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Digital Transformation towards metaverse: strategy and impact in the luxury field

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Abstract

The research aims to study the digital transformation process in the luxury industry through an empirical analysis of the relations between most implemented technologies, performance, and challenges of relevant firms in the sector. Metaverse is one of the most recent and powerful innovations, but to be developed, it requires infrastructural investments in several technologies upon which this paper is mainly focused. A questionnaire has been delivered to high-level managers in the most important luxury companies to test their sentiment upon selected fundamental technologies for digital transformation, and two interviews to top managers have been held for a direct qualitative analysis of the results. The questionnaire shows the opinion of a champion composed by more than 50 participants mainly working in large fashion firms between Italy and France. Through nine specific research questions, a correlation analysis, and the concepts defined in the interviews, it has been possible to explore the central topic of the study, providing empirical evidence that the luxury world is cautiously taking the digital transformation path and is working to implement the technologies needed for metaverse. Luxury companies improved their performance levels in recent years and started innovating at the highest rate with generally great outcomes; therefore, despite the presence of some challenges, the perspective for a push in innovative exploration seems to be optimistic. Key recommendations for a good digital transformation in the luxury industry are a digital transformation strategy harmonised with the wider corporate strategy, a constant attention to brand equity and long-term effects of implemented innovations, and an efficient use of blockchain systems to secure the digitalization process.

1. Introduction

The process of digitalization appears to be an ongoing journey, continually influencing the strategies of all business entities, with the aim of improving efficiency, competitiveness, and the overall customer experience. The integration of digital technology creates of course a huge number of opportunities, representing a fundamental step for every innovative and well managed firm which seek for a market leadership. In the luxury industry, one of the most traditional and material, some decades ago it could have been considered risible to think about a digital distribution, as high-level physical retail had always been the key successful distribution pillar. However, luxury leaders not only adapted to the change of consumers habits, but also, they put a huge effort presenting new solutions to catch and influence the latest trends which were shaping the market. They developed online shops in their own websites and high-end platforms obtaining excellent performances; especially, the best reaction to this innovation was recorded in the U.S. but also in China and Asian countries, which maintain still today, after Covid-19 and political restrictions, a great and increasing share in sales (Joy et al., 2022)[1]. This passage happened during the last ten years, but nowadays different perspectives show the potential of the new digital transformation wave towards virtual reality.

The metaverse appeared gradually as a new space for interactions, starting from gaming and entertainment to social media (Dwivedi et al., 2022)[2]. The Gen Z, probably influenced by the pandemics, found a place for expression in the metaverse, spending there more and more time; thus, to attract this target, many companies decided to create virtual editions of their products making them unique and rare thanks to NFTs and blockchain technologies[3]. Through metaverse and virtuality the actual or potential customers may create an avatar of themselves which can be used to discover new fashions and therefore new products, so to try them and see how they would fit on their body, widening the whole experience of luxury shopping (Bassano et al., 2020)[4]. Artificial Intelligence (AI) and augmented reality technologies are developing at a fast pace and for sure they will make the metaverse a more enjoyable place in which people will tend to spend an increasing

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[1] Joy, A., Zhu, Y., Peña, C., & Brouard, M. (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens. Strategic Change, 31(3), 337–343.

[2] Dwivedi, Y. K., Hughes, L., Wang, Y., et al. (2022). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. Psychology & Marketing, 1–27.

[3] Ibidem n.2

[4] Bassano, C., Barile, S., Saviano, M., Pietronudo, M., Cosimato, S. (2020). AI Technologies & Value Co-Creation in Luxury Context.

amount of time; it could assume the role of a "factory of dreams and pleasure" (Kitsios, Kamariotou, 2021)[5].

Luxury multinationals, especially LVMH, are pushing their main *maisons* toward the exploration of metaverse through projects such as virtual fashion shows based on NFTs, virtual shops etc., while also providing the tools to sustain the realization of this new business perspective (Silva et al., 2020)[6]. AI and metaverse are interconnected, they could represent the highest upgrade of digital customer experience in the alignment with the objective of a larger customer base due to higher accessibility and promotion of luxury items.

Despite the clear intention to continue towards this direction, after the crypto currencies crash and the recent big tech crisis, some shadows appear on the time required to complete the integrated metaverse project and so on its expected results in presence of larger investments. It is important to note that the metaverse is not a single platform or technology, but rather a collection of virtual worlds and platforms that are interconnected. This means that there may not be a single "ready date" for the entire metaverse, but rather various platforms and experiences will be developed and launched at different times. The recent huge success of ChatGPT has recently pushed the attention of Big Techs toward AI, draining relevant amounts of investments from metaverse projects which seem to be slower than expected in gaining the "complete metaverse" objective due to technical issues. The time necessary to create a virtual world in which unifying all the metaverses is not short as it was depicted, but the conditions that made metaverse increasingly popular are not changing, instead they are getting stronger. Data shows relevant and constant results such as larger time spent on internet by a growing share of people, as well as the democratisation of luxury and the strong interest of younger generations in digital reality[7].

Therefore, the main purpose of this thesis is to analyse the impact of digital transformation latest stages on luxury multinationals performance, focusing on their metaverse strategies and on the linked AI. implementation. On the one hand the paper aims to provide an empirical contribution to the existing literature through a model in which the two elements, considered as exogenous variables, are analysed in their role as driver of higher actual and prospective performance, while supporting at the same time the development of strategies for A.I. and metaverse in the luxury industry. Interviews with high-level managers of luxury companies aim to collect enough data to sustain or confute the thesis assumptions; then, the data analysis proceeds with the linear regression

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[5] Kitsios, F., Kamariotou, M. (2021). Artificial Intelligence and Business Strategy towards Digital Transformation: A Research Agenda. Sustainability, 13, 2025.

[6] Silva, E.S., Hassani, H. and Madsen, D.Ø. (2020), "Big Data in fashion: transforming the retail sector", Journal of Business Strategy, Vol. 41 No. 4, pp. 21-27.

[7] Ibidem n.2

method to discover which elements impacted the most on the performance levels. The finding of the analysis intends to show that metaverse projects are effective to enhance value creation in the luxury industry.

2. Literature Review

This chapter summarizes the main academic literature linked to the digital transformation strategies previously introduced. The structure proceeds in two main parts. The first one explores the most recent digital transformation strategies in the luxury industry with a focus on AI. Subsequently, the second one reviews the metaverse concept and its potentiality, considering the implications for luxury industry.

In relation to what stated above, indeed, contemporary success of the main luxury multinationals depends on many factors, but a fundamental one is represented by omnichannel strategies which rely on an increasingly deep digital presence. The digital pathway is getting more and more fundamental to enhance whole groups' performance and competitiveness in an industry characterized by oligopolistic tendencies and growing concentration.

2.1 Digital transformation innovations in the luxury industry

Digitalization is nowadays critical to reach long-term business growth as it enhances the competitiveness of a firm. Digital transformation can be defined as the integration of digital and advances technologies to transform traditional services and business processes into smarter and more efficient versions. Through digital transformation firms can reshape and strengthen their business models, operations, distribution, and customer experience (Javadi, 2022)[8]. There are several advantages such as higher customer satisfaction, organisational agility, operational efficiency, and data-based insights which are fundamental to sustain a data-driven approach in the long-term. The digitalization process presents radical changes for an organization; therefore, if it is not well managed, there are some risks to consider, e.g., there must be the technical ability to exploit the obtained data for a constant improvement of the whole corporate strategy. In this sense it is crucial to determine clear business objectives before starting the digitalization to define a linear implementation.

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[8] Javadi, Y. (2022). 7 Pillars of Digital Transformation Framework for Continuous Business Growth. iBusiness, 14, 139-149.

Thus, technology has a key role in digital transformation. It all starts with analytics, as datasets analysis reveals precious information. This activity is directly linked to automation systems through which it is possible to collect data and organise them for the analysis which can be automatised as well. In this context, new relevant AI technologies are applied to enhance and increase the efficiency of processes through natural learning processing (NLP), machine learning, predictive analysis, and platforms, such as the ones dedicated to Customer Relationship Management (CRM) and cloud computing[9]. AI and Machine Learning (ML) algorithms are used for three main purposes: clustering, classification, and regression. They are classified depending on the level of human supervision on their learning capabilities; the advanced techniques are characterized by deep learning (DL), "a subset of AI and ML that develops multi-layered artificial neural networks to attain state-of-the-art accuracy in many classification and regression tasks" (Thien et al., 2022)[10].

The luxury industry is also deeply affected by the digitalisation process, especially from the distribution perspectives. In 2023, the worldwide revenue of the luxury personal goods market amounts to US$354.80bn; the annual market expected grow will annually be 3.38% (CAGR 2023-2028); in 2023, the expected online sales share is 22,4% on the total and it should reach 26% in 2025 (Statista, 2023)[11]. It implies that digital strategies must be a great priority for luxury companies and therefore the digital transformation needs to proceed rapidly to keep a high competitiveness level.

