

The background of the cover is a dark blue field filled with a complex network of white lines and dots, resembling a social or technical network graph. The lines connect various points, creating a dense web of connections.

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Hand-Made Jewelry in the Age of Digital Technology

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ABSTRACT

People have always been central players in the world of jewelry. Not only as artisans who have given life to masterpieces of inestimable material and creative value, but also as users who have used jewelry as a means of expression, as a guardian of immaterial values or as a vehicle for messages. Over time, the human being has accepted the support of the machine in the productive, creative, and communicative processes, and today the world of jewelry swings between handmade and machine-made. Digital technology is increasingly affecting the production processes, the product itself, and the services connected to it. First, the paper aims to highlight the complexity in defining the role of luxury and handmade associated with the world of jewelry. Secondly, it aims to analyze the handmade relationship in the world of jewelry as a driving force for creating new values, of which the designer is the mediator. How the machine-made paradigm fits into the design, production, or communication of jewelry is described with contextual research from the second half of the last century until today, outlining the best examples in Italy and abroad. Then, through a descriptive case study methodology, an academic workshop is presented to investigate better the role of design in managing craftsmanship combined with new emerging technologies. The research on the context brings out the different declinations that the hand-machine relationship brings out in the world of jewelry. Then, the results obtained involve the analysis of the projects developed during the workshop, mediated through the relationship between hand and machine, underlining the designer's role. Innovation and technology, together with design methodology, redefine the stylistic features but also - and above all - deconstructs the classic concept of preciousness, resulting in the modification of the perception of the value. This implies a redefinition of the traditional parameters of luxury and the role of the human being, and a different way of designing its products. Finally, the paper analyzes the jewelry field and the designer's ability to develop the relationship between craftsmanship and new technologies, underlining the new value systems that this relationship can create.

Keywords: Jewelry design, Hand-made, Digital technology, Machine-made

INTRODUCTION

Etymologically, the word luxury derives from Latin noun and adjective *luxus*, which means 'excess', 'extravagance', and 'dislocated' (Devoto et al. 1987).

Today contemporary luxury has moved from the abundance of precious materials and materialistic approach to the grandeur of intangible values: culture, knowledge, craftsmanship, technology, durability, and beauty. The jewel, an ephemeral ornamental product by convention, is not exempt from these considerations: it amplifies the complexity of the perception of its value, if we investigate the many relationships it has had in the last century with fashion, art, design, tradition, and innovation. The histories of the jewel of the twentieth century (Cappellieri, 2018) bring out new identities, where the value is no longer only directly proportional to the quality of the material of realization, to the price displayed on the market or the rarity of the piece itself. However, it can be sought in intangible qualities. It should also be considered that the advent of industrial production first and then the digital revolution had a significant impact on the design and production processes of jewelry (Cappellieri et al. 2020) as well as in the perception of their value. In particular, the third industrial revolution and the economic boom in the 1960s impacted the democratization of luxury goods that has translated into a greater offer and compulsive consumption. This led to the widespread of the so-called Luxury for the Masses, and the brand of the sector have expanded their production by inserting more and more *masstige* products. Similarly, the equivalence of luxury as exclusivity disappears, but its meaning becomes more complicated than before. The Industrial Revolution led to the creation of another paradigm within the world of jewelry, influencing the perception of luxury: the dichotomy between hand and machine. The hand represents the craftsmanship, manual work, while the machine refers to all the automated processes of mass production and to the advent of digital inserted in the production, communicative and experiential process of the object. The hand-machine relationship established with the Industrial Revolution sees, among other production contexts, the jewelry sector oscillating in a constant movement between high craftsmanship and industry. Therefore, the Industrial Revolution defined a new market and made the beautiful and the useful accessible and democratic. The new possibilities that change in roles, productions, and languages open, also contaminate the perception of the objects created. The resulting value system can be summarized in three macro areas, described below, which see the hand-machine relationship declined according to the prevalence of one over the other, up to their mutual collaboration and synthesis.

