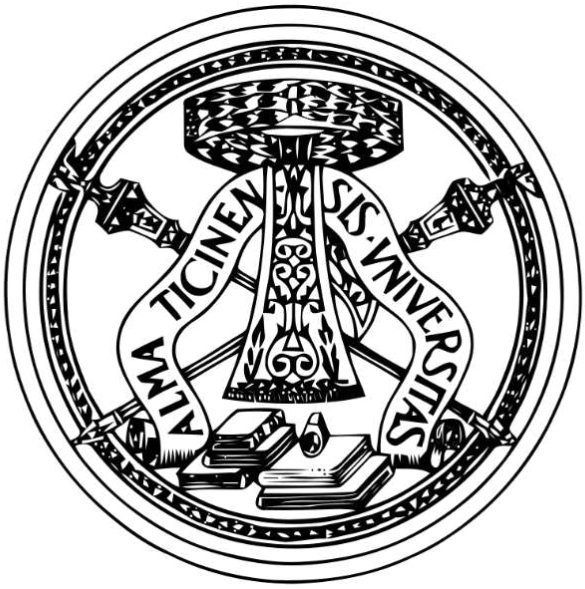

UNIVERSITÀ DI PAVIA

Department of Economics and Management

Master Programme in International Business and Entrepreneurship

Digital Transformation and Business Model Evolution: Case Studies in the Fashion Industry

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Dedication

This thesis is dedicated to my family, whose unconditional love, endless patience, and unwavering belief in me have been the true foundation of this journey. Their support has shaped not only my academic path, but also who I am today. In moments of uncertainty, it was their trust and encouragement that gave me the strength to continue. No words can fully express my gratitude for everything they have done for me and for always standing by my side, no matter the distance.

I would also like to dedicate this work to my friends, who have made my life in Italy lighter and more meaningful. Their presence, support, and shared moments have been a valuable part of this experience.

As a Turkish individual, I am profoundly inspired by the vision of Mustafa Kemal Atatürk:

"Hayatta en hakiki mürşit ilimdir."

(The truest guide in life is science.)

This principle has guided not only my academic journey, but also my perspective on growth, curiosity, and the pursuit of knowledge.

Abstract (Italian)

Questo studio sostiene che la trasformazione digitale nel settore della moda non sia un processo organizzativo uniforme, ma un fenomeno strutturalmente differenziato che riconfigura i modelli di business in modi distinti lungo la catena del valore.

Adottando un approccio qualitativo basato su studi di caso multipli, la ricerca si fonda su interviste semi-strutturate con attori operanti nelle diverse fasi della catena del valore della moda: a monte, intermedie e a valle. Ciò consente una comprensione contestuale di come la trasformazione digitale venga interpretata e implementata in differenti contesti organizzativi.

I risultati mostrano che la trasformazione digitale si è evoluta da opzione strategica a necessità strutturale nel settore della moda. Tuttavia, le sue implicazioni variano sistematicamente lungo le diverse posizioni della catena del valore. Gli attori a monte enfatizzano tracciabilità, trasparenza e controllo; gli attori intermedi si concentrano sull'integrazione dei processi e sul coordinamento operativo; mentre gli attori a valle privilegiano l'interazione con il cliente, il processo decisionale basato sui dati e l'accesso ai mercati globali.

È importante sottolineare che la trasformazione digitale non conduce necessariamente a cambiamenti radicali, ma spesso dà luogo a configurazioni ibride dei modelli di business, in cui le tecnologie digitali si integrano con le strutture esistenti. Allo stesso tempo, i risultati evidenziano tensioni emergenti, tra cui una crescente dipendenza dalle piattaforme digitali, un accesso diseguale alle risorse tecnologiche e ai dati, e una maggiore pressione in termini di velocità ed efficienza.

Nel complesso, lo studio dimostra che la trasformazione digitale non solo ridefinisce i modelli di business, ma riconfigura anche i meccanismi di creazione del valore, il controllo e le dinamiche competitive lungo la catena del valore della moda.

Abstract

This study argues that digital transformation in the fashion industry is not a uniform organizational process but a structurally differentiated phenomenon that reshapes business models in distinct ways across the value chain.

Adopting a qualitative multiple-case study approach, the research draws on semi-structured interviews with actors operating at upstream, intermediary, and downstream stages of the fashion value chain. This enables a context-sensitive understanding of how digital transformation is interpreted and implemented across different organizational settings.

The findings show that digital transformation has evolved from a strategic option into a structural necessity within the fashion industry. However, its implications vary systematically across value chain positions. Upstream firms emphasize traceability, transparency, and control; intermediary actors focus on process integration and operational coordination; while downstream firms prioritize customer engagement, data-driven decision-making, and global market access.

Importantly, digital transformation does not necessarily lead to radical disruption but often results in hybrid business model configurations, where digital technologies are layered onto existing structures. At the same time, the findings reveal emerging tensions, including increasing dependence on digital platforms, unequal access to data and technological resources, and intensified pressures for speed and efficiency.

Overall, the study demonstrates that digital transformation not only reshapes business models but also reconfigures value creation, control, and competitive dynamics across the fashion value chain.

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Introduction

Digital transformation has evolved into a structural force redefining organizational strategies across global industries. No longer confined to technological upgrades or incremental innovation, digitalization increasingly determines how firms configure their resources, design their business models, and sustain competitive relevance in rapidly shifting markets. In the fashion industry—characterized by accelerated trend cycles, volatile demand patterns, globalized supply chains, and increasing sustainability pressures—digital transformation has shifted from an operational enhancement to a strategic necessity.

The fashion industry operates within a uniquely complex and interdependent system. Short product life cycles, intense cost pressures, and high levels of consumer engagement create structural conditions in which speed, responsiveness, and adaptability are critical. In this context, digital technologies such as Artificial Intelligence (AI), blockchain, Augmented and Virtual Reality (AR/VR), advanced analytics, cloud-based platforms, and digital commerce infrastructures do not merely improve efficiency; they reshape how value is created, coordinated, and delivered across the entire value chain.

However, digital transformation unfolds differently across upstream, intermediary, and downstream actors, reflecting their distinct structural positions within the value chain. Upstream actors, intermediary firms, and downstream brands operate under distinct constraints, opportunities, and strategic priorities, which influence how digital technologies are adopted and utilized. This suggests that digital transformation is not only firm-specific but also deeply embedded within broader systems of value creation.

This study therefore approaches digital transformation as a driver of business model evolution, focusing on how firms create, deliver, and capture value across the fashion value chain.

While firm size and resource endowment have traditionally been emphasized as key determinants of digital transformation (Chandler, 1962; Barney, 1991), these factors alone do not fully explain the variation observed across the industry. Instead, transformation processes are more fundamentally shaped by how firms create, deliver, and capture value within the value chain. This perspective shifts the analytical focus from firm-level characteristics to structural positioning, highlighting that digital transformation unfolds through differentiated transformation logics across the industry.

Despite the growing body of literature on digital transformation, existing research remains fragmented. Technology-focused studies primarily examine the adoption of digital tools such as AI and blockchain, often overlooking their strategic and organizational implications (Vial, 2019; Verhoef et al., 2021). Business model research emphasizes digital innovation, including platform-based models and direct-to-consumer strategies, yet frequently lacks a structural perspective on how these transformations vary across different stages of the value chain (Zott & Amit, 2017; Teece, 2010). Similarly, studies within the fashion industry tend to focus on downstream activities such as marketing and retail, with comparatively limited attention to upstream and intermediary actors.

To address these gaps, it is useful to position this study within the broader literature by summarizing existing research streams, their limitations, and the contribution of this thesis.

Table 0.1 Positioning of the Study within Existing Literature

Research Stream	Core Focus in Existing Literature	Identified Limitation	Contribution of This Study
Technology-focused studies	Adoption of digital tools (AI, blockchain, AR/VR)	Limited integration with strategic and organizational dimensions	Integrates technological, organizational, and strategic perspectives
Business model research	Digital business model innovation (D2C, platforms)	Lacks a structural perspective across the value chain	Examines how business model transformation varies across different value chain stages
Fashion industry studies	Digitalization in marketing and retail	Limited focus on upstream and supply chain actors	Covers multiple stages of the fashion value chain
Structural perspectives on digital transformation	Firm-level differences such as size, resources, and capabilities	Overemphasis on firm-level characteristics, limited focus on value chain positioning	Reframes digital transformation through value chain positioning

Source: Author's own elaboration based on Digital Transformation literature, Business Model Innovation literature, and Digital servitization literature.

As illustrated in Table 0.1, this study contributes to the literature by integrating multiple research streams and explicitly incorporating value chain positioning as a structural dimension shaping digital transformation processes.

By positioning the value chain as the central analytical lens, this thesis examines how fashion companies adopt and implement digital transformation strategies and how these transformations influence business models, operational processes, and competitive positioning. In doing so, the study explicitly focuses on how digital transformation leads to differentiated patterns of business model evolution across upstream, intermediary, and downstream actors.

In line with this objective, the study addresses the following research question: How does digital transformation shape business model evolution in the fashion industry, and how do these transformations vary across different organizational contexts?

This research adopts a qualitative multiple-case study design, based on semi-structured interviews with actors operating at different stages of the fashion value chain, including upstream, intermediary, and downstream firms. This methodological approach enables an in-

depth and context-sensitive analysis of how digital transformation is interpreted, implemented, and translated into business model changes across diverse organizational settings.

The remainder of the thesis is structured as follows. Chapter 1 introduces the conceptual foundations of digital transformation and its relationship with business model evolution. Chapter 2 develops the theoretical framework by integrating business model literature with the Resource-Based View and Dynamic Capabilities perspectives. Chapter 3 provides the industry context and examines how digital transformation unfolds across the fashion value chain. Chapter 4 outlines the research methodology, including the case study design, data collection, and analytical approach. Chapter 5 presents the empirical findings, structured according to value chain positions. Finally, Chapter 6 concludes the thesis by discussing the key findings, contributions, and limitations of the study.

This thesis contributes to the literature in three main ways. First, it develops a structurally grounded framework that explains digital transformation across different stages of the value chain, moving beyond firm-level generalizations. Second, the study integrates insights from the Resource-Based View (Barney, 1991) and the Dynamic Capabilities perspective (Teece, 2007) to explain how differences in resource endowment and adaptive capacity influence the scope and structure of digital transformation initiatives. Third, the study provides industry-specific insights into how digital transformation reshapes value creation across interconnected actors in fashion.

Chapter 1: Structural and Conceptual Foundations of Digital Transformation in the Fashion Industry

1.1 Conceptual Foundations of Digital Transformation

The terms “digitization,” “digitalization,” and “digital transformation” are often used interchangeably in managerial discourse; however, academic literature draws a clear distinction between these concepts. Digitization refers to the technical process of converting analog information into digital form. In contrast, digitalization describes the integration of digital technologies into existing business processes to enhance efficiency and coordination. Digital transformation, on the other hand, represents a much broader and more systematic phenomenon, involving the fundamental restructuring of organizational structures, value creation mechanisms, strategic positioning, and competitive logic (Vial, 2019; Verhoef et al., 2021).

In this context, digital transformation goes beyond mere technological applications. It reshapes how companies create, deliver, and capture value in digitally mediated environments.

Accordingly, distinguishing between these concepts is essential to avoid conceptual ambiguity and to ensure analytical clarity in examining organizational change processes.

Table 1.1 Conceptual Distinctions between Digitization, Digitalization, and Digital Transformation

Dimension	Digitization	Digitalization	Digital Transformation
Conceptual focus	Conversion of analog to digital data	Integration of digital technologies into processes	Strategic and organizational reconfiguration
Level of impact	Technical	Process-level	Organizational and strategic
Scope	Narrow	Intermediate	Systemic
Value implication	Efficiency improvement	Process optimization	Value creation logic redesign
Literature reference	Vial (2019)	Verhoef et al. (2021)	Bharadwaj et al. (2013)

Source: Author's own elaboration based on Vial (2019) and Verhoef et al. (2021).

As shown in Table 1.1, digital transformation represents a broader and more systematic change compared to digitization and digitalization; it goes beyond operational improvements to encompass strategic and organizational restructuring.

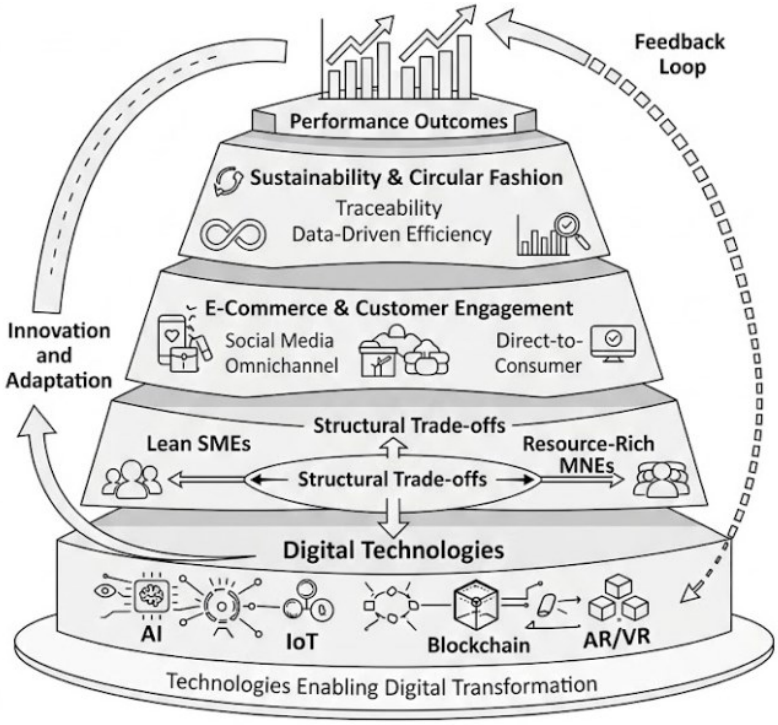
According to Vial (2019), digital transformation affects organizations through multiple interrelated dimensions, including operational processes, business models, organizational structures, and performance outcomes. Similarly, Verhoef et al. (2021) conceptualize digital transformation as a strategic process requiring alignment among digital resources, digital capabilities, and corporate strategy. In this context, digital transformation should be understood as an organizational paradigm shift rather than a single technological initiative.

Current research also emphasizes that successful digital transformation requires strategic alignment among technological infrastructure, organizational culture, and leadership competencies. Westerman, Bonnet, and McAfee (2014) argue that companies that effectively

integrate digital technologies into their core strategies can achieve superior operational performance and enhanced customer engagement. Similarly, Hess et al. (2016) emphasize that digital transformation strategies must align with broader organizational objectives to create a sustainable competitive advantage.

Taken together, these perspectives position digital transformation not merely as a technological phenomenon, but as a strategic and organizational process that fundamentally reshapes how firms compete and create value in digitally enabled environments.

Figure 1. Multi-Layered Digital Transformation Framework in the Fashion Industry



Source: Author's own elaboration based on Vial (2019), Verhoef et al. (2021), Bharadwaj et al. (2013), and Parida et al. (2019).

Figure 1 illustrates the multi-layered structure of digital transformation in the fashion industry. This framework demonstrates that digital technologies form the foundational layer that enables

higher-level strategic transformations, such as e-commerce integration, sustainability initiatives, and performance outcomes.

In this sense, digital transformation can be conceptualized as a layered process in which technological infrastructure enables, but does not solely determine, strategic and organizational change.

The acceleration of digital transformation is closely linked to the emergence of Industry 4.0. First proposed in the context of German industrial policy, Industry 4.0 refers to the integration of cyber-physical systems, real-time data exchange, automation, and interconnected production infrastructures (Kagermann et al., 2013; Lasi et al., 2014).

Industry 4.0 is shifting the logic of production from centralized and linear models toward more distributed, data-driven, and adaptive systems. Through the use of technologies such as Artificial Intelligence (AI), the Internet of Things (IoT), cloud computing, and advanced data analytics, companies can synchronize their production processes with demand signals and optimize their operations in real time.

Beyond production processes, digital transformation is increasingly linked to the rise of digital ecosystems and platform-based competition. Traditional linear value chains are being replaced by interconnected network structures where value creation occurs collaboratively among multiple actors (Jacobides, Cennamo & Gawer, 2018).