In this sense, AI improves online interactions and contemporarily cocreates value with the users; thanks to the previously collected data and its client profiling ability, it can understand the customer expectations in a circle of reciprocal advantage between human user actions and machine comprehension. Luxury AI digital assistants are basically chatbots which unify the knowledge of human assistants and the suggested efficient purchase on online channel. Conversations with customers represent a valuable source of data as the main information about the costumers is asked as well as purchase concerns, purchase driving factors, personal interests etc. The most developed digital assistants understand through interaction with a profiled consumer how to answer in the most appropriate way for the circumstance of each conversation catching the customer's emotions (Joy et al., 2022)[12]. In fact, it has been observed that there is higher trust for machines with human characteristics; empathetic intelligence, especially, makes the digital assistant more reliable

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[9] Ibidem n.8

[10] Huynh-The, T., Pham, Q., Pham, X., Nguyen, T.T., Han, Z., & Kim, D. (2022). Artificial Intelligence for the Metaverse: A Survey. *Eng. Appl. Artif. Intell., 117*, 105581.

[11] https://www.statista.com/outlook/cmo/luxury-goods/worldwide

[12] Joy, A., Zhu, Y., Peña, C., & Brouard, M. (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens. Strategic Change, 31(3), 337–343.

reducing the psychological refusal of its suggestions by costumers who get more willing to ask information and release data (Pizzi et al., 2020)[13]. Finding in Louis Vuitton a pioneer, today the basic chatbot service is active for most of the top luxury *maisons*; digital assistants can generally be considered gatekeepers, projected for simple questions, while most of complex situations are addressed to living consultants. However, in the next future human response will be considered as sort of luxury service, as new emotionally intelligent AI powered robots are under rapid development.

Since the pandemic there has been a strong push towards luxury digitalisation. Millennials and GenZs will be the driving luxury consumers by 2025 (Bain&Co., 2020)[14], therefore it will be necessary to adapt the luxury retail to their habits implementing the model of "phygital" luxury experiences, hybrids between physical and digital activities to make the whole luxury shopping immersive and able to fully capture consumers' attention. It would happen as an upgrade of the omnichannel strategy, through highly connected stores in which the experience is enhanced by the collaboration between human assistants in the physical environment on one side and by augmented reality (AR) and virtual reality (VR) on the other, with the aim of expanding the pleasure linked to luxury and so the willingness to pay premium prices. This approach is part of the luxury 4.0 strategy to innovate this industry; the ecosystem created by IoT, AI, VR/AR, etc. is thought to transform the costumer in a collaborating partner who can address luxury companies in the most desired creation processes. Phygital content creation and expanded in-store experience can differentiate the brand and sustain customer engagement (Lawry, 2021)[15].

Reduced uncertainty about tastes, habits, and behaviour of each segment of luxury buyers would finally improve brand loyalty and business profitability. Smart mirrors, interactive product displays, and other AI powered services would help the consumer showing the most appropriate products with the highest level of personalisation.

2.2 Metaverse and luxury industry

There is no unique definition of metaverse, but it can be described as a new internet, based on VR and AR, secured by blockchain infrastructures, in which users are represented by avatars between physical and virtual world. Through physical interfaces, such as head-mounted displays and hand-

[13] Pizzi, G., Scarpi, D., Pantano, E. (2020). Artificial intelligence and the new forms of interaction: Who has the control when interacting with a chatbot? Journal of Business Research.

[14] Bain & Company (2020) Bain-Altagamma 2020 worldwide luxury market monitor. In: The Diamond Loupe.

[15] Lawry, C.A. (2022), "Futurizing luxury: an activity-centric model of phygital luxury experiences", Journal of Fashion Marketing and Management, Vol. ahead-of-print No. ahead-of-print.

based input devices, it is possible to have full immersion experiences in the many linked meta-worlds, which, working as connected websites, constitute the metaverse. The extension of the physical world would be possible and so users could interact both in real and simulated environments through their digital twins and holograms. The digital twins' system works as a representation of physical entities that can synchronise on the digital sphere: operations, processes, and other actions such as monitoring, visualizing, analysing, and predicting (Tao et al., 2017)[16]. Avatars have multimodal interaction thanks to the physical support to the user body, so that the experience can be complete almost as in reality through collaboration and shared activities free from time and space limitations (Park, 2022)[17]. There are four typical elements in all the definitions of metaverse: (1) users are embodied by avatars in a social space; (2) avatars can "live" and interact in the metaverse; (3) users have virtual property rights on their virtual items as if they were physical; (4) users can generate their virtual property.[18] Nowadays the attention paid to metaverse is increasing as innovation fast pathway shows gradually the components to create the necessary digital infrastructure for such an ambitious second virtual world. Currently there are several fragmented virtual spaces, but huge tech players (e.g., Meta, Nvidia etc.) have unveiled their visions to sustain the creation of a unified metaverse. However, it is important to remember that it will need at least two decades to complete the project, as it was for the creation of the World Wide Web between the '70s and the '90s (Sun Joo et al., 2022)[19].

It is evident that in digital reality, also called X reality (XR), interfaces such as AR and VR are fundamental supports to such an ambitious venture. However, users cannot simultaneously use these two in the metaverse as they work in different ways; the first expands the user's perception in a certain place requiring a local presence, while the second works in full virtuality through telepresence. Looking at both in their level of realism[20]:

- AR ranges from assisted to mixed reality. In the first one, virtual content is easy to identify as a floating object in the physical world; in the second one the integration between virtual and physical worlds is high.
- VR scales from atomistic to holistic reality. In the first one, users have low telepresence levels, while in the second they are so immersed in the virtual environment to potentially forget it is not physical.

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[16] Tao, F., Cheng, J., Qi, Q. et al., (2018): Digital twin-driven product design, manufacturing and service with big data. Int J Adv Manuf Technol 94, 3563–3576.
[17] Park, Y. W., (2022), Ambidextrous Global Strategy in the Era of Digital Transformation, ch. 5.
[18] Ibidem n.12
[19] Sun Joo, G., Jooyoung, K., Jaemin, K. (2022): The future of advertising research in virtual, augmented, and extended realities, International Journal of Advertising.
[20] Ibidem n.18

With over 800 million people owning AR tools in 2020, it is estimated that by 2024 the number will increase to 1.7 billion worldwide, a growth by 1.5 billion since 2015 (Statista, 2021)[21]. About the AR functions at home, 41% people would use their devices for shopping purposes (Snap Inc., Deloitte Digital, 2021)[22].

The opportunities presented by this visionary objective are countless. Metaverse could imply huge improvements of sustainability, economically, environmentally, and socially speaking. People could decide to diminish their movements when substitutable by metaverse activities; in turn, this change could significantly reduce carbon footprint (De Giovanni, 2023)[23]. Therefore, circular economy systems experience would also be involved in metaverse development; blockchain technology is considered a fundamental tool to check the life cycle of products and so a guarantee of the exact environmental impact of responsible digitalisation (De Giovanni, 2022)[24].

Blockchain technology acts as a distributed ledger system where transaction data undergo verification via a consensus agreement within a network of connected participants. These recorded data entries are structured into blocks and are safeguarded by unalterable cryptographic hashes. This interconnected network operates on a peer-to-peer basis, enabling ongoing monitoring and tracking of information flow. (De Giovanni, 2021)[25].

A blockchain powered metaverse could disrupt a huge number of businesses shaping new models or adapting the typical ones to the sustainable digital environment. Marketing and branding would find a fertile soil to seed effectively, and holistic digital communication would water the virtual business fields. In this context metaverse is conceived as an infrastructure for XR platforms and technologies, in which AI works as a fluid self-improvement system able to comprehend actions, thoughts and interactions of avatars.

Thus, blockchain can be considered as a backbone of the technologies for metaverse implementation, it can mitigate inefficiencies in coordination, while sustaining omnichannel strategies as in the case of metaverse introduction. By employing blockchain technology, the network shares directly to the involved partners the same verified information; thanks to the higher control, there is also an improvement of efficiency levels (De Giovanni et al., 2022)[26]. Inefficient

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[21] https://www.statista.com/topics/3286/augmented-reality-ar/#dossierContents__outerWrapper
[22] Deloitte Digital, Snap Inc. (2021). Snap Consumer AR Global Report 2021.
[23] De Giovanni, P., (2023). Sustainability of the Metaverse: A Transition to Industry 5.0, Sustainability 15, no. 7.
[24] De Giovanni, P., (2022). Leveraging the circular economy with a closed-loop supply chain and a reverse omnichannel using blockchain technology and incentives, International Journal of Operations & Production Management.
[25] De Giovanni, P., (2021). Blockchain Technology Applications in Business and Organizations, Luiss University.
[26] De Giovanni, P., and Naclerio, A.G., (2022). Blockchain, logistics and omnichannel for last mile and performance, The International Journal of Logistics Management, Vol. 33 No. 2, pp. 663-686.

transactions, frauds, cultural limits and differences, different laws between countries, all these problems can be overcome thanks to blockchains (De Giovanni, 2020)[27]; so that, a large and deep application of this technology in digital transformation, could significantly reduce trust issues with external agents making it easier to exchange digital products in primary and secondary markets.