Manus Sine Machina

Manus sine machina draws on examples where the jewel's value is attributed to high craftsmanship rather than the possibilities that the machine can offer. Over the past two centuries, craftsmanship has assumed a crucial role in the debate on the attribution of the value of the jewel. This is because craftsmanship has survived time and machines and has adapted its traditions to contemporary times, emphasizing the value of the 'talent of the hands' (Cappellieri and Pirola, 2020). Centers of competence characterize the Italian territory: these territorial districts dedicated to goldsmith production pass on their know-how from generation to generation, creating over time a

close connection between small and medium enterprises with the knowledge and territorial resources. This defines a value system that revolves around tradition and high quality: Torre del Greco, Valenza, Vicenza and Arezzo. These areas, where the know-how has been passed on and established over time, represent a globally unique business model. Indeed this is due thanks to the richness in terms of variety. Radically diverse aesthetic, manufacturing, material and technical standards characterize each district: from corals and cameos of Torre del Greco to the High Jewelry of Valenza, from the Vicenza tradition to the production in Arezzo (Tenuta, 2021). Together with more traditional values linked to luxury, the historical context of the twentieth century sees the growth of a scenario in which jewelry dialogues with the arts, seeking a different form of expression based on unconventional materials, limited productions, or unique pieces and oriented to the restricted market of art rather than democratic commercialization of the product. At an international level, Calder, Picasso, Dalí, Fontana, Man Ray, Max Ernst miniaturized their works of art into jewels that had the same expressive language encoded in painting and sculpture and where the value lay in the author and not in the object. In the Italian context, Padua school represents the most remarkable testimony of the artist's jewel. The production of jewelry that has characterized it gives maximum artistic expression to a material, gold, the starting point for the author's creative process. Born with Mario Pinton, the school explores the material, now with the Cartesian accuracy of Giampaolo Babetto, now with Stefano Marchetti's mokumé parquetry or with the use of enamel and niello by Graziano Visintin. In the Padua school, the value of matter and techniques persists. On the contrary, we also have examples in which authorship is combined with poorer materials, like the one of the architect Riccardo Dalisi. Unique pieces, the antithesis of traditional jewels, do not display any prestigious material, but if anything, they enhance copper and tin. It is an interpretation of jewelry that overturns its traditional idea and instead thinks about the craftsmanship of old knowledge re-proposed with poor and sustainable materials but equally worthy of value. If the advent of machines leads to standardization of work and production, high craftsmanship and the artist's jewel reconstruct a different language for the communication of luxury in jewelry, unhinging the traditional dictates and adding an endless versatility of interpretation, where the talent of the hands is recognized as a creative force for new values.

Machina Sine Manus

Machina sine manus explores the years of mass production, of machines that replace human work to offer a faster, more precise, automated one. However, the tireless work of the machines does not stop the creativity of the designers who use them: they experiment with new design approaches to jewelry, where production is done entirely by the machine, but the creative idea can only come from man. The advent of the machine within traditional gold production can be described with two significant technological changes that have been able to redefine the classic paths in producing a piece of jewelry: laser cutting and 3D printing. Used in 1967 for the first time to work a sheet of

steel one millimeter thick, laser cutting is now a technology that jewelry can use to take shape. The intervention of the machine is all-embracing, replacing the activity at the goldsmith's bench to create the compositional pieces of an object before assembly. This is the case of Giancarlo Montebello, who has exploited subtractive production techniques, such as laser cutting and chemical cutting, to create highly light and detailed objects. The extreme precision that the machine allows to achieve in a short time and the fine degree of detail that it can offer could not be achieved by the human hand. This exact high machine definition also characterizes additive manufacturing technologies, such as 3D printing. Rapid prototyping has become part of the process of creating the finished object, as well as replacing the manual process of wax modeling. Its level of definition and speed have evolved to the point that some jewelry brands now produce entirely using this technology. For the most part, the resulting jewelry is made of polymer, sustainable filaments, resin, and materials far removed from traditional luxury but which nevertheless manage to carve out a space of importance. Examples of this are the jewels of Maison 203, .bijouets, or Maria Jennifer Carew. With the progress of technological innovations on filaments, resins, and powders that can be used for 3D printing, possibilities have also opened up for metals closer to the traditional world of high-end, such as gold, of which Ross Lovegrove's jewels are an example, or more innovative ones such as titanium, as in the case of Manuganda or Stefania Lucchetta. Additive and subtractive technologies represent an example of how machines can have an advantage in terms of accuracy and speed compared to manual work, defining a new kind of language. In addition to the final product, technology also transforms and reconstitutes the processes and services that revolve around the world of jewelry. Silverstein and Neil (2003) stated that it could be defined as a 'new luxury' constructed as services and products that can generate emotions and unique experiences. Examples of the entry of digital technology into jewelry retail date back ten years to when Boucheron was the first to apply virtual reality to its online shop. However, this trend has surged only with the current health emergency, leading many previously reticent high jewelry houses to open online stores. One of them is Bulgari, that opened its first online boutique in 2020, including highly specialized customer service, signature packaging dedicated to online purchases, omnichannel development, and the use of artificial intelligence. A non-physical, immaterial presence that nevertheless manages to redefine the perception of the product, the brand, and the services associated with it.