Platforms such as Amazon, Alibaba, and Zalando demonstrate how digital infrastructures facilitate interaction between producers and consumers, and how this, in turn, reshapes industry boundaries and competitive dynamics. Parker, Van Alstyne, and Choudary (2016) argue that platform economies have altered the logic of competition; they contend that firms now compete not only through product differentiation but also through ecosystem orchestration and network effects.

Within such ecosystems, data emerges as a central strategic resource. Erik Brynjolfsson and Andrew McAfee (2014) describe today's economy as a structure increasingly driven by algorithmic decision-making processes and data analytics. Similarly, Andrew McAfee and Erik Brynjolfsson (2012) emphasize that data-driven organizations outperform their competitors by utilizing predictive models and real-time insights.

The accumulation and analysis of large-scale datasets enable companies to reduce uncertainty, anticipate demand fluctuations, and personalize the products or services they offer. More importantly, data generation creates self-reinforcing feedback loops: The more a company digitizes, the more data it generates; the more data it analyzes, the more refined its strategic decisions become. In this context, digital transformation places data infrastructure at the heart of organizational strategy.

However, digital transformation is not merely a technological or structural process; it also entails organizational and cultural transformation. Kane et al. (2015) argue that digital maturity depends not only on technology investments but also on leadership alignment and cultural readiness. In this regard, organizations must redesign their workflows, reduce hierarchical rigidity, and encourage agile decision-making processes. Digital transformation often necessitates cross-functional integration and the elimination of traditional silo structures. In this sense, it implies the restructuring of internal governance systems.

On the other hand, digital transformation also brings new risks and governance challenges. Increasing reliance on digital infrastructure heightens exposure to cybersecurity threats, data privacy issues, and ethical dilemmas related to algorithmic bias. These vulnerabilities make managerial oversight more complex and necessitate integrated risk management frameworks. Consequently, while digital transformation expands strategic opportunities, it also increases the risks organizations face.

Overall, the literature indicates that digital transformation represents a systemic redefinition of competition and organizational logic. Digital transformation integrates technological innovations, platform-based market structures, data-driven decision-making processes, and organizational restructuring within a holistic strategic transformation. Understanding this conceptual foundation is of critical importance before examining how specific sectors and different types of firms manage their digital transformation processes.

Most importantly, digital transformation also redefines business model architectures. Rather than merely optimizing isolated processes, firms increasingly redesign how they create, deliver, and capture value in digitally mediated environments. In this sense, the implications of digital transformation extend beyond operational efficiency and technological adoption to the fundamental logic through which firms compete and generate value. According to Amit and Zott (2001), value creation in digital contexts emerges through new combinations of activities, complementarities, lock-in effects, and efficiency gains. Digital technologies therefore enable not only process improvement, but also new revenue streams, platform-mediated interactions, subscription-based models, and data-driven forms of value capture.

This link is particularly important in the fashion industry, where digital transformation affects multiple stages of the value chain and generates differentiated pressures on firms' value creation mechanisms. As Bocken et al. (2016) suggest, in sectors facing strong pressures for sustainability and efficiency, business model innovation cannot be separated from broader technological and organizational transformation. Accordingly, digital transformation should be understood not only as a technological shift, but also as a key driver of business model evolution. In this context, business model transformation emerges as one of the central mechanisms through which digital transformation materializes within organizations.

1.2 Business Models and Business Model Evolution in the Context of Digital Transformation

While the previous section has established digital transformation as a systemic and multi-dimensional organizational phenomenon, its strategic implications cannot be fully understood without explicitly considering business models as the core unit of analysis. Digital transformation does not operate in isolation; rather, it materializes through changes in how firms structure their value creation, value delivery, and value capture mechanisms.

The concept of the business model has gained increasing prominence in both strategic management and information systems literature as a framework for explaining how firms translate technological and organizational capabilities into economic value. Teece (2010) defines the business model as the design or architecture of value creation, delivery, and capture mechanisms. Similarly, Osterwalder and Pigneur (2010) conceptualize business models as a system of interdependent components, including value propositions, customer segments, channels, revenue streams, and key resources. Extending this perspective, Zott, Amit, and Massa (2011) argue that business models should be understood as activity systems that transcend firm boundaries and incorporate interactions with external partners and stakeholders.

This activity-based view highlights that business models are not static configurations but dynamic systems that evolve over time. In this regard, business model evolution refers to the process through which firms adapt, reconfigure, or fundamentally transform their value creation logic in response to changing technological, competitive, and institutional environments. Foss and Saebi (2017) distinguish between business model innovation and business model evolution, emphasizing that firms may engage in both incremental adjustments and radical transformations depending on the intensity of external pressures and internal capabilities. Similarly, Spieth, Schneckenberg, and Ricart (2014) conceptualize business model change as a continuous process shaped by strategic experimentation and organizational learning.

In digitally intensive environments, business model evolution is increasingly driven by technological change. Digital technologies expand the range of strategic options available to firms by enabling new forms of interaction, coordination, and value appropriation. Amit and Zott (2001) identify four key value drivers in digital business models—efficiency, complementarities, lock-in, and novelty—highlighting how digital environments facilitate new configurations of value creation. In addition, digital infrastructures support the emergence of platform-based models (Parker, Van Alstyne & Choudary, 2016), data-driven value propositions (Brynjolfsson & McAfee, 2014), and direct-to-consumer channels that reshape traditional industry structures.

At the same time, the relationship between digital transformation and business model evolution is not deterministic. While digital technologies enable transformation, they do not automatically lead to business model change. As noted by Chesbrough (2010), firms often struggle to align technological innovation with viable business models, resulting in unrealized value potential. This highlights that business model transformation requires not only technological adoption but also strategic alignment, organizational capabilities, and managerial intent.

Building on these theoretical perspectives, this study adopts a multidimensional view of business models, conceptualizing them through three core components: value creation, value delivery, and value capture (Teece, 2010; Amit & Zott, 2001). This distinction allows for a more granular analysis of how digital transformation affects different elements of firms' strategic configurations.

Importantly, existing literature suggests that these components do not evolve uniformly. Instead, business model transformation tends to occur in differentiated ways depending on firms' structural positioning, resource endowments, and capability configurations. From a Resource-Based View perspective (Barney, 1991), firms' ability to leverage digital technologies depends on the uniqueness and inimitability of their resources, particularly data assets and technological

infrastructures. At the same time, the Dynamic Capabilities framework (Teece, Pisano & Shuen, 1997; Teece, 2007) emphasizes firms' capacity to sense, seize, and reconfigure resources in response to rapidly changing environments.

In this context, digital transformation does not lead to a single or homogeneous pattern of business model change. Rather, it enables multiple transformation pathways shaped by firms' positions within the value chain and their ability to mobilize digital capabilities. Firms operating in upstream, intermediary, and downstream stages face distinct constraints and opportunities in reconfiguring their value creation, delivery, and capture mechanisms. As Jacobides, Cennamo, and Gawer (2018) argue, value creation increasingly takes place within interconnected ecosystems rather than isolated firms, making business model transformation dependent on inter-organizational relationships and network structures.

Accordingly, this study adopts a business model–centered perspective on digital transformation, emphasizing that the impact of digital technologies can only be fully understood by examining how firms reconfigure their value creation architectures. This perspective provides the conceptual foundation for analyzing how digital transformation unfolds as a structurally differentiated phenomenon across the fashion value chain, which is explored empirically in the subsequent chapters.

1.3 Structural Characteristics of the Fashion Industry

The fashion industry operates within one of the most volatile and time-sensitive competitive environments among global sectors. Unlike sectors where demand structures are relatively stable and product life cycles are long, the fashion sector is inherently shaped by rapid trend shifts, short seasonal cycles, and consumers' high sensitivity to cultural, social, and digital

signals. Consequently, competitive advantage is closely linked to speed, adaptability, and responsiveness.

The industry's transformation gained significant momentum with the rise of the fast fashion model in the late 20th century. Fast fashion has shortened traditional production cycles, reduced lead times, and increased the frequency of product refreshes (Cachon & Swinney, 2011). Instead of producing large seasonal collections based on long-term forecasts, firms have begun adopting rapid renewal systems and smaller production batches. This structural shift has intensified the pace of competition and forced firms to align their production processes with constantly changing demand signals.

However, while the fast fashion model has increased market responsiveness, it has also heightened systemic risks. Short product cycles increase forecasting errors and inventory mismatches, making demand uncertainty a structural rather than temporary feature. Consumer preferences are increasingly shaped by social media trends, influencer culture, celebrity endorsements, and viral digital content, leading to fragmented and unpredictable demand patterns.

Globalization, in turn, further increases operational complexity. The fashion industry is heavily reliant on geographically dispersed production networks. Numerous activities—from raw materials to textile processing, and from production to distribution—take place in different regions and often on different continents. This fragmented structure brings with it challenges such as coordination difficulties, long lead times, and exposure to geopolitical risks (Tokatlı, 2008). As a result, supply chain management becomes both more complex and more critical for competitive performance.

The COVID-19 pandemic has exposed the fragility of global fashion supply chains, highlighting excessive reliance on specific production hubs and the limitations of rigid

forecasting systems. This period demonstrated the need for flexibility, digital coordination, and real-time responsiveness.

At the same time, consumer behavior has undergone a fundamental transformation. The widespread adoption of digital platforms has changed the way consumers discover, evaluate, and purchase fashion products. Social commerce, live streaming, algorithm-based recommendation systems, and influencer marketing are accelerating product visibility and the spread of trends. Purchase decisions increasingly rely on user reviews, digital content, and brand transparency rather than traditional advertising.

These developments are further intensifying the dynamic between speed and visibility in the fashion markets. Trends can emerge and fade within days due to digital viral effects. Therefore, companies must continuously monitor digital signals and adjust their production processes accordingly. Failure to respond effectively may result in rapid inventory devaluation or reputational loss.

Additionally, the coexistence of luxury, premium, and mass-market segments creates an extra structural tension within the industry. While luxury brands traditionally seek to preserve their exclusivity through scarcity, craftsmanship, and controlled distribution channels, digital visibility challenges this logic by increasing accessibility and transparency. On the other hand, mass-market brands producing high volumes at low margins face pressure to increase efficiency without sacrificing speed. These segment-specific differences lead to divergent strategic responses to digital transformation.

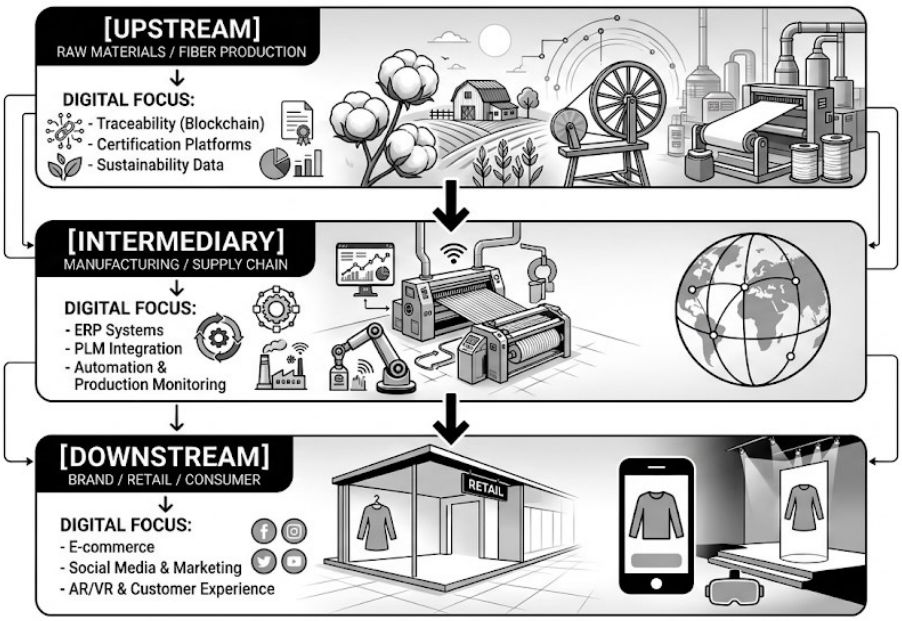
When these factors are considered together—accelerating product cycles, demand uncertainty, global fragmentation, and digital consumer engagement—it becomes evident that the fashion industry operates under structurally unstable conditions. Traditional linear production models struggle to remain effective in such an environment. Consequently, these structural pressures

push firms toward real-time coordination, predictive analytics, and digitally integrated operations.

In this context, digital transformation should be understood as an adaptive response to sector-specific structural dynamics rather than merely a technological upgrade. This perspective is essential for understanding why digital transformation becomes a strategic necessity in the fashion industry.

The effects of these structural dynamics can be better understood by examining how digital transformation is distributed across the different stages of the fashion value chain. To illustrate this, Figure 2 presents a conceptual framework showing how digital transformation is positioned across upstream, intermediate, and downstream activities.

Figure 2. Digital Transformation Across the Fashion Value Chain



Source: Author's own elaboration based on Porter (1985) and Verhoef et al. (2021).

As shown in Figure 2, digital transformation does not affect all companies in the same way; its impact varies depending on the different stages of the value chain. While upstream actors primarily focus on traceability and sustainability, intermediary firms emphasize process integration and operational efficiency; downstream firms, on the other hand, prioritize customer interaction and digital engagement.

The structural characteristics discussed above can be further summarized in terms of their impact on digital transformation.

Table 1.2 Structural Characteristics of the Fashion Industry and Implications for Digital Transformation

Structural Characteristic	Industry Condition	Strategic Challenge	Digital Transformation Implication
Short product life cycles	Rapid trend turnover	Forecasting uncertainty	AI-driven demand prediction
Demand volatility	Fragmented consumer behavior	Inventory misalignment	Real-time data analytics
Global supply chain fragmentation	Multi-location production	Coordination complexity	Digital supply chain integration
Digital consumer engagement	Social media-driven demand	Speed of response	Omnichannel and social commerce
Sustainability pressure	ESG and regulation	Traceability requirement	Blockchain and transparency tools

Source: Author's own elaboration based on Cachon & Swinney (2011), Tokatli (2008), and Niinimäki et al. (2020).

As summarized in Table 1.2, digital transformation has emerged as a response to multiple structural pressures, enabling companies to manage complexity, enhance their responsiveness, and strengthen transparency.

Another significant structural development within the fashion industry is the rise of digital-native and digitally born brands. Unlike traditional companies that retroactively integrate digital tools into existing organizational structures, digital-native brands are built from the ground up within platform-based, data-driven ecosystems. These companies rely heavily on direct-to-consumer (D2C) models, social media engagement, and real-time analytics to build brand awareness and coordinate production.

The emergence of such digitally embedded competitors is reshaping industry standards. Digital-native brands operate with lower dependence on physical infrastructure, shorter feedback loops,

and more agile decision-making processes. As a result, they increase competitive pressure on traditional firms by redefining speed, flexibility, and customer engagement expectations.

This structural transformation underscores that digital transformation in the fashion industry is not only driven by technological innovation but also by evolving competitive dynamics. The presence of digital-native firms accelerates digital adoption across the sector and reinforces the importance of data-driven and platform-based strategies.

1.4 Sustainability and Systemic Pressures in the Fashion Industry

Sustainability has emerged as one of the most profound systemic pressures reshaping the global fashion industry. Long criticized for overproduction, high water consumption, chemical pollution, and textile waste, the sector is increasingly viewed as an environmentally intensive and socially complex structure (Niinimäki et al., 2020). The acceleration of fast fashion production cycles has further exacerbated the structural imbalances between volume-driven competition and environmental responsibility.

Historically, fashion business models have prioritized speed, scale, and cost efficiency. However, the ecological consequences of these models—unsold inventory, products ending up in landfills, and carbon-intensive logistics processes—have intensified scrutiny from stakeholders. Consequently, sustainability has evolved from being merely a reputational factor into a structural constraint embedded within competitive dynamics.

