by suggesting that more meaningful and emotionally durable products would reduce wasteful consumption.

6.3 Applications in industry: Fiat, Hitachi, BTicino and others

The industrial applications of Qualistics extended beyond the automotive sector. With Olivetti Synthesis in the late 1980s, Castelli coordinated CMF identities that integrated qualistic evaluation. In the 1990s, he collaborated with BTicino and Legrand on home automation products such as the Living and Light collection, considered the first global example of products conceived through qualistic principles of varied series (Trini Castelli, 1995).

In Japan, long-term partnerships with Mitsubishi and Hitachi enabled him to apply Qualistics to information technology and electronics, including the design of supercomputers and servers where tactile, chromatic, and surface qualities were engineered to embody new technological imaginaries (Hitachi, 2007).

By the early 2000s, the Qualistic Lab was established within Castelli Design to further refine these methods, consolidating the Qualistic Diagram as a research instrument bridging design, marketing, and user studies.

These developments placed Castelli at the forefront of efforts to systematize the role of sensorial perception in industrial innovation, positioning Qualistics as a metaprojectual framework on par with CMF and No-Form.

7. Interconnections Among the Theories

7.1 Primary Design, CMF, Umbrella Diagram and Qualistics as a systemic framework

Although formulated at different times, Castelli's concepts—Primary Design, CMF Design, the Umbrella Diagram, and Qualistics—are best understood not as isolated contributions but as parts of an interconnected theoretical framework. Primary Design established the methodological foundation by redefining design as an “extensive” metaprojectual process, aimed at exploring immaterial and qualitative dimensions beyond form (Trini Castelli, 1985). CMF Design provided the operational layer, translating this vision into tools for the chromatic, material, and tactile articulation of products (Takehara, 1984). The Umbrella Diagram then offered a forecasting model to situate CMF decisions within broader historical and cultural cycles (Trini Castelli, 2021). Finally, Qualistics systematized the evaluation of emotional and perceptual qualities, ensuring that such design strategies were aligned with user experience and sustainability (Trini Castelli, 2000). Together, these tools constitute a systemic framework for design theory, one that integrates production, perception, and cultural context.

7.2 The transition from form to meta-design strategies

The interrelation of these theories reflects Castelli's overarching aim: the transition from form-centered design to meta-design strategies. This trajectory paralleled broader international debates—from Radical Design's critique of functionalism in the 1960s, to postmodernism's embrace of plural languages in the 1980s—but Castelli distinguished himself by articulating a methodological rather than stylistic response. Instead of privileging visual eclecticism, he emphasized the need for tools capable of addressing unresolved “qualitative aspects of modernity” (Trini Castelli, 1985; Mitchell, 1996). No-Form Design, emerging as a synthesis of this trajectory, epitomized this paradigm shift, by reducing form to a latent background and elevating sensorial qualities as the primary carriers of identity (Thackara, 1985).

7.3 Castelli's contribution to contemporary design culture

Within design history, Castelli thus appears as a liminal yet pioneering figure who reframed the very scope of design theory. While contemporaries such as Sottsass or Mendini are often remembered for iconic postmodern forms, Castelli's enduring contribution lies in having provided a coherent set of meta-design instruments that remain applicable to contemporary challenges—ranging from ecological transition to the design of digital and interactive systems (Bosoni, 2016). His emphasis on forecasting (Umbrella Diagram), systemic chromatic-material identities (CMF), emotional evaluation (Qualistics), and dematerialized interaction (No-Form) positions him as a theorist of design's "immaterial turn," a transition from product to experience, from object to system.

8. Conclusions

8.1 Castelli's theoretical legacy in design history

Clino Trini Castelli's work demonstrates how design theory can transcend the object and become an exploration of systemic, sensorial, and cultural dimensions. By developing tools such as Primary Design, CMF Design, the Umbrella Diagram, Qualistics, and No-Form, Castelli articulated an alternative genealogy within Italian and international design—one that privileges the meta-design process over the production of iconic forms (Mitchell, 1996; Thackara, 1985). His research is a reminder that design history should not only record products and movements but also methodological innovations that shape the discipline's epistemological framework.

8.2 Relevance of his tools for current and future CMF and meta-design practices

Today, Castelli's concepts remain relevant for multiple reasons. First, CMF Design has become a standard methodology in industries ranging from automotive to consumer electronics, confirming Castelli's pioneering vision (Takehara, 1984; Kuranishi, 1990). Second, the Umbrella Diagram continues to offer a model for forecasting in a time of accelerated cultural and ecological change, when cyclical understandings of material and chromatic languages prove more insightful than linear narratives (Trini Castelli, 2021). Third, Qualistics prefigured current debates on affective design, sustainability, and user experience, anticipating the shift from quantitative measures of performance to qualitative metrics of emotional resonance (Trini Castelli, 2000). Finally, No-Form Design resonates strongly with contemporary digital and dematerialized interfaces, where identity is constructed through intangible sensorial layers rather than through volumetric form.

Castelli's theoretical legacy, therefore, is not limited to Italian design history but extends to contemporary global design culture. His meta-design approach provides both a historical framework and a methodological repertoire for addressing today's pressing challenges: ecological transition, technological humanization, and the design of meaningful, durable, and emotionally resonant experiences.

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10. Short biography of the author(s)

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