The concept of product can be enlarged to its digital version thanks to NFTs, as in a digital world there would be necessity to produce and sell digital creations and services creating value. The blockchain system, thanks to its unique verification capabilities, support NFTs in being reliable and unique assets to distribute. Digital products distribution often follows traditional business models in a digital version, while often physical consumers can also buy the digital copy of a physical product or vice versa boosting the economic activity in both the realities. Metaverse distribution would follow the logic of omnichannel distribution systems which work online through platforms such as Amazon. The interaction level would be comparable to the physical one but having non-stop working AI agents able to comprehend and improve their selling ability while talking with avatar customers. This revolutionary approach is likely to modify the future whole shopping experience, offering much more information to customers. The integration of social media dynamics in such an environment amplifies the users' data collection and its quality, offering the most reliable and specific insights[28].

The data goldmine represented by metaverse can be crucial for advertising. Interaction is intrinsic to metaverse, and the main objective of advertisers is catching a positive attention of consumers to create brand, product and service awareness and then enhance the revenues thanks to larger sales. So, an interactive advertising experience could result in better performances (Kim, 2021)[29]. The main limit of online shopping today is the impossibility for consumers to touch, try and see the object as it would be. AI and VR would make possible the "natural mapping", the users could perceive products as in the physical world; that is a fundamental change, as product trials have a deeper impact on consumers' conversion to product purchase than a passive glance to one of the may online ads.[30] The perceptive experience is likely to stimulate a sense of psychological ownership, increasing the probability of a purchase in the physical world (Sun Joo et al., 2022)[31]. In 2021, a worldwide survey about the things people would do in the metaverse but not in real life

[27] De Giovanni, P., (2020). Blockchain and smart contracts in supply chain management: A game theoretic model, International Journal of Production Economics, Vol. 228.
[28] Ibidem n.19
[29] Dwivedi, Y. K., Hughes, L., Wang, Y., et al. (2022). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. Psychology & Marketing, 1–27.
[30] Ibidem n.19
[31] Sun Joo, A., Jooyoung, K., Jaemin K. (2022) The Bifold Triadic Relationships Framework: A Theoretical Primer for Advertising Research in the Metaverse, Journal of Advertising, 51:5, 592-607

reported that 23% people answered that they would access through their avatars to a high luxury lifestyle (Statista, 2022), revealing how powerful is the desire of luxury digital items.

Since the pandemic, several luxury leaders decided to expand their brands in new digital projects for metaverse recognising the potential development of new streams of revenues. Digital luxury products are desired by consumers also to wear their avatars. The digital objects can be sold as NFTs; the same solution is applied to sell other digital creations such as artworks, videos, and pictures. The main target for digital collectibles is represented by digital literate young people, in many cases new potential buyers of physical products, who are interested in having both a real and digital version of the same luxury item. The volume of fashion NFTs sales is likely to grow in next years as an increasing share of gen Z and gen A customers spend large amounts of time in the digital space. The NFT uniqueness quality fits perfectly with the luxury essence of rarity and strong brand identity, while the blockchain system works against the counterfeit plague as a secure authentication service of purchased products. Following this path, LVMH, Richemont and Prada, supported by Microsoft and ConsenSys launched a blockchain system called "Aura" to trace and authenticate their products and open to the participation of other luxury firms.[32]

After several successful NFT releases since 2019, responding to a growing estimated digital demand, in 2021 Gucci proposed a new type of digital distribution by selling a virtual handbag for over $4000 USD on Roblox, a metaverse gaming platform, overcoming the $3400 USD retail price of the physical product.[33] Dolce & Gabbana auctioned a NFT series called "The Doge Crown" selling for circa 1.3 million USD, while Louis Vuitton launched for its 200 years anniversary a NFT game called "200 Anecdotes", in which users can create avatars who wear LV clothes and accessories learning their history. Again, Gucci organised whole virtual spaces on Roblox, such as Gucci Garden and Gucci Town, to propose digital store experiences for a young target audience (Liu, 2023)[34]. In the fourth quarter of 2022, on Roblox there were 58.8 million daily active users, a catchment area that keeps increasing rapidly since 2018, representing on average a new target (Statista, 2023)[35]. The U.S. metaverse potential consumer expenditure total addressable market in 2022 has been accounted for 8.3 trillion USD, with only the apparel sector making 594bn USD

[32] Schmitt, R., Rossi, A., Bensoussan, A. (2022). Omni-personal luxury: how to transform your luxury business for the digital age, Ch. 5.
[33] Ibidem n. 12
[34] Liu, J. (2023). Metaverse and Brand: A Study of Luxury Brand Digital Marketing Strategy - Taking Gucci as An Example
[35] https://www.statista.com/outlook/amo/metaverse/metaverse-gaming/worldwide

(Morgan Stanley, 2022)[36]; this data shows off how large can be the new expansion in the fashion digital field through metaverse.

Despite the many clear advantages in joining the metaverse rush, there are some relevant challenges to address. Organisations must meet several, seemingly conflicting and concurrent objectives such as providing both digital and physical products and services, seeking profit and sustainability, achieving flexibility and efficiency. Seemingly incompatible corporate strategies (e.g., digital vs. non-digital, top-down vs. bottom-up methods) and structures (e.g., legacy vs. digital systems, old vs. new work practices, and physical or digital goods) are quite difficult to conciliate (De Giovanni et al., 2023)[37]. Another main concern regards information privacy about users; unlike social media and current websites, metaverse would track users' behaviour draining a huge amount of sensible biometric data through the AR/VR devices. All this sensible information leads to a high level of identity theft risk and other illegal activities which could reduce users' trust. Verification of avatars physical owners could work through biometric identification technologies; it would be fundamental to certificate and secure transactions through digital currencies. Other problems can derive from the actual disjunction between metaverse platforms, as, today, the unified metaverse still does not exist; but a key aspect of metaverse is interoperability and to be fully active it would be necessary to unify all the "meta-worlds". This operation will be done in the future, as it happened in decades ago for the world wide web, though none clearly knows how many years will be required; so, after a huge hype for metaverse in between 2021 and 2022, in 2023 trends show a temporary reduction of global investments in metaverse. However, the reasons of this recent slowdown are several and linked to the most recent financial market crisis as well as the many impactful geopolitical events in 2022, therefore it is difficult to impute the lower trust of the market only to long-term metaverse development perspectives.

It is certain that large investments in R&D, infrastructures, digital design, informatic engineering, digital marketing etc. will be the most effective pathway to complete the imagined metaverse system. The larger the invested resources will be, the faster the metaverse will be ready for consumers all over the world, maybe providing new lifeblood to the global economy.

In the literature review there is a short description of the main concepts and dynamics of digital transformation implementation with a focus on the luxury industry. It is showed that there is a high interest for digitalisation of products and operations in every business; in the case of luxury products and services, excellence is the key objective, therefore changes must be gradual and

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[36] Morgan Stanley, (2022). Luxury in the metaverse.
[37] De Giovanni, P., Volpentesta T., Spahiu, E., (2023). A survey on incumbent digital transformation: a paradoxical perspective and research agenda, European Journal of Innovation Management.

extremely well pondered to avoid the destruction of a high value built on the history of unique brands. However, due to the extreme actuality of technologies for metaverse, AR/VR, blockchain etc. nowadays there is a lack of studies about the effectiveness of these innovations in improving luxury firms' performance. There is several information about digital projects and strategies displayed by companies as crucial perspectives for the customer of tomorrow, but their results and influence on other relevant dimensions are still not disclosed for multiple reasons which goes from high competition on innovation to uncertainty about long-term positive effects. So, in presence of this gap, the academic literature can just describe some recent trends externally observed, but they are not directly confirmed or negated by managers and experts who work for luxury organizations and who touch everyday this topic.

Thus, the main connections between the most recent digital innovations and their effectiveness, as well as the strategic objectives which justify large investments in highly innovative projects, are explored in the next chapters through specific research questions quantitatively analysed and through two interviews. These talks express the digital transformation experience of Antonio De Luca, Valentino's Head of Treasury, and Ilaria Maltoni, Chanel's Marketing and Client Experience Manager.