The concept of the circular economy provides a crucial theoretical framework for understanding this transformation. Circular models emphasize resource efficiency, extending product lifespans, recycling, and closed-loop production systems (Bocken et al., 2016). Unlike linear "take–make–consume–dispose" models, circular approaches require transparency, traceability,

and accountability throughout the product lifecycle. For fashion companies, this implies not only operational adjustments but also broader implications for business model design.

At the same time, Environmental, Social, and Governance (ESG) criteria are increasingly influencing investment decisions and corporate valuations. Institutional investors and regulatory bodies are demanding standardized sustainability reporting and measurable impact metrics. This pressure is transforming sustainability from a voluntary initiative into a compliance-driven strategic requirement. The European Union's Digital Product Passport (DPP) initiative provides a concrete example of this regulatory shift by mandating product lifecycle transparency and standardized product data.

Digital infrastructures play a central role in implementing sustainability goals. Data-driven forecasting systems reduce overproduction by improving demand accuracy. Digital prototyping technologies, such as 3D printing, minimize material waste and shorten development processes. Traceability solutions—ranging from QR code-based transparency tools to blockchain-supported tracking systems—enhance visibility across fragmented supply chains. Through these mechanisms, digital transformation directly supports sustainability-oriented value creation.

Table 1.3 Digital Technologies Supporting Sustainability in the Fashion Industry

Technology	Application	Sustainability Impact
Blockchain	Supply chain traceability	Transparency and anti-counterfeiting
3D Design	Digital prototyping	Reduced material waste
AI Forecasting	Demand prediction	Reduced overproduction
QR Traceability	Product lifecycle tracking	Circular fashion support

Source: Author's own elaboration based on Niinimäki et al. (2020), Bocken et al. (2016), and Verhoef et al. (2021).

Digital technologies increasingly support sustainability initiatives by enabling traceability, reducing waste, and improving demand forecasting. Table 1.3 summarizes the key technologies and their impact on sustainability.

However, the integration of sustainability creates a structural tension within the fashion industry. The speed-driven logic of fast fashion often conflicts with the slower, resource-efficient logic of sustainable production. This "speed–sustainability paradox" reflects a broader contradiction between the capacity for short-term responsiveness and long-term environmental responsibility. Digital technologies can partially mitigate this tension by improving forecast accuracy, enhancing transparency, and increasing operational efficiency.

On the other hand, increased transparency is making companies more vulnerable to reputational risk. As digital platforms increase visibility, inconsistencies between sustainability claims and operational practices are becoming easier to detect. The phenomenon of "greenwashing"—where companies exaggerate their environmental commitments—is subject to more intense

scrutiny in digitally mediated markets. Thus, digital transformation not only enables sustainability but also reinforces accountability.

From an institutional perspective, sustainability pressures can be interpreted as coercive and normative forces that reshape organizational behavior. Regulatory requirements, industry standards, and stakeholder expectations act in concert to create compliance pressure on firms and accelerate the adoption of digital technologies. In this sense, digital transformation is closely linked to corporate legitimacy and regulatory alignment.

When these developments are considered together, it becomes clear that sustainability and regulatory dynamics are driving a systemic restructuring of the fashion industry. Environmental accountability, transparency requirements, and ESG-oriented governance frameworks place sustainability at the center of strategic decision-making. Accordingly, digital transformation becomes inseparable from long-term resilience and compliance.

This convergence strengthens the argument that digital transformation in the fashion industry is driven more by systemic pressures than by managerial preferences.

However, it must be strongly emphasized that the capacity to implement sustainability through digital infrastructure is not equal across all organizations. The implementation of traceability systems, ESG reporting mechanisms, blockchain-based transparency tools, and circular production models requires varying levels of financial investment, technological integration, and organizational coordination. While large multinational corporations can internalize complex sustainability-focused digital structures, smaller firms tend to turn to modular, outsourced, or platform-based solutions. These structural asymmetries suggest that firm size and resource availability may influence how digital transformation strategies are implemented, particularly in the context of sustainability-oriented initiatives.

This observation provides a conceptual bridge to the next chapter, where firm size is considered as a complementary factor alongside value chain positioning.

1.5 Chapter Conclusion

Previous discussions have shown that digital transformation in the fashion industry has emerged as a result of the interaction between technological paradigms, structural shifts, and pressures for systemic sustainability, and that the translation of these pressures into strategic action can be mediated by organizational scale and structural configuration. Taken together, these dynamics indicate that digital transformation is both a technologically enabled and structurally conditioned process.

Conceptually, digital transformation refers to a comprehensive organizational transformation built upon Industry 4.0 infrastructures, platform-based ecosystems, and data-driven strategic logic. At the sector level, characteristics inherent to the nature of fashion—accelerating product cycles, demand uncertainty, fragmentation of the global supply chain, and digitally mediated consumer behavior—create constant pressure for responsiveness and coordination.

At the same time, sustainability requirements and regulatory developments impose corporate constraints that increase the need for transparency, traceability, and operational accountability. These converging forces reinforce digital transformation as a structural requirement within the industry.

However, while these sector-level drivers of digital transformation are systemic, firms' responses to these pressures are not uniform. Organizational scale, resource endowment, and structural configuration determine how digital technologies are interpreted, adopted, and integrated. Accordingly, digital transformation should not be conceptualized as a homogeneous process, but rather as a differentiated phenomenon shaped by firm-specific characteristics.

Understanding these varied responses requires a theoretical framework capable of explaining how structural positioning and organizational characteristics shape strategic behavior. At the same time, these differentiated transformation processes are closely linked to business model evolution, as firms adapt their value creation, value delivery, and value capture mechanisms to changing digital and structural conditions. Accordingly, understanding digital transformation in the fashion industry requires not only examining technological adoption, but also analyzing how firms reorganize their underlying business models in response to value chain–specific pressures.

In this vein, the following section presents theoretical perspectives that explain the impact of organizational heterogeneity—particularly firm size—on digital transformation strategies.

Chapter 2: Theoretical Framework of Digital Transformation and Business Model Evolution

2.1 Digital Transformation and Strategic Change

Digital transformation is frequently discussed as a technological phenomenon; however, contemporary strategic management literature increasingly conceptualizes it as a form of organizational and strategic change. Rather than representing the simple adoption of digital tools, digital transformation entails a reconfiguration of value creation logic, competitive positioning, and governance structures. In this sense, it intersects directly with broader debates on strategic renewal and business model innovation.

Business model literature provides an important analytical framework for understanding this transformation. A business model can be defined as the system of activities that determines how a firm creates, delivers, and captures value (Amit & Zott, 2001; Zott, Amit & Massa, 2011). Digital technologies are transforming these activity systems by enabling new forms of interaction, increasing operational efficiency, and supporting data-driven coordination. This transformation extends beyond operational improvements to fundamentally reshape value creation architectures.

To analytically specify this transformation, business models can be decomposed into three core dimensions: value creation, value delivery, and value capture (Osterwalder & Pigneur, 2010). Digital transformation affects value creation by enabling data-driven product development and new forms of resource recombination; it reshapes value delivery through omnichannel integration, platform participation, and supply chain coordination; and it transforms value capture through subscription models, direct-to-consumer strategies, and data monetization. Accordingly, digital transformation does not merely support existing business models but can reconfigure their underlying architecture.

In highly digital sectors such as fashion, adapting business models has become particularly critical. Traditional wholesale-based distribution structures are increasingly being supplemented or replaced by omnichannel retail, platform-mediated sales, and direct-to-consumer (D2C) strategies. Digitalization enables companies to internalize customer data, reduce intermediary layers, and redesign pricing, personalization, and inventory management systems. Accordingly, digital transformation often materializes through business model reconfiguration rather than isolated technological adoption.

However, digital transformation should not be reduced solely to business model change. While business model innovation constitutes an important dimension, the transformation process also involves resource reallocation, capability development, organizational restructuring, and governance redesign. Thus, digital transformation should be conceptualized as a multidimensional strategic alignment process.

Crucially, the capacity of business models to be redesigned through digitalization is determined by internal resource structures and adaptability. Financial capital, technological infrastructure, managerial expertise, and data assets influence the scope and depth of transformation. Therefore, business model change is embedded within broader resource and capability configurations.

This integration is particularly important for analyzing how digital transformation generates heterogeneous patterns of business model evolution across firms exposed to similar technological pressures. Differences in resource availability, adaptability, and organizational conditions influence the extent to which business models can be redesigned. In this context, the Resource-Based View (RBV) and Dynamic Capabilities frameworks will be examined in the following sections.

2.2 Resource-Based View (RBV)

The Resource-Based View (RBV) is recognized as one of the most influential theoretical frameworks in strategic management literature for explaining performance differences at the firm level. The origins of the RBV trace back to Penrose (1959), who conceptualized the firm as a collection of productive resources. Rather than viewing firms as homogeneous entities operating within the same industry structure, Penrose emphasized internal heterogeneity as the fundamental source of growth and competitive differentiation.

Building on this foundation, Barney (1991) systematized RBV, arguing that sustainable competitive advantage arises from possessing valuable, rare, inimitable, and non-substitutable resources (VRIN). While valuable resources enable firms to capitalize on opportunities or mitigate threats, rarity prevents widespread imitation, inimitability safeguards strategic positioning, and non-substitutability limits competitive replication. Within this framework, RBV shifts the analytical focus from external market positioning to internal resource configuration.

The RBV approach has been further refined in subsequent studies. Later contributions emphasized conditions such as resource immobility and the strategic role of organizational knowledge in uncertain environments (Peteraf, 1993; Grant, 1996).

Resource heterogeneity and resource immobility form the core assumptions of the RBV. Firms differ in terms of the assets, capabilities, and organizational processes they possess. These differences persist over time due to path dependency, causal ambiguity, and social complexity (Barney, 1991). These mechanisms make strategic advantages difficult to replicate and sustain over time.

In digitally intensive environments, the nature of strategic resources has undergone a significant transformation. Digital infrastructures, unique data assets, analytical capabilities, algorithmic

systems, and technological integration architectures are increasingly becoming critical strategic resources (Wade & Hulland, 2004; Bharadwaj et al., 2013). Unlike traditional physical assets, digital resources exhibit characteristics such as scalability, modularity, and network effects, thereby reinforcing competitive asymmetries. Firms that accumulate large-scale data or develop platform-based systems can generate self-reinforcing advantages that are difficult to imitate.

RBV also distinguishes between tangible and intangible resources. In the context of digital transformation, intangible resources often hold greater strategic importance. While tangible digital investments—such as enterprise software, cloud infrastructure, or automation technologies—can be procured from the market, intangible assets like proprietary datasets, organizational learning routines, digital culture, and brand value accumulate over time and are embedded within organizational processes. Accordingly, the strategic value of digital transformation depends not only on technology acquisition but also on the integration of firm-specific, difficult-to-replicate resources.

From a business model perspective, these resource configurations determine the extent to which firms can redesign their value creation, delivery, and capture mechanisms. Firms possessing unique data assets, strong digital infrastructures, and integrated capabilities are better positioned to experiment with new revenue models, platform-based interactions, and service-oriented extensions. In contrast, firms with limited digital resources may adopt more incremental or modular adjustments to their business models.

In the fashion industry specifically, these digital resources become even more strategic. Real-time data analytics, integrated supply chain platforms, AI-powered forecasting systems, and omnichannel infrastructures enable companies to respond quickly to demand fluctuations and shortened product lifecycles. Thus, digital assets function as core strategic resources rather than peripheral technological tools.

Financial capacity is also a key factor in determining the potential for digital transformation. Investments in areas such as enterprise systems, artificial intelligence integration, cloud architectures, and cybersecurity infrastructure require significant capital and long-term commitments. Companies with strong financial resources and diversified revenue structures have structural advantages in launching and sustaining comprehensive digital transformation initiatives. In contrast, small firms operating under capital constraints may face limitations in establishing enterprise-wide digital infrastructures.

From an RBV perspective, differences in resource endowments create structural asymmetries in digital transformation capacity. While multinational corporations can accumulate large-scale digital systems and unique datasets across different markets, SMEs operate with more limited technological infrastructure and data assets. These asymmetries influence not only the scale but also the strategic depth of digital transformation.

The rise of platform-based ecosystems adds further complexity to the RBV framework. Traditional RBV assumes that firms internalize and control their strategic resources. However, in digital environments—particularly in fashion e-commerce and social commerce—firms often rely on external platforms for visibility, distribution, and customer engagement. SMEs, in particular, depend on third-party infrastructures they do not fully control. This challenges the assumption of resource immobility and highlights the role of external dependencies in shaping digital transformation capacity.

Despite its explanatory power, RBV has been criticized for its relatively static nature. While it effectively explains performance differences based on resource ownership, it does not fully capture how firms adapt in rapidly changing technological environments. In contexts characterized by continuous digital disruption, the value of resources is not fixed but evolves over time. Therefore, understanding digital transformation requires complementing RBV with a dynamic perspective that explains how firms reconfigure resources under uncertainty.

To better distinguish between these theoretical perspectives, a comparative overview is provided below.

Table 2.1 Comparison of RBV and Dynamic Capabilities in Explaining Digital Transformation

Dimension	Resource-Based View (RBV)	Dynamic Capabilities
Theoretical focus	Resource heterogeneity	Adaptation under change
Key mechanism	VRIN resources	Sensing, seizing, transforming
Temporal orientation	Static	Dynamic
Relevance to digital transformation	Explains resource-based asymmetries	Explains transformation processes
Limitation	Limited explanation of change	Less precise measurement
Key authors	Barney (1991)	Teece (2007)

Source: Author's own elaboration based on Barney (1991) and Teece (2007).

As shown in Table 2.1, these perspectives provide complementary insights into digital transformation processes.

Accordingly, the next section introduces the Dynamic Capabilities framework, which explains how firms adapt and transform their resource configurations in response to environmental change.

2.3 Firm Size as a Contextual Condition in Digital Transformation

Firm size has long been recognized as a structural determinant of organizational behavior (Chandler, 1962; Hannan & Freeman, 1984). Differences in size affect not only resource endowment but also governance structures, coordination mechanisms, and innovation processes. Therefore, firm size is not merely a descriptive characteristic; it functions as a structural condition that shapes strategic choices.

From the Resource-Based View (RBV) perspective, large firms typically possess greater financial capital, more advanced technological infrastructure, and a broader pool of human resources. Economies of scale enable these firms to invest in advanced digital systems, enterprise-wide integration platforms, and long-term technological experiments. Access to capital markets and diversified revenue streams reduce investment risk in large-scale digital transformation initiatives. These structural advantages increase the likelihood of adopting infrastructure-intensive and systematically integrated digital strategies.

However, scale also brings with it structural complexity. As organizations grow, hierarchical layers increase, coordination costs rise, and decision-making processes become more formal. Organizational inertia and bureaucratic rigidity can limit the ability to perceive and adapt, particularly in rapidly changing digital environments. This may reduce adaptability by slowing resource reallocation and limiting the speed of digital experimentation.

In contrast, small and medium-sized enterprises (SMEs) typically have leaner organizational structures and flatter hierarchies (Beck, Demirgüç-Kunt & Maksimovic, 2005; OECD, 2021). The fact that decision-making processes are largely concentrated around founders or small leadership teams enables the rapid testing and implementation of new digital tools. Although SMEs may not have extensive financial resources, their structural flexibility enhances their adaptability and accelerates their sensing–seizing processes.

This situation creates a dichotomy conceptualized as the scale–agility paradox. While large firms benefit from resource depth, they face coordination rigidities; SMEs, on the other hand, operate under resource constraints despite possessing agility advantages. Accordingly, digital transformation pathways emerge from the interaction between resource availability and structural flexibility rather than firm size alone.

The innovation literature also supports this distinction. While large firms possess advantages such as structured R&D systems, cumulative learning, and technological standardization, they may struggle with radical innovation due to risk-averse tendencies and internal coordination challenges. In contrast, small firms typically exhibit a stronger entrepreneurial orientation and higher tolerance for experimentation, enabling them to make faster strategic shifts in digital markets.

Firm size also shapes risk exposure. Large firms face higher systemic and reputational risks when implementing digital transformation across global operations. Integration errors, cybersecurity breaches, or platform incompatibilities can result in significant financial and reputational losses. SMEs, while more agile, remain vulnerable to different types of risks due to limited cybersecurity infrastructure, technological dependence, and financial fragility.