Manus et machina

Manus et machina explores the evolution of the craftsman who becomes 2.0 and uses new technologies to expand communication, market presence, and production in which the designer manages to act as a mediator between the two terms using the qualities of each to create innovation. After the advent of 3D printing and even today with the spread of digital use, open-source, interactivity, and free online sharing are conditioning the world of jewelry and changing its paths. Expertise in digital modeling software and the possibility

of social communication are transforming the role of designers or artisans, who can become entrepreneurs on the web. The result is more excellent permeability of communication between creator and client and a change in the roles that define the creation of a piece of jewelry. The machine and the hand come together to define new experiences and methods of communication and new professional figures. On the one hand, the spread of makers and digital artisans, who increasingly adopt technology to convey and communicate their work, increases their ability to exploit digital communication and open-source tools, as well as the spread of shared workspaces that lead to the generation of a new network of people, less individualization of production processes and a sharing of skills. On the other hand, the figure of the designer emerges as essential, able both to mediate between technologies and design and to attribute new meanings and values to the objects produced. This is the case of Nervous System, a studio founded in 2007 by Jessica Rosenkrantz and Jesse Louis-Rosenberg. Generative systems, 3D printing, algorithms, and digital platforms allow consumers to create their personalized products easily. An open-source use of technology is made transparent and public, regulated by a license, to spread innovative knowledge. The digital revolution has marked a radical change for products but also for processes and services in the jewelry world.

APPLIED RESEARCH: MADE BY HAND, MADE BY MACHINE AT POLITECNICO DI MILANO

The man-machine paradigm that has been established, first with the industrial revolution and then with the digital revolution, determines the addition of a new component that design must translate into the project and that can offer the consumer a different concept of luxury. This concept refers to the addition of an experiential system. With a descriptive case study methodology we tested the possibility of man-machine combination. In 2017, a university workshop, called Made by Hand - Made by Machine, a collaboration between Politecnico di Milano and London College of Fashion, was held in their respective venues but synthesized into a physical exhibition during Salone del Mobile 2018 at the Politecnico venues, a satellite space of the event. The challenge was to simultaneously enhance traditional authorship and the seriality of the machine, the imperfection of one and the versatility of the other. The specific aim of the workshop was first to develop design and manufacturing processes that strengthen and convey the concept. Secondly, gathering an understanding of the limitations and opportunities of various ways of working between artisanal and technological tools. Moreover, driving innovation in jewelry design by incorporating new thinking methods in craft technology, creative arts and digital engineering. The methods for collecting data were qualitative, through observation of the workshop's progress and conversation with participants. The participants were students of the master's and three-year degrees in fashion design, specializing in jewelry and accessories, and the workshop was conducted over 8 days in 2 months with specific steps to guide the design phases: 1) Launch of the brief: The idea of luxury is often tied to labor and time intensive techniques. Changing how something