3. Research methodology

3.1. Questionnaire description

The research analysis is based on a dataset obtained through a questionnaire. The survey, proposed between May and August 2023 to middle and top management of influential luxury companies, collects a relevant sample of managerial opinions about digital transformation strategies in the luxury industry through the experience of the participants in the company in which they are currently working. The questionnaire is structured in three main questions; under each one, the answers are displayed as in the following 7-point Likert scale expressing the level of agreement to a certain statement:

No wish to answer	0
Strongly disagree	1
Disagree	2
Somewhat disagree	3
Neither agree nor disagree	4
Somewhat agree	5
Agree	6
Strongly agree	7

Fig. 1

The first question asks in which technologies the firm has invested; therefore, it presents a list of digital innovations: metaverse, AR, digital twin, VR, XR, AI, blockchain, cryptocurrencies, IoT, big data analysis, cloud technology, 3D printing and e-commerce. The second one asks whether the company has been able to improve its performance in the following dimensions: profit, ROI, market share, sales growth, customer satisfaction, customer experience, quality of product/service, brand awareness, agility, resiliency, circular economy, social, economic, and environmental sustainability. The third question lists seven possible challenges incurred by the firm while implementing its digital transformation to understand what the perceived negative risks and effects are; they are: complex software & technology, continuous evolution of customer needs, lack of a digital transformation strategy, lack of proper IT skills and expertise, security concerns, budget constraints and difficulties in business model transformation.

The values 1-7 can be considered in negative to positive order ascending from the value 1, when interpreting the pivot results about technologies and performances; challenges are studied in the opposite order (the lower the number, the better the result).

3.2 Quantitative analysis techniques

The results of the survey are studied through descriptive analysis by nine specific research questions, formulated to understand the relations between implemented technologies for digital transformation, performances, and challenges. Pivot tables are used to find the average value of answers per a determined category (product/service segment, revenue class, HQ, number of employees etc.) respect to a specific request in the questionnaire, e.g., "on which innovations companies in the luxury industry have invested the most in the last two years in relation to their service/product category?". In this way, it has been possible to ordinate the sample showing trends and peculiarities relevant to the objective of this paper, while also creating the conditions for a linear Pearson correlation analysis between the average implementation level of selected technologies, and the average level of economic and customer relations performances of the firms in the three main product categories. The correlation has been performed by XLSTAT, the output is commented and displayed in tables with correlation results and their p-values.

3.3 Interviews description - Qualitative analysis

Two interviews have been conducted to investigate the scope of the thesis. They are summarised to show the opinions about digital transformation implementation presented by two important figures representing Valentino and Chanel positions. These two companies are not public, and it is rare to find some disclosure about their strategic vision of digital innovation.

4. Results

4.1 Questionnaire and research questions (RQs)

The survey sample is constituted by 51 managers who mainly work for big companies (84%) in the fashion & style segment (63%) with HQ in Italy (57%) or France (35%). The other principal categories are perfume & cosmetics (16%), cars & yachts (10%); the remaining firms have their HQ in Germany (8%). Most of companies have more than 200 employees (88%) and revenues higher than one billion Euro (75%). The descriptive analysis is mainly concentrated on this homogeneous group due to its significancy for the research scope. It proceeds with nine detailed research questions, where the average results are reported following the Likert scale (Fig. 1).

RQ1: On which innovations companies in the luxury industry have invested the most during the last two years?

The most implemented innovations in the three main product segments accounting for 80,4% total answers (fashion & style, perfume & cosmetics, cars & yachts) are XR, AI, AR, VR, IoT and e-commerce, with an average value higher than 6 (agree) out of 7. About the HQ countries, German companies show higher levels of investments in the mentioned technologies, followed by France and then Italy. This situation probably depends on the smaller champion of German firms which belong to the luxury automotive sector, famous for the high level of innovation investments. This set of technologies is also confirmed when looking at the dimension of companies both in revenues and number of employees, confirming a decision trend between large companies in the industry. Cryptocurrencies result as the least sustained innovation in most cases.

RQ2: What have been the average economic performances of companies in the luxury industry during the last two years? (Profit, ROI, market share, sales growth)

Economic performances in the whole industry have been great in the last two years, after Covid-19 crisis. ROI, profit, market share and sales growth answers indicate a 6.2/7 average value confirming the known recent results of luxury companies. This confirmation is relevant also for the fact that the improvement has been general and not limited to largest firms. The performance has improved due to several reasons, but investments in digital transformation were relevant in the last years to sustain great projects of e-commerce and digitalisation during the pandemics.

RQ3: What have been the average economic performances of companies in the luxury industry during the last two years compared to the most implemented digital innovations? (Profit, ROI, market share, sales growth)

Confronting economic performances of firms with the most implemented technologies (XR, AI, AR, VR, IoT and e-commerce) it is possible to see that in presence of these innovations the answers about economic results are on average over 6.3/7, showing a positive effect of firms' efforts to innovate. XR and VR, implemented at level 6-7, display on average the best associated economic performance.

RQ4: What have been the average customer relations performance of companies in the luxury industry over the last two years? (Customer satisfaction, customer experience, quality of product/service, brand awareness)

It is showed a high level of average customer relations performance (6.5/7); it peaks in customer experience, followed by brand awareness and customer satisfaction. In the high-end automotive sector results are especially high on average (6.8/7), also presenting the best result of customer satisfaction. In the fashion segment it is evident a greater attention to customer experience and brand awareness; the same trend is followed by perfume & cosmetics. Reported quality of products has also improved but at an average slower pace (6.3/7). Firms with revenues higher than 1 billion Euro are the cluster with greatest positive results.

RQ5: What have been the average customer relations performance of companies in the luxury industry during the last two years in relation to the most implemented digital innovations? (Customer satisfaction, customer experience, quality of product/service, brand awareness)

Associating the implementation of XR, AI, AR, VR, IoT and e-commerce with the customer relations performance level, it can be observed a high average result (6.5/7). In presence of large investments in the afore mentioned technologies, there are especially excellent levels of reported brand awareness and customer experience. The best outcome of customer satisfaction can be identified in presence XR efforts, while quality seems to be more sensible to IoT and brand awareness to E-commerce.

RQ6: What have been the average sustainability performances of companies in the luxury industry over the last two years? (Social sustainability, economic sustainability, environmental sustainability)

From the sustainability point of view the performance of companies in the sample is good on average (6.1/7). The best performing companies are in the fashion segment (6.3/7), followed by perfume & cosmetics, and cars & yachts. Economic sustainability is central, although social and environmental actions are sustained as well. The highest attention to these objectives is given by companies in the revenue class larger than one billion Euro, probably thanks to larger profit margins and organisations more capable to dedicate resources for sustainability programs.

RQ7: What have been the average circular economy performance of companies in the luxury industry over the last two years? (Reusing actions, repairing actions recycling actions)

The average circular economy performance level is quite good (6/7) as most of companies agree about having implemented recycle systems. This trend looks common in the industry beyond the dimensions of the firm, showing that also SMEs are worrying about environmental issues and carbon footprint. The increasing attention to these topics is also probably due to the strong brand reputation owned by luxury organisations with the aim of avoiding the boycott by public opinion. Although reusing and repairing actions are on average good, but not really strong (5.8/7); this result is likely to increase in next years to reduce potential value conflicts with the rising share of gen-z customers.

RQ8: What have been the most common types of challenges in the implementation of digital transformation during the last two years?

The most reported challenges for the segments fashion & style and perfume & cosmetics on average are budget constraints (5.7/7) and lack of proper IT skills (5.8/7). For cars & yachts the most relevant challenge is represented by security concerns (6.6/7) and difficulty in business model transformation (5.8/7). Looking at the dimensions of firms, it is generally possible to observe higher average values for technical challenges in the case of smaller organizations in lower revenue classes; therefore, they tend to perceive larger complexity probably due to fewer resources to invest in innovative projects if compared to bigger competitors.

RQ9: What have been the most common types of challenges related to the most implemented digital transformation innovations in relation to the service/product category during the last two years? (XR, AI, AR, VR, IoT and e-commerce)

Relating the implementation of XR, AI, AR, VR, IoT and e-commerce with the most common challenges level, it can be generally detected a relevant but not so high average value (5.5/7), showing a limited impression of difficulty in the process of digital transformation. The highest results in presence of innovation investments, so the strongest perceived difficulties, are linked to budget constraints (5.7/7) and complex software and technologies (5.8/7). About the first one, VR appears as the most expensive technology to sustain; while about the second one, IoT seems to be the most complex technology to employ.