In conclusion, firm size influences digital transformation through various interrelated dimensions: resource capacity, structural complexity, decision-making speed, innovation orientation, and risk exposure. These dimensions can be structured comparatively to more clearly illustrate how firm size shapes digital transformation strategies across organizations.

Table 2.2 Firm Size as a Contextual Condition Shaping Digital Transformation

Dimension	Large Firms	SMEs	Theoretical Interpretation
Resource endowment	High financial and technological resources	Limited resources	RBV: resource asymmetry
Organizational structure	Complex, hierarchical	Flat, flexible	Structural theory
Decision-making speed	Slower	Faster	Dynamic capabilities
Digital transformation scope	Integrated, system-wide	Selective, modular	Strategy variation
Risk exposure	High systemic risk	High vulnerability	Risk asymmetry

Source: Author's own elaboration based on Barney (1991), Teece (2007), and OECD (2021).

As shown in Table 2.2, firm size does not determine whether digital transformation will occur; however, it significantly shapes how the transformation unfolds through the interaction between the availability of resources and organizational flexibility.

These dimensions interact dynamically: resource abundance without adaptability may lead to inefficiency, while agility without sufficient resource depth may constrain scalability.

Therefore, digital transformation strategies must be interpreted within the structural constraints imposed by organizational scale. Firm size conditions how transformation unfolds rather than whether it occurs.

This discussion suggests that firm size should be understood as a contextual condition that shapes the scope and depth of business model transformation through its influence on resource configuration and adaptability. However, firm size alone does not determine transformation outcomes; rather, it interacts with value chain positioning and capability structures in shaping differentiated digital transformation pathways. Accordingly, digital transformation strategies emerge from the interaction of two fundamental dimensions.

2.4 Integrative Theoretical Framework

In the previous sections, three complementary theoretical perspectives were presented to understand digital transformation: the Resource-Based View (RBV), the Dynamic Capabilities framework, and organizational conditions that shape how transformation unfolds across firms. While each of these perspectives has limited explanatory power on its own, their integration provides a comprehensive analytical framework for examining differentiated digital transformation strategies.

The Resource-Based View explains how heterogeneity in resource endowments shapes firms' capacity to invest in and sustain digital infrastructure. Financial capital, technological systems, proprietary data assets, and digital capabilities emerge as strategic resources that determine the scope, depth, and level of integration of digital initiatives. Firms with greater resource depth possess a structural advantage in pursuing infrastructure-intensive and systematically integrated transformation pathways.

The Dynamic Capabilities approach, however, extends this structural logic through adaptability. Sustainable performance in rapidly changing digital environments depends not only on resource ownership but also on the capacity to perceive technological changes, evaluate emerging opportunities, and continuously transform organizational structures. Accordingly, digital transformation should be understood as an ongoing process of adaptation rather than a one-time implementation.

Organizational conditions, including differences in scale, resource availability, and structural flexibility, help connect these two perspectives. While some firms possess deeper resource bases and stronger infrastructure capabilities, others benefit from greater agility and faster decision-making processes. Accordingly, digital transformation pathways are shaped by the

interaction between resource endowment and adaptability capacity rather than by a single organizational characteristic alone.

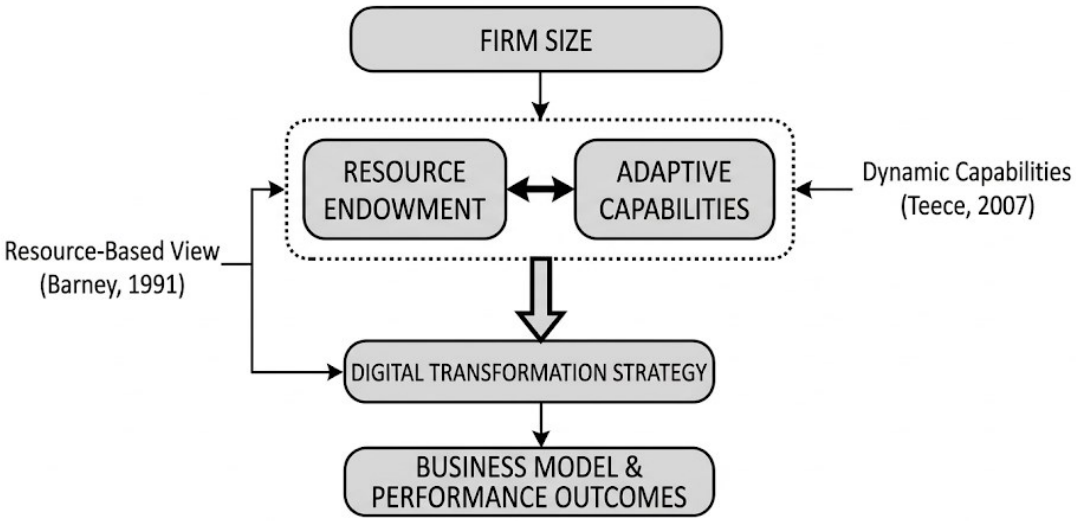
Accordingly, differentiated patterns of business model evolution emerge from the interaction of two fundamental dimensions: (1) resource endowment and (2) adaptability capacity. These dimensions shape how firms reconfigure value creation, value delivery, and value capture mechanisms in response to digital pressures.

Firms with deeper resource bases may be better positioned to adopt integration-focused and infrastructure-intensive digital strategies, whereas firms operating under tighter resource constraints may rely more on selective, modular, and opportunity-driven digital initiatives.

This integrated framework positions organizational characteristics as contextual conditions that shape how digital transformation translates into business model transformation. It provides the theoretical foundation for analyzing how firms operating at different stages of the fashion value chain develop distinct business model configurations under similar technological pressures.

To synthesize these theoretical perspectives, a conceptual model has been developed that illustrates how organizational conditions shape digital transformation through the interaction between resource endowment and adaptation capacity.

Figure 3. Conceptual Model of Organizational Conditions and Digital Transformation in the Fashion Industry

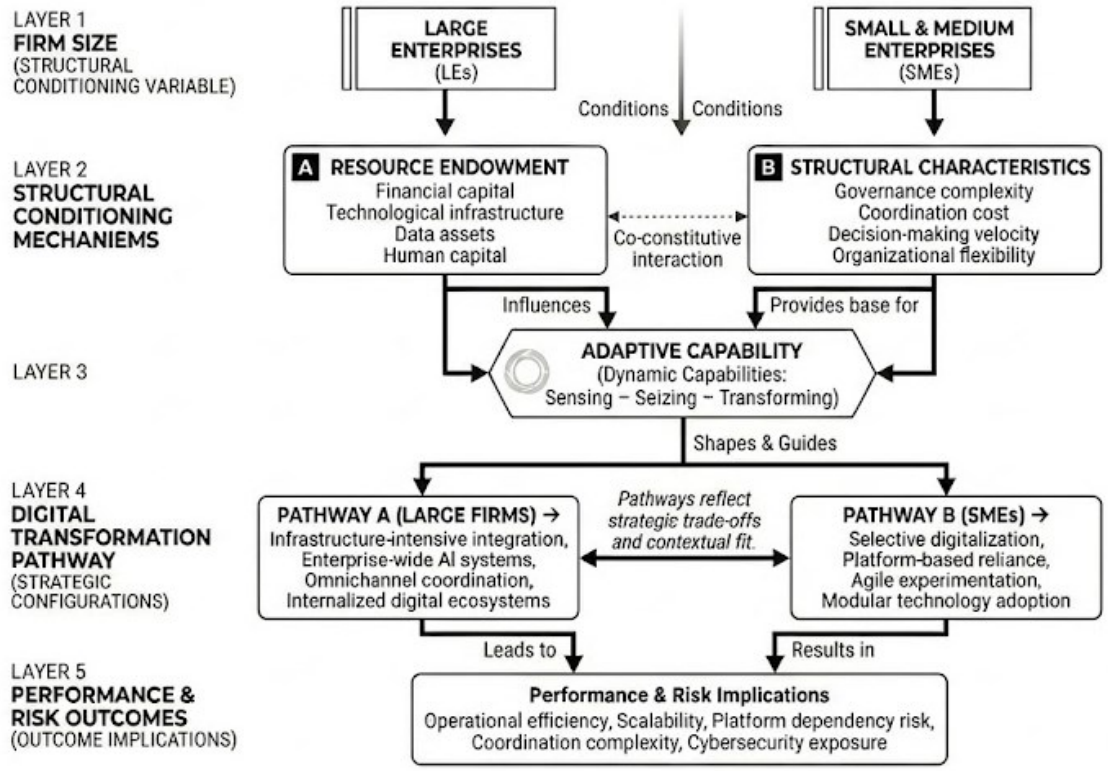


Source: Author's own elaboration based on Barney (1991), Teece (2007), and Verhoef et al. (2021).

As shown in Figure 3, digital transformation strategies emerge from the interaction between resource endowment and adaptability capacity, both of which are influenced by broader organizational conditions.

Although Figure 3 presents a simplified conceptual model, digital transformation pathways can be further understood by incorporating additional structural dimensions and strategic configurations. Figure 4 extends this framework by capturing these interactions in greater detail.

Figure 4. Multi-Layered Conceptual Framework of Organizational Conditions and Digital Transformation Pathways



Source: Author's own elaboration based on Barney (1991), Teece (2007), Verhoef et al. (2021), and Parida et al. (2019).

As illustrated in Figure 4, digital transformation pathways are shaped by the interaction between resource endowment, structural characteristics, and adaptive capabilities. These interactions generate distinct strategic configurations across organizations, reflecting trade-offs between integration, flexibility, and technological dependence.

2.5 Chapter Conclusion

The theoretical discussion in this chapter has established the conceptual foundation for understanding digital transformation as a strategic and structurally embedded process. By integrating insights from the Resource-Based View (RBV), the Dynamic Capabilities framework, and organizational contingency perspectives, the analysis moves beyond technology-centric interpretations of digital transformation and positions it within broader debates on resource heterogeneity, adaptive capacity, and structural differentiation.

From an RBV perspective, firms differ in their resource endowments, including financial capital, digital infrastructure, proprietary data assets, and managerial expertise. These heterogeneous resource configurations influence the scope and depth of digital transformation initiatives. Digital infrastructures and data analytics capabilities increasingly function as strategic assets that shape firms' ability to redesign value creation, delivery, and capture mechanisms. However, resource possession alone does not guarantee successful transformation.

The Dynamic Capabilities framework complements this structural logic by emphasizing firms' capacity to sense technological and market changes, seize emerging opportunities, and transform organizational processes accordingly. In digitally intensive environments characterized by volatility and rapid technological evolution, sustainable transformation depends on continuous reconfiguration rather than static resource ownership. Accordingly, digital transformation is conceptualized not as a one-time implementation of technology, but as an ongoing process of organizational adaptation.

Firm size is acknowledged as an important structural factor influencing resource availability and investment capacity. Larger firms often possess deeper financial and technological resources, while smaller firms may benefit from greater structural flexibility. However, firm

size is treated in this study as a contextual condition rather than the primary analytical lens. While scale influences how digital initiatives are resourced and implemented, it does not fully explain variation in transformation pathways.

Instead, the central analytical focus of this thesis lies in value chain positioning. Firms operating at upstream, intermediary, and downstream stages are embedded in distinct competitive logics, coordination structures, and value creation systems. These structural positions condition how resource configurations and adaptive capacities are mobilized in response to digital pressures. Consequently, digital transformation is conceptualized as a differentiated process shaped by the interaction between resource endowment, adaptive capability, and value chain position.

This integrated theoretical perspective provides the foundation for the empirical analysis that follows. By examining firms located at different stages of the fashion value chain, the study investigates how digital transformation translates into distinct patterns of business model evolution. In doing so, the empirical chapters explore how value creation, value delivery, and value capture mechanisms are reconfigured under varying structural and organizational conditions.

Chapter 3: Digital Transformation in the Global Fashion Industry: Industry Context and Market Dynamics

This chapter examines digital transformation within the structural and competitive dynamics of the global fashion industry. Drawing on industry reports, market data, and empirical evidence, it provides a contextual overview of how digital technologies are reshaping the industry at a macro level. Building on the theoretical framework developed in Chapter 2, the chapter connects these industry-level developments to value chain dynamics, highlighting how structural conditions influence firm-level digital transformation processes.

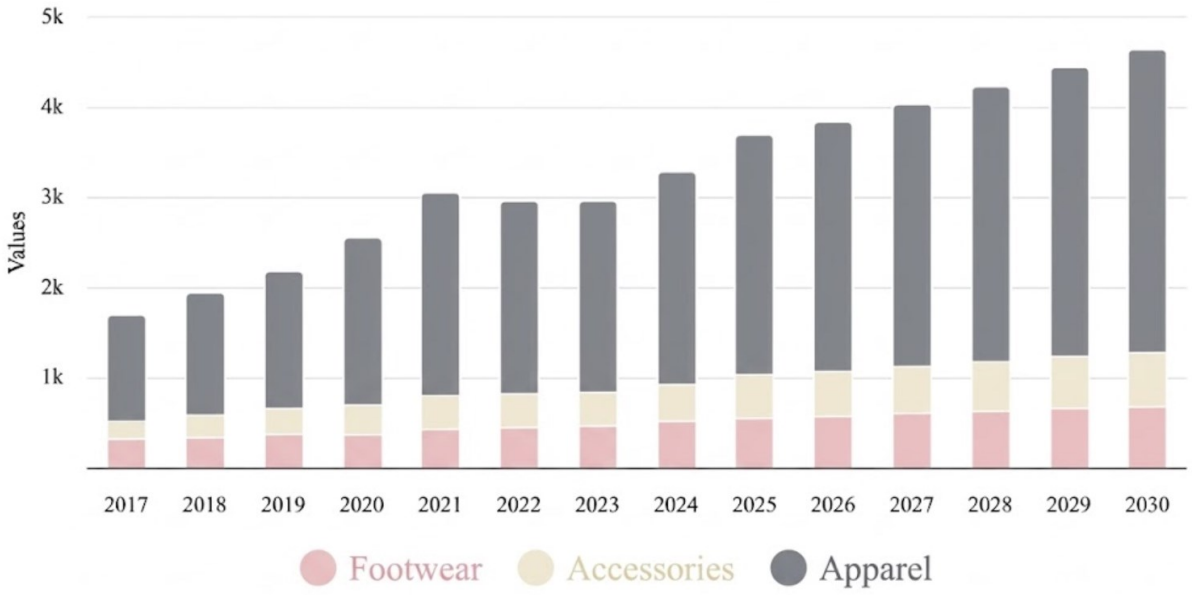
Rather than focusing on firm-level analysis, this chapter emphasizes broader industry trends, including market size, digital adoption patterns, and emerging technological infrastructures. By mapping these developments onto value chain positions, the analysis establishes the contextual conditions under which differentiated business model transformations emerge across upstream, intermediary, and downstream actors.

3.1 Structure and Economic Importance of the Global Fashion Industry

The global fashion industry represents one of the most dynamic and structurally complex sectors within the contemporary consumer economy. It encompasses a wide range of interconnected activities, including design, production, distribution, marketing, and retail, all of which are embedded within highly fragmented and globally dispersed supply chains. With an estimated market size of approximately 1.7 trillion U.S. dollars, the industry constitutes a major component of global economic activity, shaping employment, trade flows, and consumption patterns across regions. Recent projections further indicate that the global fashion market is expected to exceed 2.3 trillion U.S. dollars by 2030, reflecting sustained long-term growth and increasing global demand (Statista, 2025).

In addition to its economic scale, the fashion industry is characterized by continuous expansion across product categories. This growth reflects not only rising consumption but also increasing diversification across apparel, accessories, and footwear segments.

Figure 5. Global Fashion Market Growth by Segment (2017–2030)



Source: Statista Market Insights (2025).

As illustrated in Figure 5, the global fashion market has demonstrated steady growth across all major segments. Apparel remains the dominant segment, while accessories and footwear also exhibit consistent upward trends. This expansion indicates that the industry is not only increasing in size but also becoming more segmented and commercially complex. As a result, firms are required to manage broader product portfolios, respond to increasingly volatile demand patterns, and coordinate operations across multiple markets and channels.