is made changes the meaning and our perception. This brief is about making conscious decisions about the processes employed and the meaningful relationship of emerging technologies and traditional handcrafts and how this relationship can inform your concepts; 2) Explanation of the reference context; 3) Explanation of the expected outputs: develop a piece or set of pieces, informed in design and manufacturing process by digital technology as well as handcrafts; 4) Inspiration and Mood board definition; 5) Concept and sketches definition; 6) Technical drawings, 3D models and prototype development; 7) Delivery and presentation. The results obtained, about 80 physical pieces of jewelry capable of responding to the brief, generated three clustered reading levels of the hand-machine relationship: High Tradition, Live Now, Future Thought. The first category, High Tradition, includes jewelry that looks to the past and draws on traditions, reinterpreting them in a modern key. Some examples follow. Coral and its apotropaic function are innovated through laser cutting in the Pop Coral necklace, where tradition is also linked to a more modern concept of customization: the necklace is in fact composed of coral-shaped laser-cut modules that can be composed as desired by the end-user. The New Contact gorge, combines hand smock stitching with 3D printing, creating a continuum of forms through the union of the machine and human work. In the Marbles choker, in a game of mimesis, a marble sphere is hidden in a necklace made of hand-painted rubber spheres, whose textures imitate the classic veining of marble. The second category, Live Now, reflects on the meaning of jewelry that seeks out the wearer's personality or amplifies its perception. Baudrillard reminds us that 'today the product most in demand on the market is not a raw material, nor a machine, but a personality' (Riesman in Baudrillard, 1998). Experience makes jewelry interesting, its communication, its relationship with its memory, and its interaction with the customer. The Do I Love Me? collection takes us back to an emotional sphere, the game of I Love You Don't Love Me, with delicate laser-cut brooches where the petals can be frayed as in a game between lovers, modifying and personalizing the appearance of the object. Alternatively, the Semblance necklace uses a 3D scanner to scan the human body and freeze a moment in time, making it digital and 3D printable so that one can always carry around a physical memory of the now-grown body. Finally, the third category, Future Thoughts, combines the hand and the machine with a glance towards the future, telling of new bodies, such as the masks of the Beautiful Robots project, or of dreamlike and personal 3D printed worlds painted with the imperfection of manual techniques characteristic of The Freshness series.

CONCLUSION

Where is luxury today? We have seen how the perception of luxury in jewelry has radically changed and how technological innovations have managed to give a significant boost to this change. Whether it is a question of artisans and small businesses or large brands of fine jewelry, the constitution of product values is imbued with characteristics such as the personalization of the product, storytelling and the narration of imaginaries, the now interactive experience that the consumer can have and the perception that

the customer himself will attribute to the product. The results of the young talents from Politecnico di Milano and London College of Fashion, future designers in the working world, confirm a marked propensity for a design that associates preciousness with research and experimentation rather than the cost of the material. It was noticed how working between the handmade and the machine-made increased a profitable exchange of skills, generating innovation for the final product. Participating students, in the role of designers, contributed as mediators between different languages, creating new values and meanings for the product. The observation also revealed the main limitations of the workshop, mainly related to the time and prototyping technologies available. It was in fact noted that having had more industrial technologies and time available would have helped in experimenting more and in the prototype development. The imagery created by the three categories is a synthesis of the hand-machine paradigm that, through the designers' young minds, is no longer a design constraint but a creative possibility for new product solutions. The projects proposed are heterogeneous, proof of extensive research in both the world of craftsmanship and that of innovation. Some draw on traditional culture to propose an alternative processing method borrowed through the total or partial use of the machine. In this case, the machine can become an object of design, or a simple tool again mediated by the craftsman's hands. However, this same manual skill is not always represented by the productive intervention that insists on the creation of the jewel but can also be present in the intervention of the final consumer who is the very subject of the creation of aesthetics by choosing, modifying, or destroying parts of the jewel. The creator of meaning in this case turns out to be the customer himself: the jewel, in this way, acquires a value given not only by the meaning that the designer gives to the object but also by the meaning that its user interprets. Customization brings the consumer closer to the object he is buying, making it feel more like his own by entering the definition of its aesthetic parameters. Finally, all the projects are characterized by a strong integration between the manual and technological components, converging the two areas in a synergic context where one is indispensable to the other. It can also be seen how the results obtained unhinge the idea of luxury from the preciousness of the materials or the intense manual work and propose a different uniqueness of the product, made up of the unusual relationship between two worlds that are close to each other but belong, in the words of Donald Norman (2008), 'to two different species', namely the world of man and machine. The price or the perceived value of an object cannot be defined by the mere actual count of the work involved in producing it, nor by the mere authorship of the designer. It is the whole creative process that leads to the production of the object itself, as well as the innovative component that an unusual union manages to generate it is not art, it is not craftsmanship, it is not serial production, but something more.

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