**Correlation and P-value tables between innovations and economic performance**

Correlation table (fig. 2)

INNOVATIONS	PROFIT	ROI	MARKET SHARE	SALES GROWTH
METAVERSE	-0.194	0.014	-0.110	0.011
AR	0.063	0.225	0.115	0.057
DIGITAL TWIN	0.089	0.199	**0.316**	-0.006
VR	0.038	0.221	0.010	0.133
XR	0.274	0.225	**0.309**	0.064
AI	-0.142	0.140	0.127	0.144
BLOCKCHAIN	-0.188	0.151	0.020	0.170
CRYPTOCURRENCIES	-0.049	0.132	0.040	0.133
IOT	-0.215	-0.089	-0.009	-0.076
BIG DATA ANALYTICS	-0.120	-0.023	0.125	0.071
CLOUD TECHNOLOGY	-0.222	-0.031	-0.163	0.061
3D PRINTING	-0.004	0.024	-0.014	-0.035
E-COMMERCE	0.185	0.219	0.084	0.207

P-value table (fig. 3)

INNOVATIONS	PROFIT	ROI	MARKET SHARE	SALES GROWTH
METAVERSE	0.173	0.925	0.441	0.936
AR	0.660	0.112	0.421	0.690
DIGITAL TWIN	0.537	0.162	**0.024**	0.967
VR	0.792	0.119	0.945	0.352
XR	0.052	0.113	**0.027**	0.657
AI	0.321	0.327	0.375	0.313
BLOCKCHAIN	0.187	0.290	0.891	0.233
CRYPTOCURRENCIES	0.733	0.354	0.779	0.354
IOT	0.129	0.534	0.951	0.597
BIG DATA ANALYTICS	0.400	0.873	0.381	0.619
CLOUD TECHNOLOGY	0.118	0.829	0.253	0.669
3D PRINTING	0.978	0.869	0.925	0.808
E-COMMERCE	0.194	0.123	0.556	0.144

Correlation chart (fig. 4)
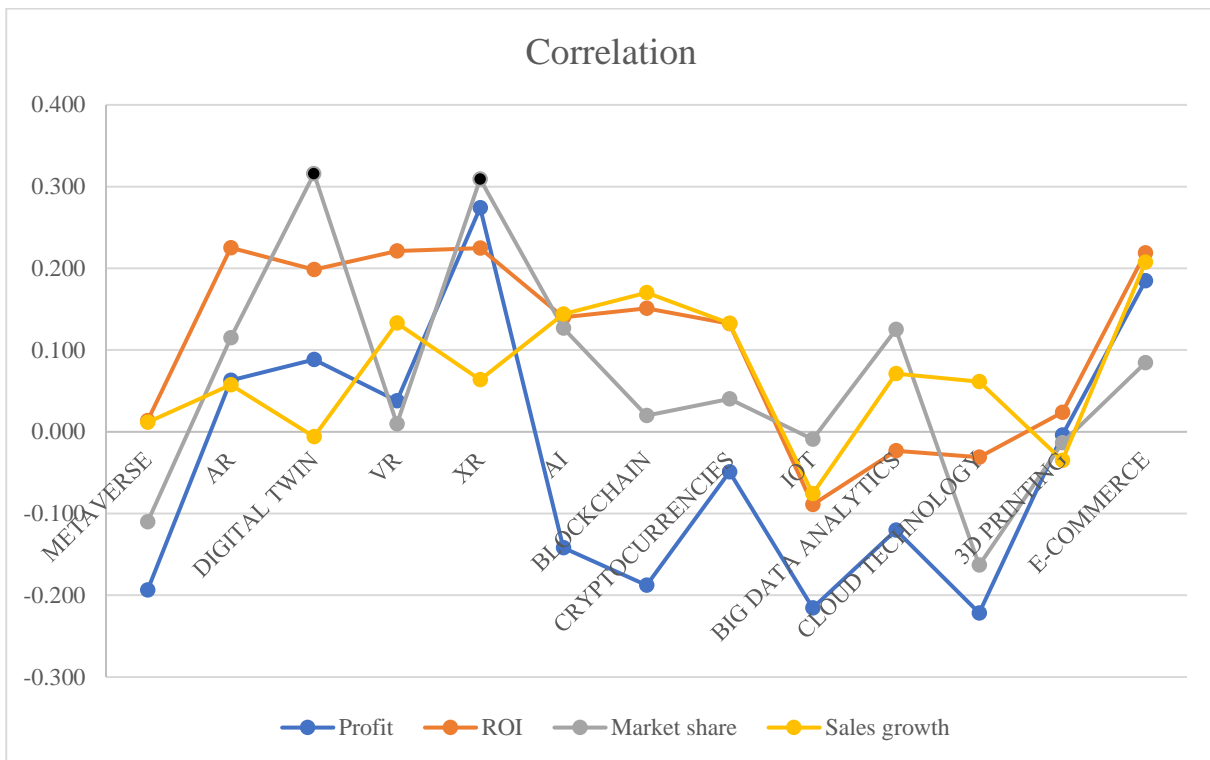
P-value chart (fig. 5)
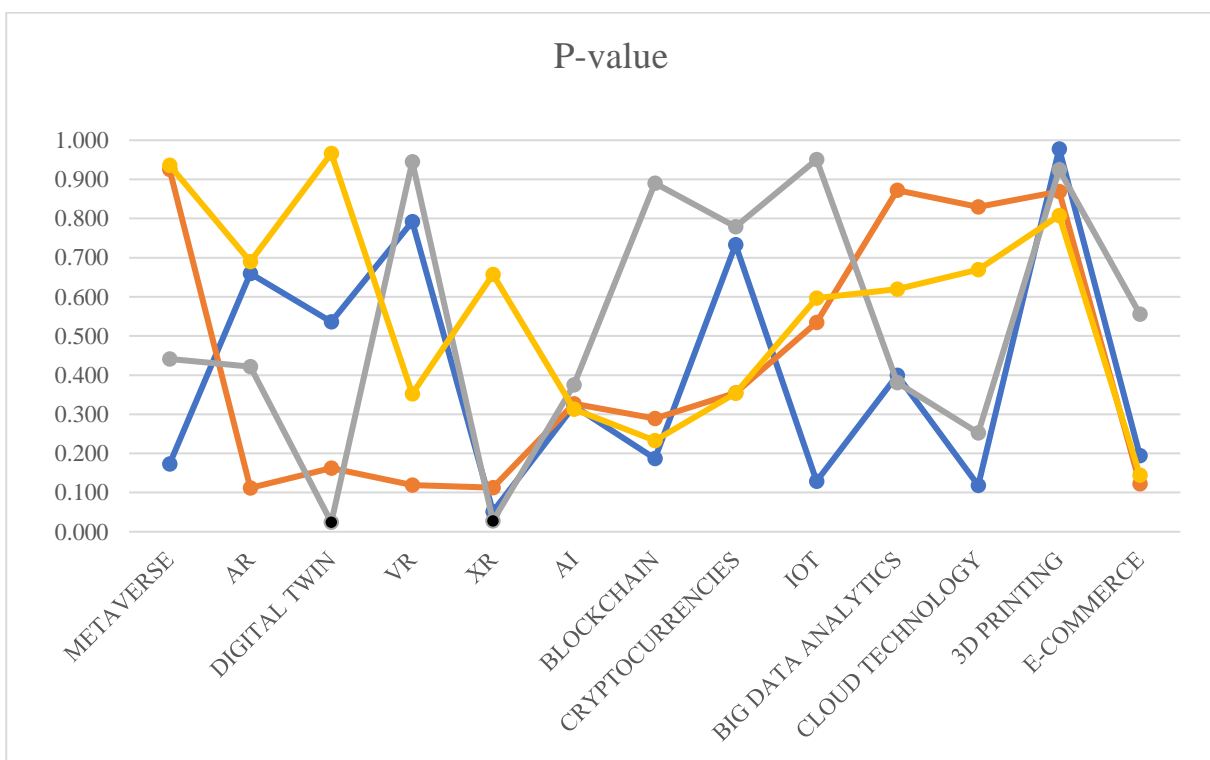
The first table (fig. 2) represents the correlations between the average results about implemented innovations with the average results about economic performance of firms. The second one (fig. 3) shows the p-value of each correlation result (fig. 2). The two tables are respectively represented in the dotted line charts above (fig. 4-5). Observing the graphs, it is possible to notice that there is a general convergence towards e-commerce, although the highest positive correlation is found in two cases verified by their p-value (p-value <= 0.1) in the second table (fig. 3); they are highlighted as black dots (fig. 4-5).

Case 1: digital twin vs market share

- Correlation r = 0.316
- p-value = 0.024

As showed in fig. 4, digital twin technology has a positive and significant correlation with market share, verified by a correspondent p-value next to zero (see fig. 5). This relationship could be explained by the high engagement degree driven by the mirrored representation of the user itself in the digital version. As observed in the previous chapters, many companies are adopting VR solutions; this choice is probably pushed by the observation that a direct identification with a digital twin may increase the willingness to physically own the items visible in digital life. A digital twin is an ideal and symbolic representation of the customer created by the client himself, if it tends to represent a desired lifestyle it will engage the user in discovering more and more the product. In this perspective, the creation of digital twins to "populate" the created VR environment could lead to a cheaper and more rapid conversion of the user into a real customer. Luxury firms invest huge amounts of resources in marketing and communication hoping to break in the mind of customers, to obtain a parcel of their attention; through the direct symbolic identification in the digital twin, the perspective could radically change, as customers would look for recognition of their entity in association with luxury items and incredible lifestyle. A completed metaverse would surely make more effective this technology, enhancing the sensorial submersion in the virtual space.