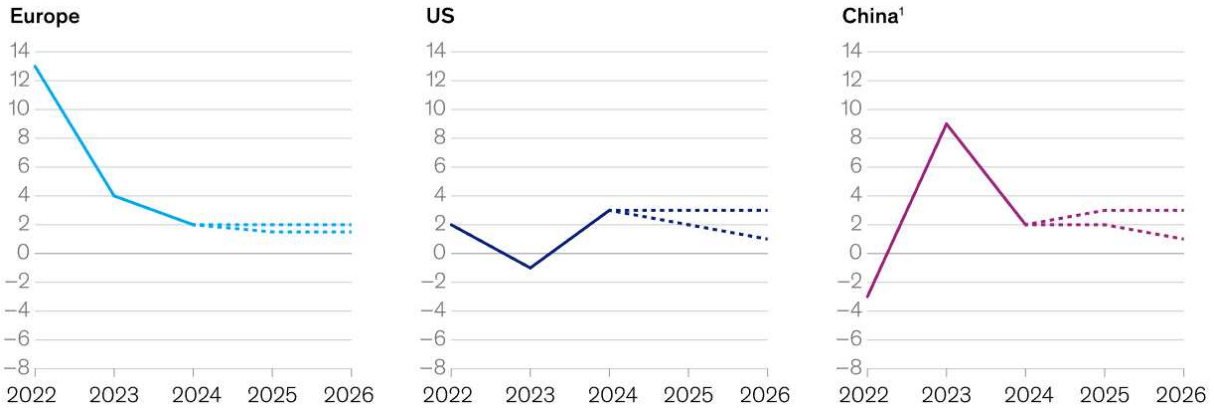
The structure of the fashion industry is inherently heterogeneous, comprising a diverse set of actors ranging from multinational luxury conglomerates and large-scale fast-fashion retailers to

small and medium-sized enterprises and independent designers. These actors operate under distinct strategic and operational logics. Luxury brands emphasize exclusivity, craftsmanship, and controlled distribution, whereas fast-fashion companies prioritize speed, cost efficiency, and rapid responsiveness to evolving consumer preferences. At the same time, the expansion of digital infrastructures has enabled the emergence of digitally native brands that rely on direct-to-consumer (D2C) models and platform-based ecosystems, further increasing the diversity of organizational forms within the industry.

Over the past decades, the fashion industry has undergone significant structural transformation driven by globalization, technological advancements, and shifting consumer expectations. Production activities have increasingly been relocated to emerging economies, while design, branding, and strategic decision-making remain concentrated in established fashion hubs. This geographical dispersion has led to highly fragmented and interdependent supply chains, where coordination, responsiveness, and information flow have become critical determinants of firm performance.

These structural dynamics are also reflected in region-specific growth patterns across global markets.

Figure 6. Fashion Retail Sales Year-on-Year Growth by Geography (%)



Source: McKinsey & Company (2023)

As illustrated in Figure 6, growth dynamics within the global fashion industry vary significantly across regions. Emerging markets, particularly China, demonstrate higher growth potential but are also associated with greater volatility. In contrast, mature markets such as Europe and the United States exhibit more stable but relatively slower growth trajectories. These regional differences indicate that industry development is not uniform but shaped by varying economic conditions, consumer behavior patterns, and levels of market maturity.

Digitalization has become a defining force shaping the contemporary fashion industry. The rapid expansion of e-commerce, the increasing importance of digital marketing channels, and the growing reliance on data analytics have fundamentally transformed how fashion companies engage with consumers and organize their operations. Digital technologies enable firms to interact directly with customers, access global markets more efficiently, and optimize internal processes such as demand forecasting, inventory management, and supply chain coordination. In this context, traditional retail models are increasingly being reconfigured toward integrated, data-driven, and digitally mediated systems of value delivery.

Alongside these economic and structural shifts, sustainability has emerged as a critical concern within the fashion industry. Increasing regulatory pressures and heightened consumer awareness regarding environmental and social impacts are pushing firms to reconsider conventional production and consumption models. The industry's high levels of resource consumption and waste generation have intensified the need for transparency and accountability. In response, companies are increasingly adopting digital technologies to enhance traceability, improve resource efficiency, and support sustainability initiatives across global supply chains.

Within this evolving landscape, digital transformation has shifted from being a strategic option to becoming a structural necessity. However, the pathways through which digital transformation unfolds vary significantly across firms, depending on factors such as resource availability,

organizational complexity, and technological capabilities. As a result, digital transformation does not follow a uniform trajectory across the industry; rather, it is shaped by the specific structural conditions under which firms operate.

Taken together, these structural characteristics—industry expansion, segmentation, global fragmentation, regional variation, and increasing sustainability pressures—create a complex and evolving context. Within this context, digital transformation emerges as a context-dependent process that interacts with firms' structural positions and operational environments, laying the foundation for differentiated patterns of business model evolution across the fashion value chain.

3.2 Digital Technologies Transforming Fashion Companies

Digital technologies have become a central driver of structural and strategic change within the global fashion industry. Advances in artificial intelligence, data analytics, and digital commerce infrastructures are fundamentally transforming how fashion companies design products, manage supply chains, and engage with consumers. Rather than functioning as isolated tools, these technologies increasingly operate as interconnected systems that reshape both operational processes and strategic decision-making.

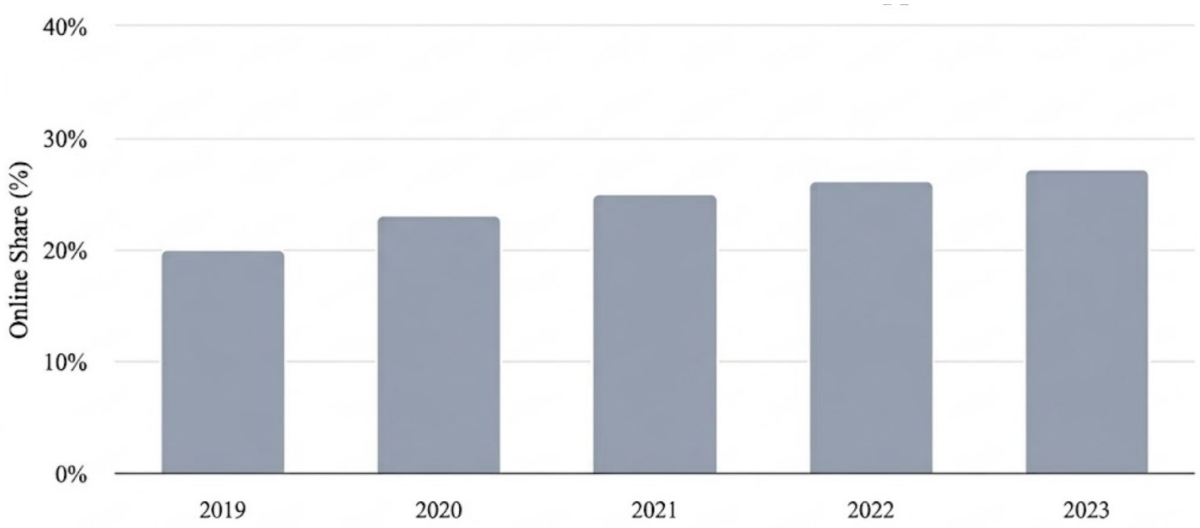
One of the most visible manifestations of this transformation is the rapid expansion of omnichannel retail strategies. Fashion companies are increasingly integrating physical stores with digital platforms to create seamless customer experiences across online and offline environments. Unlike traditional multichannel approaches, omnichannel systems enable the full integration of inventory visibility, logistics coordination, and customer data across all touchpoints. This allows firms to offer more consistent and personalized experiences while improving operational efficiency. As a result, value delivery mechanisms are shifting from

fragmented channel structures toward integrated, data-driven systems (Verhoef et al., 2021; Piotrowicz & Cuthbertson, 2014). This integration not only enhances customer experience but also allows firms to capture more granular consumer data across channels, strengthening both personalization capabilities and strategic decision-making. In parallel with the expansion of omnichannel strategies, the increasing importance of digital channels is reflected in the rapid growth of online fashion sales.

Artificial intelligence and advanced data analytics have also become increasingly important in shaping decision-making processes. Fashion companies are leveraging large volumes of consumer and operational data to better understand demand patterns, identify emerging trends, and respond more rapidly to market changes. Predictive analytics tools enable firms to improve forecasting accuracy and reduce mismatches between supply and demand, which is particularly critical in an industry characterized by high demand volatility and short product life cycles. Industry evidence suggests that data-driven forecasting systems can reduce forecasting errors by up to 30–50%, improving inventory efficiency and reducing overproduction (McKinsey & Company, 2023).

The shift toward digital consumption is clearly reflected in the increasing share of online fashion sales. In 2023, online channels accounted for approximately 27% of total global apparel retail sales, highlighting the growing role of e-commerce in the fashion industry (Statista, 2024). Furthermore, this share is expected to exceed 30% in the coming years, indicating the continued expansion of digital market channels.

Figure 7. Growth of Online Fashion Sales as Share of Total Apparel Retail (%)



Source: Statista (2024).

As illustrated in Figure 7, the share of online fashion sales has increased steadily over recent years, reaching approximately 27% in 2023. This trend reflects a structural shift toward digitally mediated consumption patterns, where online platforms increasingly shape how consumers interact with fashion brands. As a result, digital channels are no longer supplementary but have become central components of value delivery and market access in the fashion industry.

Beyond demand forecasting, digital technologies are also transforming internal operations and supply chain processes. Industry 4.0 technologies—such as automation, digital prototyping, and cloud-based coordination systems—enable faster product development cycles and more efficient production processes. Digital design tools allow firms to create and test virtual prototypes before physical production, reducing both development time and material waste while improving flexibility in product design (Kagermann et al., 2013; Lasi et al., 2014).

These transformations are not limited to isolated functions but extend across multiple organizational domains within fashion companies.

Figure 8. Digital Transformation Across Key Operational Areas in Fashion Retail

Source: Deloitte (2025)

As illustrated in Figure 8, digital transformation spans multiple interconnected organizational areas, including customer engagement, merchandising, inventory planning, supply chain management, and retail execution. This indicates that digital technologies are not confined to specific functions but are integrated across the entire value creation system of fashion companies.

Taken together, these developments demonstrate that digital technologies are not merely enhancing operational efficiency but are fundamentally reshaping how fashion companies create, deliver, and capture value. As digital infrastructures become more deeply embedded within organizational processes, they increasingly define the competitive dynamics of the industry, reinforcing the strategic importance of digital transformation across all stages of the fashion value chain.

3.3 Organizational Differences in Digital Transformation Strategies

While firm size influences resource configurations, it does not constitute the primary analytical dimension of this study. Although digital transformation affects the fashion industry broadly, firms differ significantly in the pace, scope, and strategic depth of digital technology adoption. From a resource-based perspective, differences in resource endowment, managerial capabilities, and strategic orientation shape how firms implement and leverage digital transformation initiatives (Verhoef et al., 2021; Parida et al., 2019). These differences highlight that digital transformation is not only technology-driven but also structurally conditioned by firm-specific resource configurations.

Large fashion companies typically possess more comprehensive technological infrastructures and financial resources that enable them to invest in integrated digital systems. These investments include enterprise-level data platforms, artificial intelligence systems for demand forecasting, and globally coordinated omnichannel retail structures. Industry reports indicate that major multinational fashion companies have significantly increased their investments in digital technologies, allocating substantial budgets to data analytics capabilities, e-commerce expansion, and digital infrastructure development (McKinsey & Company, 2023; Deloitte, 2023). In some cases, leading global brands invest billions annually in digital transformation initiatives, reflecting the strategic importance of technology-driven capabilities in sustaining competitive advantage.

In contrast, smaller fashion companies tend to adopt more selective and cost-effective digital solutions. Rather than developing large-scale infrastructures, many SMEs rely on modular technologies such as cloud-based e-commerce platforms, social media marketing tools, and third-party digital marketplaces. These solutions allow smaller firms to access global markets and expand their customer base without significant capital investment (OECD, 2021). At the same time, SMEs account for more than 90% of businesses in the fashion and textile sector

globally, highlighting their economic importance despite limited resource availability. However, their reliance on external platforms may reduce strategic control over data, customer relationships, and long-term value capture.

These differences can be more clearly understood by comparing the strategic and technological approaches of large firms and SMEs.

Table 3.1 Digital Transformation Strategies in Large Firms vs SMEs in the Fashion Industry

Dimension	Large Firms (MNEs)	SMEs
Digital Infrastructure	Integrated, enterprise-wide systems	Modular, platform-based tools
Investment Capacity	High	Limited
Technology Adoption	AI, big data, omnichannel systems	E-commerce, social media, cloud tools
Market Access	Global, multi-channel	Platform-dependent
Strategic Control	High (own systems & data)	Lower (platform dependency)
Flexibility	Lower (complex structures)	Higher (agility)

Source: Author's own elaboration based on McKinsey (2023), Deloitte (2023), OECD (2021)

As summarized in Table 3.1, digital transformation strategies differ significantly between large firms and SMEs in terms of resource allocation, technological capabilities, and strategic control. While large firms benefit from integrated infrastructures and global coordination capabilities, smaller firms rely on flexible and platform-based solutions that enhance accessibility but may constrain long-term strategic autonomy.

Accordingly, digital transformation should be interpreted not as a uniform sectoral shift but as a differentiated process shaped by firms' resource configurations and adaptive capacities.

Variations in digital strategy reflect the interaction between resource endowment, as emphasized in the resource-based view, and firms' ability to reconfigure organizational processes in response to technological change, as highlighted in the dynamic capabilities framework.

Beyond differences in resource allocation, digital transformation also reshapes how value is created and coordinated across organizational functions. Digital technologies increasingly integrate multiple operational layers, including product development, inventory planning, supply chain coordination, and customer engagement. Industry 4.0 technologies—such as automation, digital prototyping, and cloud-based coordination systems—enable faster product development cycles and more efficient production processes.

At the same time, digital platforms are fundamentally transforming how fashion companies interact with consumers and access markets. Social media platforms and digital marketplaces enable brands to build direct relationships with consumers while operating within algorithm-driven ecosystems. In such environments, visibility and performance are increasingly shaped by platform logics, where customer engagement and content performance determine market reach. In 2023, online channels accounted for approximately 27% of global apparel retail sales and are expected to exceed 30% in the coming years, reinforcing the growing importance of platform-based market access (Statista, 2024).

In addition to market-facing processes, digital technologies are increasingly used to enhance transparency and traceability within fashion supply chains. Technologies such as blockchain and digital certification systems allow firms to track products across multiple stages of production, verify origin, and support sustainability claims. This reflects a broader transition toward data-driven trust mechanisms, where transparency becomes an essential requirement within global value chains.

Taken together, these developments demonstrate that digital transformation in the fashion industry is a multidimensional and system-level process. Its impact extends beyond efficiency gains to influence organizational structures, strategic priorities, and competitive dynamics. Importantly, these transformations do not occur uniformly across firms; rather, they are shaped by firms' structural conditions and resource configurations, laying the foundation for differentiated patterns of business model evolution examined in the following sections.

3.4 Digital Business Models and Market Access

Digital transformation has fundamentally reshaped how fashion companies access markets and interact with consumers, leading to a structural reconfiguration of business models. One of the most prominent manifestations of this shift is the rise of Direct-to-Consumer (D2C) models, which enable firms to bypass traditional intermediaries such as wholesalers and retail chains. Through e-commerce platforms and digital marketplaces, companies can establish direct relationships with consumers, gaining greater control over pricing, branding, and customer data.