Case 2: XR vs market share

- Correlation r = 0.309
- p-value = 0.027

The positive and significant correlation between XR and market share is probably linked with the previous case, as extended reality can be considered an effective tool to capture the attention of potential customers, especially from young generations. The presence of XR enhances qualities of luxury products, looking for a marvel effect on the users; XR tries to go beyond the physical experience enlarging it through paired AR and VR systems. Well implemented XR could virtually open the exclusive luxury world and experience to all the interested people who have access to XR tools, a target whose willingness to pay could be consistent through specific digital marketing activities in this channel. Also in this case, a fully structured and accessible metaverse would be the key to extract the maximum potential value from XR technologies.

Correlation table between innovations and digital transformation challenges

- A. Complex software and technology
- B. Continuous evolution of customer needs
- C. Lack of digital transformation strategy
- D. Lack of proper IT skills and expertise
- E. Security concerns
- F. Budget constraints
- G. Difficulties in business model transformation

Correlation (fig. 6)

INNOVATIONS	A	B	B	D	E	F	G
METAVERSE	**-0.372**	0.265	-0.116	**-0.281**	0.238	0.131	0.136
AR	**-0.296**	0.183	-0.119	**-0.303**	-0.021	-0.098	0.078
DIGITAL TWIN	-0.118	0.046	-0.223	-0.060	0.187	0.182	0.156
VR	**-0.283**	0.100	-0.203	**-0.307**	**0.379**	0.264	**0.484**
XR	-0.149	0.087	-0.079	-0.258	-0.195	-0.197	0.087
AI	-0.262	-0.097	-0.249	-0.201	**0.569**	**0.333**	**0.587**
BLOCKCHAIN	-0.186	-0.031	-0.166	-0.065	**0.470**	**0.475**	**0.332**
CRYPTOCURRENCIES	**-0.295**	-0.120	**-0.325**	**-0.318**	0.243	0.111	0.181
IOT	-0.249	-0.113	**-0.288**	-0.236	**0.553**	0.253	**0.355**
BIG DATA ANALYTICS	-0.275	-0.082	-0.101	-0.231	0.217	-0.044	0.201
CLOUD TECHNOLOGY	**-0.370**	-0.141	-0.244	**-0.319**	**0.469**	0.166	0.263
3D PRINTING	-0.275	0.011	-0.153	-0.258	-0.042	-0.155	-0.073
E-COMMERCE	0.129	-0.038	**0.291**	0.291	-0.413	-0.097	-0.135

P-values (fig. 7)

INNOVATIONS	A	B	B	D	E	F	G
METAVERSE	**0.007**	0.060	0.416	**0.046**	0.093	0.358	0.341
AR	**0.035**	0.200	0.405	**0.031**	0.881	0.494	0.585
DIGITAL TWIN	0.408	0.747	0.116	0.678	0.189	0.202	0.273
VR	**0.044**	0.486	0.154	**0.028**	**0.006**	0.061	**0.000**
XR	0.296	0.546	0.581	0.067	0.170	0.165	0.543
AI	0.063	0.497	0.078	0.158	**0.000**	**0.017**	**0.000**
BLOCKCHAIN	0.192	0.827	0.244	0.650	**0.001**	**0.000**	**0.017**
CRYPTOCURRENCIES	**0.036**	0.402	**0.020**	**0.023**	0.085	0.436	0.203
IOT	0.078	0.429	**0.040**	0.095	**0.000**	0.073	**0.011**
BIG DATA ANALYTICS	0.051	0.566	0.482	0.103	0.127	0.758	0.157
CLOUD TECHNOLOGY	**0.008**	0.324	0.085	**0.023**	**0.001**	0.244	0.062
3D PRINTING	0.051	0.939	0.283	0.068	0.771	0.276	0.611
E-COMMERCE	0.368	0.790	**0.038**	0.038	0.003	0.499	0.345

Correlation and P-value tables between innovations and digital transformation challenges

Correlation chart (fig. 8)
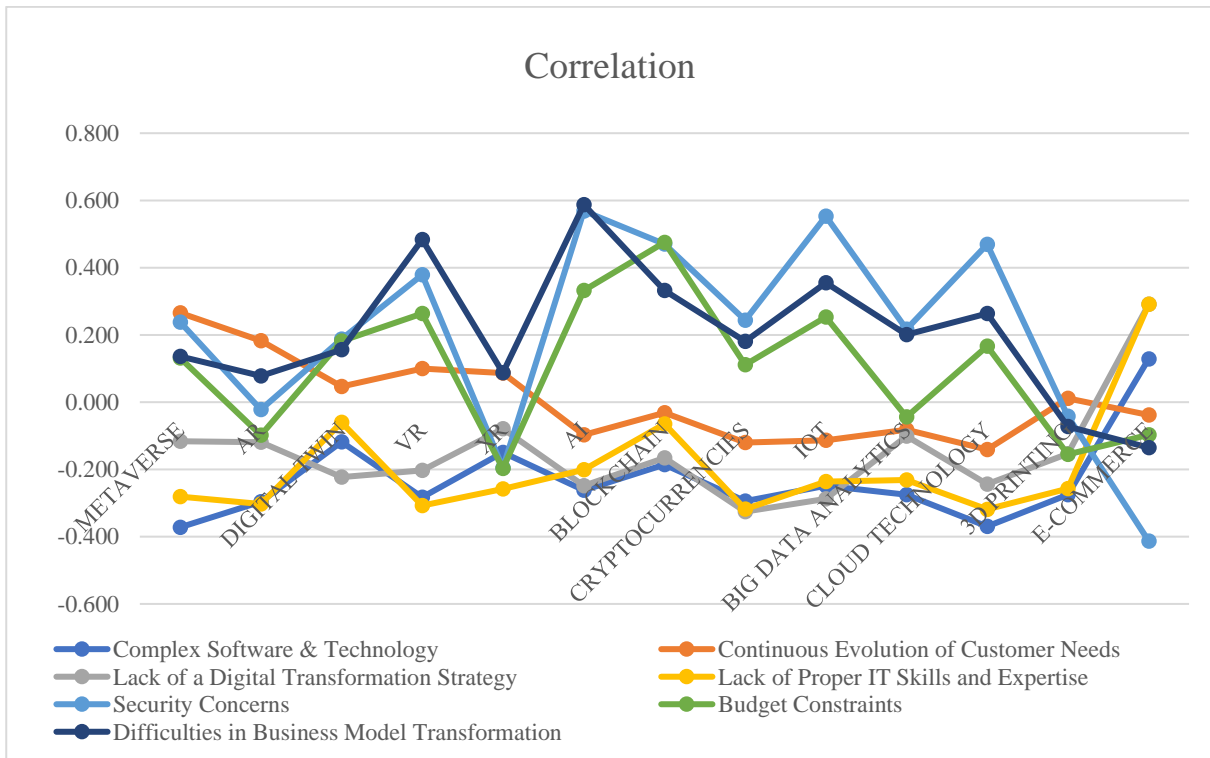
P-values chart (fig. 9)
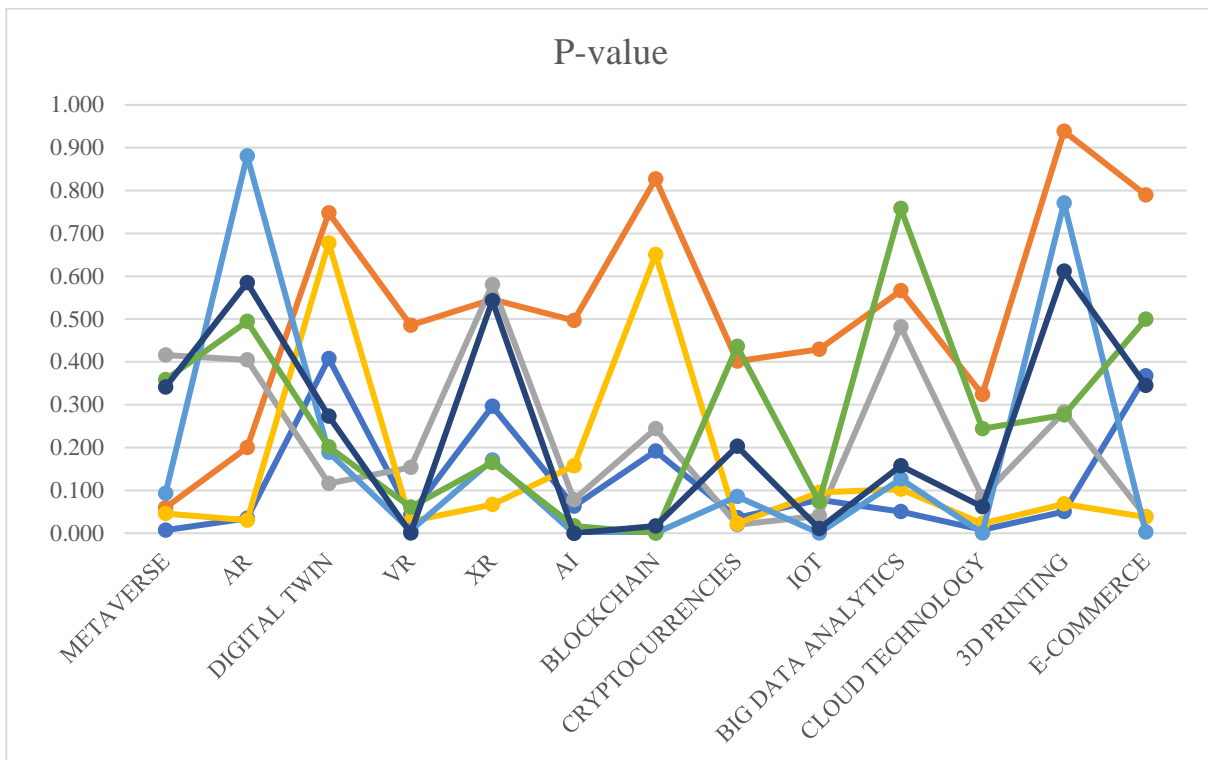
Looking at the correlation values between technologies and challenges represented above, it is possible to see several cases of high correlation and low p-value. The challenges with most technological correlations (five) are: complex software and technology, lack of proper IT skills and expertise, and security concerns. Although budget constraints represent a central issue as shown in the nineth RQ. Focusing on three relevant and linked cases:

Case 1: AI vs security concerns

- Correlation r = 0.568
- P-value = 0.000

AI, probably the most flexible of the mentioned technologies, emerges as a concern for security. AI is one of the most popular recent types of digital innovation, it has many possible applications and is a fundamental way to metaverse and digital transformation. Being quite difficult to control and to implement internally, AI development is often externalised by companies, an efficient choice in terms of cost, but also a larger risk of private data leaks with consequent damages for the company reputation. Security becomes a greater issue especially in case of fully autonomous AI systems for

driving and for remote control of machines, cars, and houses. However, the high actual correlation can also be interpreted as an answer to other security issues, in whose presence firms prefer to implement AI as an automatic protection which in turn can be more effective of traditional methods. The ambiguity of AI is likely to be reduced in the following years thanks to improved cyber security systems and so more trust in this technology could be expected.

Case 2: blockchain vs security concerns

- Correlation r = 0.470
- P-value = 0.001

The correlation between investments in blockchain and security concerns is surely less equivocal than the previous one; indeed, this innovation is usually implemented to increase control's efficiency in countless solutions from supply chain management to sustainability tracking and digital products authentication. Every type of transaction or order backed by blockchain can be fully traced and cannot be copied or leaked due to code uniqueness of each interaction. This innovation can also be useful to sustain other tools' internal development, making it possible to run safe intranets necessary for the execution of technologies such as IoT, AR, VR, and XR.

Case 3: blockchain vs budget constraints

- Correlation r = 0.475
- P-value = 0.000

In the graphs it is reported a high correlation between blockchain and budget constraints, it probably means that this innovation is considered suitable also in case of a lower budget. This reason could explicate the large popularity of blockchain systems across industries, and of course in the luxury one as well. Investing in blockchain solutions can produce a great impact on the efficiency of the company due to its several applications, while its quality as digital transformation attractor has great implications for the acquisition of the other mentioned technologies as they all require the presence of blockchain to work properly and safely. Digital economy finds its backbone in this flexible tool, which in turn will fill the role of a structural guaranty of reliability for the metaverse evolution.

4.2 Interviews – Qualitative analysis

Two interviews have been conducted to investigate the scope of the thesis. The summarised opinions about digital transformation implementation presented in the following paragraph represent a short qualitative analysis of the central topics of this paper.

4.2.1 Antonio De Luca - Head of Treasury at Valentino
Rome, 9/6/2023

Interviewer: What do you think about the current tech trends impacting the luxury industry?

A. De Luca: There are some important trends we're following. For instance, the rise of cryptocurrencies is concerning due to the absence of regulation, which increases the risk of scams. On the bright side, blockchains offer traceability advantages for luxury products. Open banking and direct exchanges are also changing the banking landscape, which has interesting implications for the luxury sector.

Interviewer: Has Valentino just seen clear results implementing digital transformation innovations?

A. De Luca: At the moment, we haven't seen significant performance improvements from these technologies. We're exploring the Metaverse through collaborations, especially for marketing and advertising purposes. However, using the Metaverse for direct sales isn't quite there yet. AI is another area we're monitoring, and while it's expected to impact luxury and fashion, it'll take some time. Right now, humans are still the ones in control of AI.

Interviewer: Could you tell us more about NFTs and their role in the Metaverse?

A. De Luca: NFTs are an interesting concept, but their taxation in the Metaverse is also a complex issue in absence of precisely defined laws. We're experimenting with NFTs as a way to stimulate the Metaverse system, but we are giving them for free to study how they are perceived by the public without incurring in the current hole of taxation law. However, the physical customer experience remains a priority for us, despite the potential of AI simulations to convince hesitant customers.

Interviewer: How do you see AI affecting the customer experience?

A. De Luca: AI will bring challenges, and many jobs are at risk, but we're more focused on integration, making humans and AI collaborate rather than immediate replacement.

Interviewer: What's your advice regarding technological trends?

A. De Luca: We believe it's essential to study technologies thoroughly before integrating them blindly. Blockchain has proven useful, but cryptocurrencies, in their current form, pose challenges. If we had regulated cryptocurrencies with stable values, they might be more feasible for official exchanges.

Interviewer: In conclusion, how would you describe Valentino's approach to digital innovation?

A. De Luca: We consider ourselves innovative but cautious. We're actively studying digital innovations but proceed with care in their full implementation.

4.2.2 Ilaria Maltoni – Marketing and Client Experience Manager at Chanel
Rome, 16/6/2023

Interviewer: Can you give us some insights into how Chanel approaches innovation?

I. Maltoni: Chanel operates through several divisions, each handling different aspects of the business, while corporate functions like finance are transversal. In our Italian branch, we have the flexibility to implement local projects, but these are carefully examined by the central artistic direction in Paris. Chanel is known for its reserved nature, and our research is driven solely by the pursuit of excellence. We aim to lead in avant-garde innovations, especially in technological research, but our approach is cautious, with a focus on long-term effects.

Interviewer: Can you tell us about the integration of AI and VR technologies in Chanel boutiques?

I. Maltoni: Of course. In several boutiques, we've embraced AI and VR technologies, including digital fitting rooms that enhance the shopping experience. Customers can request garments from other boutiques, improving product availability. In our beauty boutiques, we offer features for virtual makeup trials, which we introduced during the pandemic. These technologies are now well-integrated into our website as well.

Interviewer: How does Chanel encourage customer interaction with these technologies?

I. Maltoni: We encourage independent customer interaction by providing QR codes in the boutiques. When scanned, these codes lead customers to our platform, where they can explore

Chanel products and prices. However, we have specific QR codes in place to avoid conflicts with retailers who may offer different prices.

Interviewer: Could you explain how technology is used for fragrances?

I. Maltoni: Fragrances pose unique challenges for digitization. We're exploring possibilities, and our 2023 marketing plan includes mentions of the Metaverse. We recently created an AR experience during the Venice Film Festival, showcasing Gabrielle Chanel's story. The founder's story often inspires our projects. Our goal is also to make high fashion more accessible through digital tools.

Interviewer: NFTs are a hot topic in the tech world. What's Chanel's stance on NFTs?

I. Maltoni: NFTs are indeed revolutionary, and we're evaluating their potential. Artistic collaborations involving NFTs are a possibility, especially considering Chanel's owners are avid art collectors. We assess these opportunities carefully to ensure they align with our brand identity. Brand equity is paramount, and any project must support it in the long run.

Interviewer: It's clear that Chanel values brand integrity. How do you approach innovation in different markets?

I. Maltoni: We consider the US, Korea, and Japan as safe markets for innovation testing. In these markets, we focus on AR and immersive experiences. We're particularly keen on enhancing olfactory discovery through technology. Events and AR applications have resulted in significantly higher sales, but we also acknowledge the contribution of Chanel's advisors' capacity.

Interviewer: do you view the impact of technology on the brand's image?

I. Maltoni: Technology has the potential to strengthen our customer relationships, but it also poses risks to our brand image. We're cautious and prioritize brand equity. Our economic results have been excellent, and the artistic direction doesn't hesitate to decline innovations if we're not fully confident in their long-term impact on our brand.

Interviewer: How would you finally describe Chanel's innovative journey?

I. Maltoni: Indeed, we're committed to preserving the timeless essence of Chanel while leveraging technology to enhance the customer experience and maintain our position as a leader in the luxury industry.

5. Highlighting discussions

Digital transformation strategies have had a decisive impact on luxury multinationals, although the effects will be completely visible in next years. Nowadays, several firms are still studying or starting to implement technologies like XR, AI, AR, VR, IoT, blockchain and e-commerce; however, in several cases in which they are just adopted, they could have been responsible for remarkable economic gains. Luxury firms embracing digital transformation have seen significant improvements in ROI, profitability, market share, and sales growth.