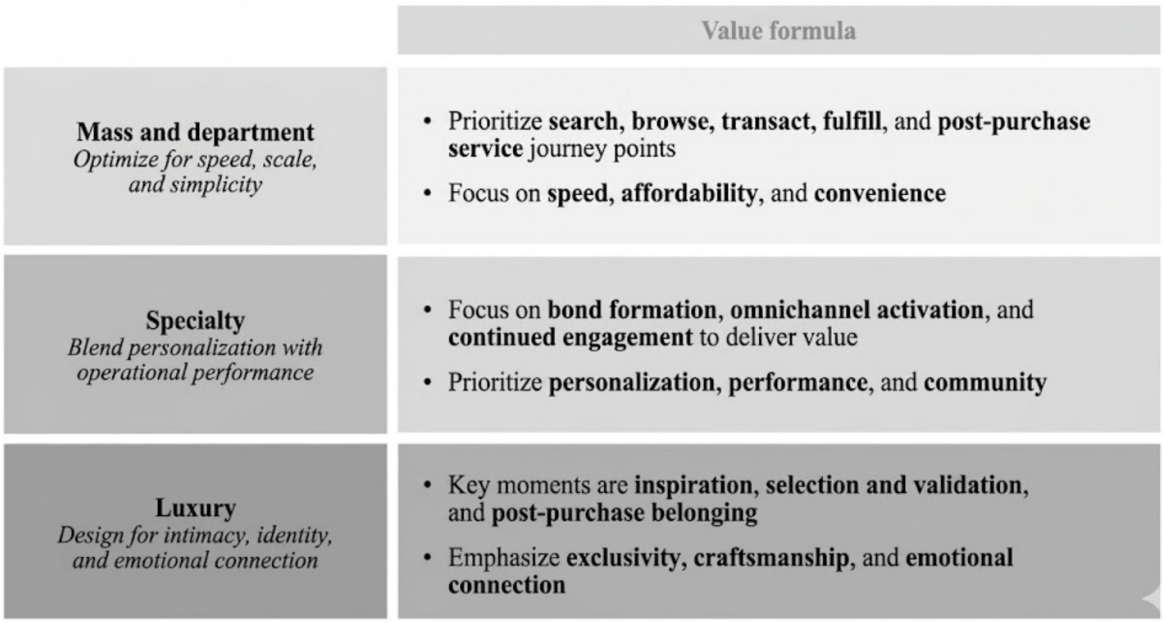
Rather than representing a simple shift in sales channels, this transformation reflects a deeper restructuring of value delivery and value capture mechanisms. By internalizing distribution channels, firms are able to collect granular consumer data, personalize offerings, and optimize marketing strategies in real time. This data-driven interaction not only enhances customer engagement but also strengthens firms' ability to continuously adapt their market strategies.

The growing importance of digital channels is also reflected in industry data. In 2023, online fashion sales accounted for approximately 27% of global apparel retail sales and are expected to exceed 30% in the coming years, highlighting the increasing role of digital platforms in shaping market access (Statista, 2024). At the same time, industry reports indicate that fashion companies are continuing to invest heavily in e-commerce and digital infrastructures,

reinforcing the strategic importance of digital channels for future growth (McKinsey & Company, 2023).

In parallel, the rise of omnichannel strategies further reinforces this transformation. Rather than treating online and offline channels as separate, firms increasingly integrate physical stores, digital platforms, and logistics systems into a unified customer experience. This allows companies to synchronize inventory, personalize interactions across touchpoints, and provide seamless purchasing journeys. These differences in value delivery become particularly visible across different fashion segments.

Figure 9. Omnichannel Value Creation Across Fashion Segments



Source: McKinsey & Company (2023)

As illustrated in Figure 9, different fashion segments prioritize distinct value dimensions within omnichannel strategies. While mass-market players emphasize speed, affordability, and convenience, luxury brands focus on emotional connection, exclusivity, and post-purchase

engagement. Specialty segments, in turn, balance personalization and performance-driven value propositions. This indicates that digital transformation does not produce a uniform business model shift; instead, it reshapes value delivery in ways that are aligned with brand positioning and target customer expectations.

In addition, digitalization significantly accelerates international market access. Compared to traditional expansion models, which require substantial investment in physical retail infrastructure, digital channels allow firms to reach global consumers rapidly and at lower cost. As a result, even smaller fashion brands are increasingly able to operate in multiple markets simultaneously, reducing entry barriers and expanding their geographical reach.

However, this increased accessibility is accompanied by new forms of strategic dependency. Firms operating within platform-based ecosystems often rely on infrastructures controlled by third parties, such as e-commerce marketplaces and social media platforms. Changes in platform algorithms, visibility mechanisms, or governance rules can directly affect brand visibility and sales performance. This indicates that market access in digital environments is no longer fully controlled by firms themselves, but is increasingly mediated by platform logic and algorithmic systems.

Overall, digital transformation reshapes market access by simultaneously enabling greater autonomy through disintermediation while introducing new dependencies through platform-based ecosystems. These dual dynamic highlights that business model transformation in the digital era involves not only increased opportunities but also new structural constraints.

3.5 Organizational Capabilities and Strategic Flexibility

Beyond technological investments, digital transformation in the fashion industry is fundamentally shaped by organizational capabilities and strategic flexibility. Firms are required

not only to adopt digital technologies, but also to reconfigure internal processes, coordinate across functions, and adapt to rapidly changing market conditions. In this context, digital transformation emerges as an organizational process rather than a purely technological shift.

Industry reports highlight that digital transformation increasingly requires the integration of multiple organizational functions, including customer engagement, supply chain management, inventory planning, and retail execution. Rather than operating as isolated initiatives, digital technologies are embedded across interconnected systems that support value creation, delivery, and capture simultaneously. This integrated approach reflects the growing importance of organizational alignment in achieving effective digital transformation.

In particular, omnichannel capabilities have become central to organizational transformation. Fashion companies are increasingly required to coordinate online and offline channels, synchronize inventory systems, and manage customer interactions across multiple touchpoints. This requires not only technological infrastructure but also organizational flexibility to ensure consistent and seamless customer experiences. Industry studies suggest that companies implementing integrated omnichannel strategies can achieve up to 20–30% higher customer retention rates, highlighting the performance impact of coordinated digital capabilities (Deloitte, 2023). As a result, firms must develop capabilities that enable real-time coordination between front-end (customer-facing) and back-end (operational) activities.

These dynamics are closely aligned with the concept of dynamic capabilities, which emphasizes firms' ability to sense opportunities, seize them through strategic investments, and transform organizational processes accordingly (Teece, 2007). In the fashion industry, such capabilities are particularly critical due to high demand volatility, short product life cycles, and rapidly shifting consumer preferences. Empirical evidence indicates that firms with advanced digital integration capabilities outperform competitors in terms of responsiveness and operational efficiency, particularly in volatile market environments (McKinsey & Company, 2023). Firms

must therefore continuously adjust their operations, product offerings, and communication strategies in response to digital signals and market feedback.

At the same time, digital transformation involves the restructuring of core operational areas, including merchandising, demand planning, supply chain coordination, and customer relationship management. Digital coordination systems have been shown to reduce lead times and improve supply chain responsiveness in fashion production networks, enabling faster and more flexible operational processes (Deloitte, 2023). This indicates that digital transformation spans multiple organizational layers, requiring firms to integrate customer-facing activities with internal processes such as inventory management, fulfilment, and platform-based operations.

Overall, these findings suggest that digital transformation is not solely dependent on technology adoption, but rather on firms' ability to integrate and reconfigure organizational processes across multiple functions. Strategic flexibility and organizational coordination therefore emerge as critical enablers of digital transformation, shaping how effectively firms can respond to technological change and evolving market dynamics.

3.6 Platform-Based Digital Transformation and Strategic Trade-offs

Digital transformation in the fashion industry involves significant variation in how companies adopt and implement digital technologies. Although access to digital tools has become increasingly widespread, firms differ in their technological configurations depending on their strategic priorities, operational needs, and organizational capabilities. Rather than representing a uniform process, technology adoption reflects a set of strategic choices shaped by trade-offs between accessibility, flexibility, and control.

A key development in this context is the growing reliance on modular and platform-based digital technologies. Many fashion companies adopt solutions such as cloud-based inventory

management systems, ready-made e-commerce infrastructures, and digital marketing analytics tools to support their transformation processes. These technologies allow firms to develop digital capabilities without investing in complex in-house IT systems. Platforms such as Shopify and WooCommerce, for instance, enable fashion brands to establish online retail operations with relatively low financial and technical barriers, thereby facilitating broader participation in digital markets (OECD, 2021).

This shift is strongly reflected in industry data. E-commerce has become a central component of the fashion industry, with online channels accounting for approximately 27% of global apparel retail sales in 2023 and expected to exceed 30% in the coming years (Statista, 2024). Furthermore, global e-commerce revenues are projected to grow at an annual rate of 6–11% in Europe and around 7% in the United States, indicating the continued expansion of digital market channels (McKinsey & Company, 2023). These figures highlight that digital platforms are no longer complementary tools but foundational infrastructures shaping market access and value delivery mechanisms.

In this context, modular digital technologies significantly reduce initial investment requirements and provide firms with the flexibility to experiment with different tools and strategies. Industry reports indicate that cloud-based infrastructures and platform ecosystems have lowered entry barriers in global fashion markets, enabling a growing number of firms to access international consumers through digital channels (Deloitte, 2023; McKinsey & Company, 2023). As a result, digital transformation facilitates broader participation in global markets, particularly by enabling firms to scale operations without corresponding investments in physical retail infrastructure.

However, the adoption of platform-based technologies also introduces new forms of strategic dependency. Firms operating within digital ecosystems rely on infrastructures controlled by third parties, such as social media platforms, online marketplaces, and digital payment systems.

Changes in platform algorithms, governance rules, or visibility mechanisms can directly affect firms' market reach and sales performance. In this sense, while platforms provide accessibility and scalability, they also limit firms' control over critical aspects of value delivery and customer interaction.

These dynamics highlight that digital transformation involves inherent strategic trade-offs. While modular and platform-based technologies enable rapid adoption, cost efficiency, and global reach, they may also reduce technological autonomy and increase exposure to external risks. This indicates that digital transformation is not solely a process of capability enhancement but also a reconfiguration of control within digital ecosystems, where firms must continuously balance independence and dependency.

3.7 Implications of Digital Transformation in the Fashion Industry

Previous sections have demonstrated that digital transformation has fundamentally reshaped multiple dimensions of the fashion industry, including retail channels, supply chain coordination, product development processes, and consumer engagement strategies. Digital technologies such as artificial intelligence, data analytics, and omnichannel infrastructures are becoming increasingly embedded in both the operational and strategic activities of fashion companies (Verhoef et al., 2021; McKinsey & Company, 2023).

Industry data further highlights the scale and acceleration of this transformation. In 2023, online channels accounted for approximately 27% of global apparel retail sales and are expected to exceed 30% in the coming years, reflecting the growing dominance of digital market environments (Statista, 2024). At the same time, continued investments in digital infrastructure, AI-driven analytics, and platform-based ecosystems indicate that digital transformation is no

longer optional but has become a structural necessity for firms operating in the fashion industry (McKinsey & Company, 2023).

These developments suggest that digital transformation extends beyond technological adoption and fundamentally redefines how firms create, deliver, and capture value. In particular, the integration of digital technologies across value chain activities enables firms to enhance efficiency, improve responsiveness, and develop more data-driven and customer-centric business models. However, these benefits are accompanied by new challenges, including increased dependence on digital platforms, heightened competitive pressures, and the need for continuous organizational adaptation.

Importantly, the implications of digital transformation are not uniform across firms. As demonstrated in the previous sections, differences in resource endowment, organizational capabilities, and strategic positioning lead to varied transformation pathways. Large firms tend to leverage integrated digital infrastructures to achieve scale and coordination, while smaller firms adopt flexible and platform-based solutions that enhance accessibility but may limit long-term control over value creation.

Overall, digital transformation should be understood as a structural and context-dependent process that reshapes competitive dynamics within the fashion industry. These findings provide an important foundation for examining how firms interpret, implement, and respond to digital transformation in practice. In this regard, the following chapter presents the research methodology used to investigate these processes through a qualitative multiple-case study approach.

3.8 Chapter Conclusion

This chapter has examined the broader context of digital transformation in the global fashion industry by synthesizing insights from academic literature and industry reports. The analysis demonstrates that digital technologies—such as artificial intelligence, data analytics, omnichannel systems, and platform-based infrastructures—are increasingly embedded in the operational and strategic activities of fashion companies, fundamentally reshaping how value is created, delivered, and captured.

The findings highlight that digital transformation is not a homogeneous or purely technology-driven process. Instead, it is deeply shaped by structural and organizational factors, including resource endowment, technological capabilities, and strategic orientation. As a result, firms follow different transformation pathways, reflecting their position within the industry and their ability to integrate and leverage digital technologies effectively.

Moreover, the chapter has shown that digital transformation introduces both opportunities and constraints. While digital technologies enable enhanced efficiency, global market access, and data-driven decision-making, they also create new dependencies, particularly through platform-based ecosystems and algorithm-driven market structures. This dual dynamic underscores that digital transformation involves not only capability development but also strategic trade-offs related to control, flexibility, and long-term value capture.

Importantly, these developments suggest that business model evolution in the fashion industry is closely intertwined with digital transformation processes. Firms are increasingly required to adapt their value creation, delivery, and market access mechanisms in response to changing technological and competitive conditions. However, these adaptations are not uniform but vary depending on firms' structural characteristics and organizational capabilities.

Overall, the chapter reinforces the importance of adopting a differentiated and context-sensitive perspective in analyzing digital transformation in the fashion industry. This perspective provides the conceptual and empirical foundation for the subsequent analysis, which examines how fashion firms interpret and implement digital transformation strategies in practice.

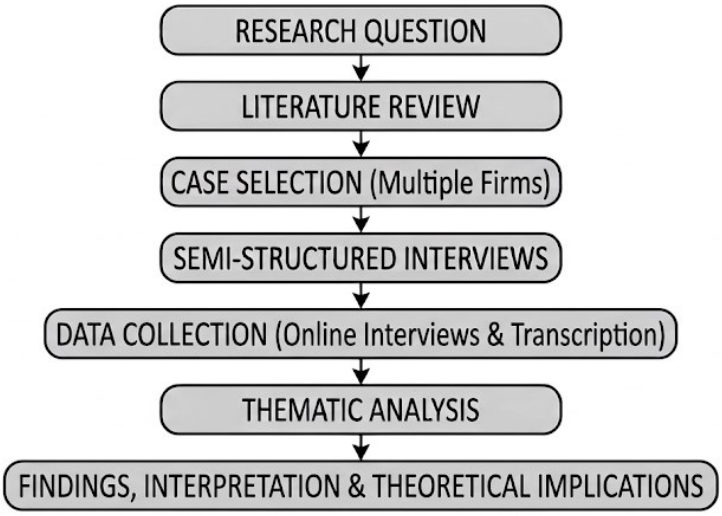
Chapter 4: Methodology

4.1 Research Design

This study adopts a qualitative and exploratory research design to examine the impact of digital transformation in the fashion industry on the evolution of business models. An exploratory approach is deemed appropriate because digital transformation is a context-dependent phenomenon that encompasses technological, organizational, and strategic dimensions and has not yet been fully elucidated in the literature.

To provide an overview of the research process, Figure 10 illustrates the methodological framework adopted in this study.

Figure 10. Research Design and Data Analysis Process



Source: Author's own elaboration.

As shown in Figure 10, this study follows a structured qualitative research approach that links theoretical foundations with empirical data collection and thematic analysis processes.

Given the complexity of digital transformation, a qualitative methodology was chosen to uncover managerial perspectives and organizational processes that cannot be fully understood using quantitative methods alone. This approach enables a more in-depth and context-sensitive analysis.

Within this framework, the study is based on a multiple case study research design. The case study method is particularly suitable for examining current phenomena within their real-life context and, in particular, for answering the questions “how” and “why” (Yin, 2018). This is particularly important for a phenomenon like digital transformation, which is closely linked to firm-specific characteristics such as organizational structure, resource availability, and market positioning. This research design aligns with the study’s research questions; as the study aims to understand how digital transformation influences the evolution of business models and how these processes vary across different organizational contexts.

Another advantage of the multiple-case approach is that it enhances the study’s analytical power by enabling cross-case comparisons and analytical generalizations (Yin, 2018; Eisenhardt, 1989). Rather than aiming for statistical generalization, this research seeks to contribute to theory development by identifying patterns and variations across different cases.

The unit of analysis in this research is the firm-level business model, and the focus is on how mechanisms for creating, delivering, and capturing value are reshaped through digital transformation.

The selected cases cover different stages of the fashion value chain, ranging from raw material production to design and brand-level activities. This allows for an examination of how digital transformation has influenced business model evolution across different layers of the sector.

The cases also differ in terms of firm size and organizational structure. However, these differences are not the primary focus of the study, and no direct comparison between large firms

and SMEs is intended. Instead, firm size is treated as a contextual factor that indirectly shapes resource availability, digital capabilities, and transformation pathways.

The case selection was designed to ensure diversity in terms of organizational context and position within the value chain, thereby enabling a more comprehensive and multidimensional analysis of the subject under examination.

In this regard, the research design was structured in a way that aligns with the objective of developing a deeper and context-sensitive understanding of how digital transformation has guided business model evolution.

4.2 Research Approach

This study adopts a qualitative research approach, as it aims to understand how digital transformation is perceived, interpreted, and implemented by managers within their organizational contexts. Since digital transformation is not merely a technical process but also involves managerial interpretation and strategic decision-making processes, the interpretivist perspective is particularly suitable for this study.

Interpretivism emphasizes understanding social phenomena through the meanings individuals ascribe to them (Bryman, 2016). Unlike positivist approaches, which aim to produce objective and generalizable findings, the interpretive approach focuses on context-specific insights and individuals' subjective experiences. In this study, digital transformation is therefore treated as a socially constructed and context-specific process shaped by organizational conditions, managerial perspectives, and sectoral dynamics.

From this perspective, knowledge is not viewed as an objective and universal phenomenon, but rather as a construct emerging from the interaction between the researcher and the research

context. Consequently, rather than establishing causal relationships or testing predefined hypotheses, the study aims to develop a deep and multidimensional understanding of how digital transformation influences the evolution of business models.

This approach is also consistent with the study's qualitative and exploratory research design. It allows for the examination of complex organizational processes through the experiences and interpretations of sector stakeholders; at the same time, by supporting the use of flexible and in-depth data collection methods, it enables the discovery of new themes that emerge throughout the research process.

4.3 Data Collection

The primary data for this study were collected through semi-structured interviews with professionals working in the fashion industry. This method was chosen because it allows for an in-depth examination of managerial perspectives while maintaining a certain consistency across cases.

Semi-structured interviews are widely used in qualitative research because they strike a balance between structure and flexibility (Bryman, 2016). While pre-determined questions ensure comparability across interviews, they also allow for the discovery of new themes and a deeper exploration of specific topics based on participants' responses.

The interview protocol was developed based on the theoretical framework established through the literature review. Concepts such as digital transformation, value chain dynamics, and business model evolution were particularly emphasized. The interview questions were designed to reflect the study's core analytical dimensions and were directly aligned with the research objectives. In this context, the questions were structured around key themes such as the role of digital transformation in business strategy, the adoption of digital technologies, their impact on

value chain activities, business model changes, and the opportunities and challenges presented by digital transformation. This structure ensured consistency across interviews while allowing participants to elaborate on their firm-specific experiences. Additionally, the question design was structured to support the examination of key factors used in data analysis, ensuring alignment with the analytical framework developed in this study.

In total, four interviews were conducted with company representatives operating at different stages of the fashion value chain. These stages range from raw material production to design and brand-level activities. This diversity enables an examination of how digital transformation influences business model evolution across the sector's various layers.

All interviews were conducted in English via Zoom, lasted approximately 30–45 minutes, and were recorded with the participants' consent. All participants were industry professionals and provided informed consent for the use of their real names and professional titles in this research. Given the non-sensitive and professional nature of the data, anonymity was not deemed necessary. The recordings were subsequently transcribed to facilitate systematic analysis. The interview transcripts have been lightly edited for clarity and readability. Filler words, repetitions, and minor grammatical errors have been removed; however, the original meaning of the participants' statements has been preserved. The full interview transcripts are presented in the appendices section of this thesis, ensuring the transparency and traceability of the research process. The complete set of interview questions is included in the Appendix A.

The semi-structured interview format allowed participants to elaborate on their experiences and provide in-depth insights into digital transformation initiatives within their organizations. This was particularly valuable for uncovering context-specific processes and strategic assessments that would be difficult to access through more structured data collection methods.

To strengthen the empirical foundation of the study, the interview data was supplemented with secondary sources such as company websites and publicly available reports. These sources contributed to contextualizing the findings and enhanced the validity of the empirical analysis. In this regard, the study adopts a data triangulation approach by combining multiple data sources to improve the credibility and robustness of the findings (Denzin, 2007; Yin, 2018).

4.4 Sampling Strategy & Case Selection

This study adopts a purposive sampling strategy, which allows for the selection of cases that are directly relevant to the research objectives and rich in information (Bryman, 2016). Given the exploratory nature of the study, participants were selected from among individuals directly involved in digital transformation processes within their organizations. In this context, interviews were conducted with a total of four professionals. The selected participants hold positions that allow them to provide both strategic and operational insights into digital transformation processes, thereby constituting a suitable sample for addressing the research questions.

Case selection was designed to ensure diversity across different stages of the fashion value chain. The sample includes firms ranging from upstream raw material production to downstream design and branding activities. This structure enables a comprehensive analysis of how digital transformation influences business model evolution across the sector's various layers. Each case is defined at the firm level, with the focus on the firm's digital transformation initiatives and their impact on business model evolution. This definition ensures consistency in the analysis while also allowing for comparisons across different organizational contexts.

Lenzing Group is a globally recognized company specializing in the production of sustainable fibers used in the textile and fashion industries. Operating in the upstream segment of the value

chain, the company stands out for its production processes focused on technological innovation and sustainability. Its global presence and advanced production capacity make it a significant case study for examining large-scale digital transformation in material production. The interview was conducted with Mert Canlı (Marketing & Branding Specialist, with a background in Textile Engineering), who works at the company, and offers a perspective that combines both technical and marketing viewpoints.

Metraco is a textile company specializing in the supply and distribution of raw materials for the fashion industry. By assuming an intermediary role in the value chain, it acts as a bridge between upstream production and downstream actors. This position allows the company to interact with both production processes and market demands, offering a suitable perspective for examining the impact of digital transformation on supply chain operations. The interview was conducted with Bedir Zidan, a Sales Executive in the R&D department, and provides both technical and commercial insights.

Zeynep Tosun represents the creative and design-focused segment of the industry as an independent fashion designer and founder of her own brand. The brand places a strong emphasis on craftsmanship, identity, and artistic direction, positioning itself within the high-value-added creative segment of the fashion value chain. As both a designer and an entrepreneur, Zeynep Tosun offers a unique perspective on how digital transformation intersects with creative processes and brand development. The interview was conducted directly with the designer.

Pietro Brunelli is an Italian fashion brand specializing in maternity wear, operating at both the design and brand levels. The company adopts a business model that integrates design, product development, and market positioning within a niche market segment. This structure provides a significant example for understanding downstream digital transformation. The interview was conducted with the company's founder and CEO, Pietro Brunelli, and provides strategic insights at the brand level.

To systematically present key information about the selected cases and interviewees, Table 4.1 summarizes each company's position in the value chain, its role in the industry, and the perspectives gained through the interviews.

Table 4.1 Overview of Case Study Companies and Interviewees

Company	Value Chain Position	Industry Role	Interviewee	Position	Perspective Provided
Lenzing Group	Upstream (Raw Materials)	Sustainable fiber production	Mert Canlı	Textile Engineer & Marketing & Branding Specialist	Technical, Production & Market Perspective
Metraco	Intermediary (Supply Chain)	Textile supply and sourcing	Bedir Zidan	Sales Executive (R&D)	Supply Chain & Commercial Perspective
Zeynep Tosun	Downstream (Design Stage)	Independent fashion designer brand	Zeynep Tosun	Founder & Designer	Creative & Entrepreneurial Perspective
Pietro Brunelli	Downstream (Brand Level)	Fashion brand (maternity wear)	Pietro Brunelli	Founder & CEO	Strategic & Market Perspective

Source: Author's own elaboration based on interview data and company sources

These cases were selected not to make a direct comparison across company sizes, but to offer various perspectives along the fashion value chain. Accordingly, firm size is considered a contextual factor influencing resource availability and digital capabilities, rather than a primary analytical dimension. Differences in size, market positioning, and organizational structure are therefore treated as background conditions that support interpretation across cases.

Overall, the sampling strategy is aligned with the objective of revealing diverse and context-specific insights into how digital transformation has shaped business model evolution in the fashion industry.

This diversity of perspectives obtained across the value chain supports the development of a more comprehensive understanding of how digital transformation influences business model evolution in different organizational contexts.

4.5 Data Analysis

The data collected through semi-structured interviews were analyzed using a thematic analysis approach. Thematic analysis is a widely used method in qualitative research for identifying, analyzing, and interpreting patterns of meaning within the data (Braun & Clarke, 2006; Bryman, 2016). This method was chosen because it allows for the systematic yet flexible analysis of complex and context-dependent phenomena such as digital transformation.

The analysis process was conducted using an iterative and interpretive approach. In the first phase, all interview transcripts were carefully reviewed multiple times to gain familiarity with the data. This phase is of critical importance in qualitative research as it ensures the researcher deeply understands the data before proceeding to the coding process (Braun & Clarke, 2006).

Following this stage, the open coding process was carried out. Data fragments were examined and grouped based on shared meanings and their relationships with the research objectives. Rather than applying a predefined coding scheme, the process was kept flexible, allowing the data to guide the identification of relevant concepts (Bryman, 2016).

The coding process incorporates both inductive and deductive elements. On the one hand, some codes were developed based on the theoretical framework established through the literature review—particularly the concepts of digital transformation, value chain dynamics, and business model evolution. On the other hand, new codes reflecting participants' experiences, interpretations, and insights were derived directly from the empirical data.

In the subsequent stage, the initially created codes were reviewed and refined to reveal broader patterns. Related codes were grouped under higher-level categories, and core themes were developed based on these categories. The process of transitioning from codes to themes is a fundamental component of thematic analysis and supports the meaningful interpretation of qualitative data (Braun & Clarke, 2006).

The development of themes was guided by both the research questions and the structure of the fashion value chain, allowing the analysis to remain closely aligned with the study's central analytical lens. This approach allowed for an examination of how digital transformation differs among upstream, intermediary, and downstream actors, while also identifying common patterns across the cases.

Thematic analysis also facilitated cross-case comparisons and supported the identification of similarities and differences among the selected companies. This aligns with the multiple case study approach and underscores the importance of cross-case comparison for generating analytical insights (Yin, 2018).

To enhance analytical rigor, the coding and theme development process was conducted iteratively; continuous comparisons were made between data fragments and the emerging themes. The researcher took care to conduct the analysis as data-driven as possible, being mindful of the potential impact of subjective interpretations. This approach ensures traceability between the empirical data and the findings presented in the study.

Overall, this analytical approach allowed for a structured and in-depth interpretation of the data and provided a solid foundation for the findings presented in the following section. The themes identified were used as the key elements determining the structure of the findings section.

4.6 Analytical Framework and Key Factors

To ensure that the analysis is conducted in a structured and theoretically grounded manner, a set of fundamental analytical factors has been identified to guide the interpretation of empirical data. While thematic analysis enables the identification of patterns emerging from the interviews, these factors provide an analytical framework that facilitates the systematic organization of findings and the comparison of cases.

This approach aligns with previous studies that treat digital transformation as a multidimensional process affecting value creation, organizational processes, and business models (Vial, 2019; Verhoef et al., 2021). Rather than focusing solely on technological adoption, this perspective emphasizes the broader organizational impacts of digital transformation.

The selection of analytical factors is grounded in both the research questions and the theoretical framework developed in Chapter 2. Together, these dimensions form an analytical framework that enables a systematic interpretation of how digital transformation unfolds across different organizational contexts.

First, the analysis examines each company's position within the fashion value chain. This focus is grounded in the approach that digital transformation does not affect firms homogeneously but rather reshapes specific activities within the value creation process (Porter, 1985; Verhoef et al., 2021). The fact that the selected cases cover different stages from raw material production to design and the final product allows for an examination of how digital transformation manifests itself at various stages of value creation.

Second, the analysis focuses on the role of digital technologies in organizational processes. In this context, the types of technologies adopted, their areas of application, and their effects on operational and strategic activities are examined. This dimension aligns with the literature highlighting the role of digital technologies in restructuring operational capabilities and decision-making processes (Bharadwaj et al., 2013; Vial, 2019).

Third, the study examines the impact of digital transformation on business model configurations. In this context, changes in value creation, value delivery, and value capture mechanisms, as well as transformations in customer interaction and distribution channels, are

addressed. This approach is parallel to studies that treat digital transformation as a fundamental driver of business model innovation (Teece, 2010; Zott & Amit, 2017).

Finally, the analysis evaluates the perceived benefits and challenges associated with digital transformation. This dimension encompasses both the opportunities provided by digital technologies and the constraints faced by organizations, aligning with the literature that highlights both the enabling and constraining effects of digital transformation (Vial, 2019).

Importantly, these core factors are directly aligned with the research questions and ensure that the analysis remains focused and consistent. At the same time, they allow for a structured comparison across cases while maintaining sensitivity to firm-specific dynamics. These factors form the basis for organizing the findings presented in the next chapter.

Table 4.2 Analytical Framework and Key Factors

Analytical Dimension	Description	Link to Literature	Relevance to Study
Value Chain Position	Identifies the stage of the fashion value chain in which each firm operates (e.g., raw material, production, design, retail)	Porter (1985); Verhoef et al. (2021)	Enables analysis of how digital transformation differs across value chain stages
Digital Technologies & Processes	Examines the types of digital technologies adopted and their role in operational and strategic processes	Bharadwaj et al. (2013); Vial (2019)	Helps understand how digital tools reshape organizational activities
Business Model Transformation	Analyzes changes in value creation, delivery, and capture mechanisms	Teece (2010); Zott & Amit (2017)	Explores how digital transformation affects business models
Benefits & Challenges	Identifies perceived advantages and barriers related to digital transformation	Vial (2019)	Provides insight into opportunities and constraints experienced by firms

Source: Author's own elaboration based on Porter (1985), Bharadwaj et al. (2013), Teece (2010), Zott & Amit (2017), Vial (2019), and Verhoef et al. (2021).

The table above summarizes the analytical framework used in this study and illustrates how each dimension is grounded in existing literature while directly supporting the empirical analysis of digital transformation and business model evolution across the fashion value chain.

4.7 Chapter Conclusion

This chapter has outlined the methodological framework adopted to investigate how digital transformation influences business model evolution in the fashion industry. A qualitative and exploratory research design was employed, supported by a multiple case study approach, to capture the complexity and context-dependent nature of digital transformation processes.

The study was grounded in an interpretivist perspective, enabling an in-depth understanding of managerial perceptions and organizational practices. Primary data were collected through semi-structured interviews with industry professionals operating at different stages of the fashion value chain, ensuring both depth and contextual diversity. These data were complemented by secondary sources to enhance the validity and robustness of the analysis through data triangulation.

The analytical process was based on thematic analysis, combining inductive and deductive coding approaches. This allowed for the identification of patterns emerging from the empirical data while maintaining alignment with the theoretical framework developed in earlier chapters. Furthermore, the use of a structured analytical framework ensured consistency in interpreting the findings and enabled systematic cross-case comparison.

Overall, the chosen methodology provides a rigorous and context-sensitive foundation for examining digital transformation as a multidimensional and organization-specific phenomenon. The following chapter builds on this methodological approach by presenting the empirical findings and analyzing how digital transformation manifests across different stages of the fashion value chain.

Chapter 5: Findings and Case Study Analysis

To provide an overview of the empirical context, Table 5.1 summarizes the key characteristics of the case companies, including their position within the value chain, the timing of digital transformation initiatives, firm size, number of employees, market scope, and key digital technologies adopted. This overview facilitates a clearer understanding of the cases prior to the presentation of the findings and supports the comparative analysis across different value chain positions.