Chanel example shows how apparently immutable organisations are evolving through deeply studied strategies, in the attempt to meet new customers' needs and luxury selection criteria. This shift can confirm the realness of the results highlighted in the correlation analysis, VR is considered as a tool to enlarge the market share, especially towards the youth. Therefore, digital innovation has enhanced customer relations and brand awareness giving a new sense to customer experience. Additionally, sustainability efforts have gained momentum, representing key values of new generations. Despite budget constraints and IT skills shortages, the impact has been generally positive, confirming the necessity of digital transformation in the luxury sector.

As sustained by Antonio De Luca, blockchain's fundamental and ambidextrous role, supposed in the RQs and in the correlation analysis, is confirmed as crucial to reach luxury companies goals. Blockchain systems are relatively cheaper to implement and can be applied to several activities in the economic cycle of luxury firms, also in the case of more hesitant innovation strategies.

Indeed, the technologies powering the metaverse can strategically complement and enhance digital transformation strategies for luxury firms. In the next future, the metaverse offers immersive experiences and interactive possibilities that align seamlessly with digital transformation goals. These technologies will be able to create engaging virtual showrooms, interactive showcases, and personalized brand experiences, amplifying customer engagement. Moreover, the data-rich environment of the metaverse can inform and refine digital strategies. Its global reach enables luxury brands to connect with a worldwide audience, while early adoption provides a competitive edge. Implementing XR, AI, AR, VR, IoT, blockchain and e-commerce means being technically ready for the launch of an integrated open metaverse, while having at the same time improved most of key performance dimensions. Although metaverse still remains in development stages, its technologies can elevate digital strategies, enrich customer experience, and bolster the global competitiveness of luxury firms.

6. Managerial Insights

Following the analysis results it is possible to delineate some recommendations for managers to implement the best digital transformation strategies in the current luxury industry. These suggestions could help firms stay competitive, enhance customer relationships, and preserve the essence of their brand while embracing innovation and technology.

1. Embrace key innovations strategically and holistically. Before adopting a certain technology, it is necessary to have a structured strategy. XR, AI, AR, VR, IoT, and e-commerce emerge currently as the most effective in the luxury industry in terms of value created. However, the right choice always depends on the corporate strategy of the company, on its position in the market, on its core competencies etc., and there must be a holistic innovation approach to make the implementation effective, other dimensions of the organisations should be adapted to well embrace the digital revolution.

2. Pay attention to brand equity when implementing digital transformation. Of course, the recent success of luxury industry cannot be uniquely attributed to its digitalisation, but performances have improved significantly in presence of these innovations, which clearly have enhanced brand awareness, customer experience as well as economic results such as ROI, market share and sales growth, suggesting that digital transformation is not just an option but a necessity for long-term success. By the way, luxury companies should always be highly sure that their brand equity will not be spoiled before launching themselves in extremely new projects as suggested in the interviews.

3. Implement blockchain systems to protect and certify digital innovation activities. Investigate opportunities within the metaverse for marketing and advertising purposes, but exercise caution when dealing with IoT, NFTs, AI, VR etc. Security concerns are relevant in terms of violated data privacy, identity theft and other problems; therefore, blockchain technologies could be implemented to create a safety net in digital transformation and a traceability system of each operation. This technology paired with all the others can build more trust with costumers and contemporarily it could be the technical foundation for many digital products thought for a next generation metaverse.

7. Conclusion

Considering the key points expressed by the two interviewed managers it is possible to confirm that in the luxury industry the general trend about digital innovation is to implement its technologies with a cautious strategy which aims to strengthen long-term brand equity. Not all the luxury companies act in this way (e.g., Gucci), nevertheless it is evident the risk of dissipating decades of prestige and iconicity when the pathway of contemporaneity does not seem to be surely appropriate. In facts, Chanel and Valentino examples are quite representative of the most of *maisons* due to their influential position and timeless elegance.

Digital innovation, sustainability, and brand respectability are closely linked and therefore luxury companies must pay attention to the visible introduction of new technologies if the customers' mental association with them is still not well realised. When talking about sportive cars the assumptions cannot be the same as in the case of parfums, clothes and jewellery, so it is evident that digital transformation strategies will differ depending on the core business, but some common points are defined as well, all these companies have a similar mission: to create excellence and unique experiences. Thus, deep market analyses, high budget on marketing innovation, a continuously improved quality of products and services etc. are activities to strongly sustain. If the difference today is increasingly played on the digital customer experience, while competition between brands offer keeps being strong despite the recent M&As waves in the luxury industry, it is demanded a higher effort to prudently innovate. As the new generation wealthy target is captured by immersive experiences, unforgettable details, and multisensorial explorations that can go beyond imagination and time to represent the essence of beauty, the chance to participate to the digital creative rush becomes an imperative, because "if we want things to stay as they are, things will have to change".

This research explores the opinions of a relatively small champion of managers, it tries to identify relevant trends about digital transformation of luxury companies. Due to the extreme contemporaneity of the subject, there are still a huge variety of perspectives to discuss as the theoretical studies on the presented innovations have started only recently. To conclude, the reported data only show a picture of the last two years; however, the discussed findings can be a useful starting point for deeper analyses to be done on larger samples and to be verified with more sophisticated techniques; further observing of the luxury industry patterns will surely deliver more precise information.

Bibliography

Aydin, Nalbant, & Ömer (2023). Development and Transformation in Digital Marketing and Branding with Artificial Intelligence and Digital Technologies Dynamics in the Metaverse Universe. Journal of Metaverse, 3, 9-18.

Bassano, Barile, Saviano, Pietronudo, Cosimato. (2020). AI Technologies & Value Co-Creation in Luxury Context.

De Giovanni, P., (2021). Blockchain Technology Applications in Business and Organizations, Luiss University.

De Giovanni, P., (2020). Blockchain and smart contracts in supply chain management: A game theoretic model, International Journal of Production Economics, Vol. 228.

De Giovanni, P., (2022). Leveraging the circular economy with a closed-loop supply chain and a reverse omnichannel using blockchain technology and incentives, International Journal of Operations & Production Management.

De Giovanni, P., (2023). Sustainability of the Metaverse: A Transition to Industry 5.0, Sustainability 15, no. 7.

De Giovanni, P., Naclerio, A.G., (2022). Blockchain, logistics and omnichannel for last mile and performance, The International Journal of Logistics Management, Vol. 33 No. 2, pp. 663-686.

De Giovanni, P., Volpentesta T., Spahiu, E., (2023). A survey on incumbent digital transformation: a paradoxical perspective and research agenda, European Journal of Innovation Management.

Dwivedi, Y. K., Hughes, L., Wang, Y., Alalwan, A. A., Ahn, S. J., Balakrishnan, J., ... & Wirtz, J. (2022). Metaverse marketing: How the metaverse will shape the future of consumer research and practice. Psychology & Marketing.

Heller, B., & Bar-Zeev, A. (2021). The problems with immersive advertising: In Ar/VR, nobody knows you are an ad. Journal of Online Trust and Safety, 1(1).

Hollensen, Kotler, Opresnik, (2022). Metaverse–the new marketing universe. Journal of Business Strategy.

Huynh-The, Pham, Pham, Nguyen, Han, Kim. (2022). Artificial Intelligence for the Metaverse: A Survey.

Joy, Zhu, Peña, & Brouard (2022). Digital future of luxury brands: Metaverse, digital fashion, and non-fungible tokens. Strategic Change, 31(3), 337– 343.

Kadry, A. (2022). The Metaverse Revolution and Its Impact on the Future of Advertising Industry. Journal of Design Sciences and Applied Arts, 3(2), 347-358.

Kim, J. (2021). Advertising in the metaverse: Research agenda. Journal of Interactive Advertising, 21(3), 141-144.

Kitsios, Kamariotou. (2021). Artificial Intelligence and Business Strategy Towards Digital Transformation: A Research Agenda. Sustainability.

Ku, SW. (2020). Platform Strategy for Business Transformation in a Blockchain Ecosystem. In: Hacioglu, U. (eds) Digital Business Strategies in Blockchain Ecosystems. Contributions to Management Science. Springer.

Met, Uysal, Özkaya, Orç. (2020). Key Success Factors for Strategic Management in Digital Business. In: Hacioglu, U. (eds) Digital Business Strategies in Blockchain Ecosystems. Contributions to Management Science. Springer.

Monica, P. D., & Darma, G. S. (2022). Digital Marketing Strategy Facing the Metaverse Era. Jurnal Komunikasi, 10(1), 73-84.

Silva, Hassani, and Madsen (2020), "Big Data in fashion: transforming the retail sector", Journal of Business Strategy, Vol. 41 No. 4, pp. 21-27.

Stokel-Walker (2022). Welcome to the metaverse, New Scientist, Vol. 253, Issue 3368, 39-43.

Taylor, C. R. (2022). Research on advertising in the metaverse: a call to action. International Journal of Advertising, 41(3), 383-384.

Yemenici, A. D. (2022). Entrepreneurship in the world of Metaverse: Virtual or real?. Journal of Metaverse, 2(2), 71-82.