Table 5.1 Overview of Case Companies

Company	Value Chain Position	Digital Transformation Initiation	Firm Size	Number of Employees	Market Scope	Key Digital Technologies
Lenzing	Upstream	Early 2010s	Large	~8,000+	Global	Blockchain, Traceability Systems
Metraco	Intermediary	Mid-2010s	Medium-sized	~350	Europe / B2B	ERP, PLM
Zeynep Tosun	Downstream	Late 2010s	Small	12	Global (Online)	AI, Social Media, E-commerce
Pietro Brunelli	Downstream	COVID-19 acceleration	Medium-sized	~3,000	Global (Online)	Shopify, AI Marketing Tools

Source: Author's own elaboration based on interview data

5.1 Digital Transformation Across the Value Chain

This section examines how digital transformation manifests itself at different stages of the fashion value chain and how its effects vary depending on firms' positions within the industry.

Rather than emerging as a uniform process, digital transformation appears as a context-dependent phenomenon that reshapes value creation and organizational practices in different ways along the value chain.

The findings indicate that the role and effects of digital transformation differ significantly among upstream, intermediary, and downstream actors. While upstream firms focus more on transparency, traceability, and supply chain coordination, downstream actors are oriented toward customer interaction, brand management, and market-oriented innovations. Intermediary actors, however, occupy a hybrid position, where digital transformation supports both operational efficiency and relational coordination throughout the supply chain.

While value chain position constitutes the primary analytical lens of this study, the findings also indicate that organizational scale and resource availability indirectly shape how digital transformation is implemented across cases. This suggests that although transformation logics are primarily structured by value chain position, their depth and scope are conditioned by firm-specific capabilities. More specifically, the findings show that digital transformation reshapes value creation, value delivery, and value capture mechanisms in stage-specific ways rather than uniformly across firms.

Structuring the analysis along the value chain reveals that digital technologies reorganize specific activities rather than transforming organizations in a uniform manner, and in doing so generate differentiated patterns of business model evolution across the fashion ecosystem. This perspective allows for a more precise understanding of how business model evolution is embedded within value chain–specific dynamics.

Accordingly, the following subsections present the findings according to value chain stages; the analysis progresses from upstream activities toward downstream, customer-focused segments.

5.1.1 Digital Transformation in Upstream Activities: Emphasis on Control, Verification, and Traceability (Lenzing)

The findings indicate that digital transformation in the upstream phase of the fashion value chain manifests in a fundamentally different way compared to downstream, or consumer-focused, segments. In the case of Lenzing, digital transformation is geared toward enhancing supply chain transparency, traceability, and data reliability, rather than customer experience or market engagement. This suggests that digital transformation at the upstream level is primarily oriented toward control and verification rather than market-facing innovation.

As a global fiber producer, Lenzing operates at the beginning of the value chain, supplying raw materials to intermediate actors such as yarn producers and manufacturers. Although the company does not interact directly with end consumers, the findings indicate that digital transformation creates an indirect impact on downstream activities. Through traceability systems and certification mechanisms, it actively engages with brand companies and shapes their requirements regarding sustainability and transparency. This indicates that the value chain is evolving from isolated stages toward more integrated and data-driven value networks. Furthermore, Lenzing's extensive customer network, which encompasses thousands of actors across various stages of the value chain, further increases the need for traceability and digital coordination.

In this context, a fundamental aspect of digital transformation is the development of traceability systems and digital platforms that enable the verification of product origin and sustainability claims. The company's proprietary Lenzing Pro platform functions as a digital infrastructure managing certification and licensing processes, enabling brands to access verified documents and ensure compliance with sustainability standards. As emphasized by the interviewee: *"Digital transformation in our company mainly relates to transparency and traceability. These are the most important aspects."* (Interviewee, Mert Canlı, Lenzing). This statement clearly

indicates that digital transformation at the upstream level is primarily centered on visibility and verification rather than customer-facing innovation.

In addition, blockchain-based solutions such as TextileGenesis offer a new level of transparency by enabling traceability throughout the supply chain via digital tokens ("fiber coins") assigned to raw materials. As further explained in the interview: *"For each bale of fiber, we create a digital identity called a fiber coin… This system enables traceability from the fiber stage to the final garment."* (Interviewee, Mert Canlı, Lenzing). This demonstrates how digital technologies extend traceability across the entire value chain, transforming upstream activities into data-driven verification systems.

These findings indicate that digital transformation has a stronger impact on coordination, traceability, and certification processes than on production activities, suggesting that its effects are unevenly distributed across operational areas. From a Dynamic Capabilities perspective, these practices demonstrate firms' ability to reconfigure resources and adapt to increasing demands for transparency (Teece, 2007).

Beyond traceability, the findings reveal a shift toward a broader verification-based value system within the fashion industry. Brands are increasingly demanding formal verification mechanisms, such as certification and licensing, to support their sustainability claims; this reflects a transition from voluntary transparency to mandatory proof. This shift toward proof-based value creation is directly reflected in the interview: *"Brands want to verify claims… they require certificates or licenses as proof."* (Interviewee, Mert Canlı, Lenzing). Accordingly, digital transformation strengthens the role of upstream actors as providers of verifiable trust rather than merely raw materials.

In this context, Lenzing's digital systems not only support operational processes but also function as mechanisms that build trust and reliability throughout the value chain. Certification

and licensing systems emerge not only as value-added services but also as governance tools that enable brands to exert control over producers and ensure compliance with sustainability standards. In this configuration, value capture is reinforced through certification-based differentiation, long-term B2B dependencies, and the ability to embed verification infrastructures into client operations.

From a business model perspective, the findings indicate that digital transformation enables a shift from product-based value creation to a hybrid model where physical products and digital services converge. Certification, licensing, and traceability systems stand out as value-added services that not only enhance product reliability but also strengthen competitive positioning. This transformation is explicitly articulated by the interviewee: *"The services we provide, such as certification and licensing, add value to our products."* (Interviewee, Mert Canlı, Lenzing). This highlights that digital transformation expands value creation mechanisms by embedding services into the product offering, supporting a hybrid product–service business model.

In this sense, digital transformation contributes to business model innovation by expanding value-creation mechanisms and, particularly in B2B relationships, by strengthening customer lock-in effects. This reflects the increasing role of digitally embedded services in strengthening competitive differentiation and long-term client relationships. Furthermore, digital transformation extends to customer relationship management through tools such as CRM systems, enabling the tracking and coordination of interactions with numerous stakeholders across the value chain.

However, the findings also reveal that the implementation of digital transformation involves various challenges. While digital systems enhance transparency and trust, their effectiveness depends on coordination among the actors throughout the supply chain. One of the key challenges highlighted in the interviews is the disparity in digital maturity levels, particularly among manufacturing firms, which acts as a barrier to full integration. As noted in the interview:

"Manufacturers… have lower levels of digital maturity… they require continuous guidance." (Interviewee, Mert Canlı, Lenzing). This indicates that digital transformation at the upstream level is constrained by the capabilities of other actors within the value chain.

Additionally, factors such as data privacy, regulatory complexity, and resistance to organizational change further complicate the transformation process. Interestingly, the findings suggest that smaller firms may demonstrate greater flexibility in adapting to digital transformation, whereas larger organizations may face higher levels of resistance due to structural complexity. This highlights that digital transformation is shaped not only by technological factors but also by organizational and structural conditions.

Lenzing's position, particularly in production hubs like Turkey, also demonstrates that it assumes an intermediary role through digitally supported coordination mechanisms between global brands and local producers.

Finally, the findings highlight the tension between sustainability as a marketing narrative and as a verifiable practice. While sustainability is increasingly used as a storytelling tool in the fashion industry, Lenzing positions itself as an actor offering measurable and verifiable sustainability solutions. This distinction is explicitly emphasized by the interviewee: *"Sustainability is often used as a narrative… companies need to genuinely implement it rather than using it superficially."* (Interviewee, Mert Canlı, Lenzing). This reinforces the role of digital transformation in shifting sustainability from symbolic communication to measurable and verifiable practice. This distinction strengthens the company's role as one of the key providers of reliable sustainability within the fashion ecosystem.

Overall, the Lenzing example demonstrates that digital transformation at the upstream level is primarily driven by the need for control, verification, and coordination within increasingly complex global supply chains. Rather than focusing on consumer engagement, upstream

companies are using digital technologies to build trust, ensure traceability, and position themselves as critical providers of trust and sustainability within the fashion ecosystem.

5.1.2 Digital Transformation in Intermediary Activities: Integration, Coordination, and Operational Efficiency (Metraco)

The findings indicate that digital transformation among intermediary actors is primarily driven by the need to manage operational complexity and ensure coordination across multiple, interdependent production stages. While digital transformation in upstream firms is more focused on traceability and transparency, intermediary firms such as Metraco focus on integrating fragmented processes and synchronizing cross-departmental information flow.

As a vertically integrated ready-to-wear manufacturer, Metraco operates across many stages of the value chain, including fabric processing, cutting, sewing, and finishing. This structure creates a high level of operational complexity, as it requires the simultaneous management of numerous product variations, materials, and production steps. In this context, digital transformation is primarily implemented through enterprise systems—particularly ERP solutions like Santis. These systems provide end-to-end visibility into production processes, enhancing predictability; they enable companies to anticipate delays in advance, engage in proactive communication with customers, and minimize potential disruptions in production plans.

The findings indicate that the integration of ERP systems with production technologies, such as automated cutting and sewing machines, represents a significant step toward Industry 4.0 applications. This integration enables real-time monitoring of production activities, improves capacity planning, and supports data-driven decision-making regarding orders and delivery schedules.

A key insight emerging from the data pertains to the transformation of information management processes. Prior to the adoption of digital systems, production coordination relied heavily on fragmented communication channels such as email, which increased the risk of miscommunication, delays, and production errors. As described by the interviewee: *"Before having this kind of system… this is total chaos, really total chaos."* (Interviewee, Bedir Zidan, Metraco). This statement clearly illustrates the limitations of pre-digital coordination mechanisms and the operational risks associated with fragmented communication structures.

With the implementation of Product Lifecycle Management (PLM) systems and integrated ERP platforms, this "information chaos" has been significantly reduced. This structure, which enables all departments to access the same up-to-date data source, eliminates inconsistencies arising from fragmented communication by enabling a "single source of truth" approach. This transformation is also explicitly reflected in the interview: *"Everything is digitalized… all departments work based on the same data… using only one source."* (Interviewee, Bedir Zidan, Metraco). This highlights how digital systems restructure value delivery by ensuring consistency, synchronization, and real-time visibility across departments.

In this context, mid-level digital transformation can be interpreted as a shift from human-centric, fragmented coordination to system-based, data-driven control. This transformation reduces the reliance on human memory and attention, thereby lowering the risk of errors. Given that even minor errors can lead to significant financial losses and reputational damage, particularly in high-volume production environments, this transition is of critical importance. Consequently, digital transformation strengthens not only efficiency but also organizational reliability and risk management. As emphasized by the interviewee: *"Minimizing the errors… is the most profitable thing you can do."* (Interviewee, Bedir Zidan, Metraco). This demonstrates that business model improvements at the intermediary level are closely linked to error reduction, cost control, and operational precision rather than radical innovation.

Beyond internal operations, digital transformation also impacts relationships with international brands. Digital systems enable greater transparency, faster response times, and more effective coordination; this creates a critical advantage in global supply chains characterized by tight delivery schedules and high-quality standards. Furthermore, digital transformation often emerges not merely as an internal preference, but as a requirement imposed by international brand customers seeking greater speed, transparency, and reliability. This external pressure is also reflected in the interview: *"Brands expect fast communication and transparency… otherwise it becomes very difficult to work with them."* (Interviewee, Bedir Zidan, Metraco). This indicates that digital transformation at the intermediary level is not only internally driven but also shaped by the expectations of global supply chain partners.

Furthermore, technologies such as AI-powered CRM systems are increasingly being utilized in customer acquisition, communication, and market expansion processes; by reducing the cost and duration of traditional methods like international travel and trade shows, they are transforming companies' commercial operations. This indicates that mid-level digital transformation is not limited to production processes but is also extending to strategic and commercial functions.

From a business model perspective, the findings point more toward an incremental transformation. Rather than radically altering the fundamental logic of the business model, digital technologies make the implementation of the existing structure more efficient, flexible, and rapid. This suggests that business model change at the intermediary level occurs through process optimization and capability enhancement rather than structural reconfiguration.

However, the digital transformation process also brings significant challenges. One of the most critical obstacles is the integration of digital systems into existing organizational routines. In particular, resistance to change among long-tenured employees and intergenerational differences in technological proficiency make it difficult to adopt new systems. As noted in the

interview: *"Some employees resist new systems… especially those who are used to traditional ways of working."* (Interviewee, Bedir Zidan, Metraco). This highlights that digital transformation is not purely technological but also deeply organizational and human-centered.

Furthermore, concerns regarding data security and the reliability of external software providers pose significant risks, particularly given the strategic value of customer and production data. These challenges demonstrate that digital transformation is not merely technological but also an organizational and cultural transformation requiring multi-dimensional adaptation.

Overall, the Metraco example reveals that digital transformation at the intermediate level primarily focuses on process integration, operational control, and managing complexity. It also highlights the role of intermediary firms as coordinators that connect different stages of the value chain through digitally enabled systems. These findings also reflect dynamic capabilities, particularly the firm's ability to integrate and reconfigure internal processes in response to operational complexity. Compared to upstream and downstream actors, mid-tier firms use digital technologies both to coordinate their internal operations and to meet the expectations of global supply chain partners, thereby assuming a critical connector role within the fashion value chain.

5.1.3 Digital Transformation in Downstream Activities: Market Orientation, Data, and Creative Processes (Zeynep Tosun)

The findings reveal that digital transformation in the downstream phase of the fashion value chain is primarily driven by changes in customer engagement, market access, and brand positioning. While digital transformation in upstream and intermediate actors is primarily associated with operational efficiency and process integration, in downstream firms such as the

Zeynep Tosun brand, the transformation is more market-oriented, reshaping how value is created, delivered, and captured.

One of the key findings emerging from the data is that digitalization enables the elimination of intermediaries (disintermediation) and platform-based market access. Before the widespread adoption of digital technologies, brands were largely dependent on intermediaries such as showrooms and distributors for access to international markets. As expressed by the interviewee: *"Previously, we were dependent on intermediaries such as wholesale showrooms… With digitalization, we have been able to eliminate many of these intermediaries."* (Interviewee, Zeynep Tosun). This statement clearly illustrates how digital transformation reshapes value delivery by reducing dependence on traditional gatekeepers and enabling direct market access. These intermediaries significantly shaped both market access and design decisions, thereby limiting the brand's creative freedom. With the rise of digital platforms, e-commerce, and social media, the brand has increasingly shifted toward direct-to-consumer (DTC) sales channels and reduced its reliance on traditional intermediaries. As further emphasized: *"We can now sell directly to customers worldwide."* (Interviewee, Zeynep Tosun). This indicates that digital transformation enables firms to internalize distribution channels and directly access global markets.

By internalizing distribution channels, the brand increases control over pricing, customer data, and margin structures, thereby directly reshaping its value capture mechanisms. This shift strengthens firms' ability to control both customer relationships and revenue structures.

Additionally, digital platforms have made it possible for small-scale designers to access distant markets such as Australia, Japan, and China.

Beyond disintermediation, the findings point to the growing importance of data as a strategic resource. Data emerges as a central element shaping decision-making processes and market

strategies. This shift toward data-driven decision-making is explicitly reflected in the interview: *"We can now track what customers view, what they purchase, and why certain products perform better than others."* (Interviewee, Zeynep Tosun). This indicates a transition from intuition-based decision-making toward data-supported strategic processes.

However, this transformation does not eliminate creative intuition; rather, it gives rise to a hybrid decision-making model where data and creativity coexist. As implied in the interview, data complements rather than replaces creative judgment, supporting a hybrid logic of decision-making.

Digital transformation is also significantly reshaping marketing and communication processes. AI-powered tools used in advertising, content creation, and customer targeting processes optimize a brand's global reach while reducing operational costs. As described by the interviewee: *"Instead of traditional photoshoots, we use AI to digitally dress models… photoshoots can cost between $5,000 and $10,000."* (Interviewee, Zeynep Tosun). This demonstrates how artificial intelligence significantly reduces content production costs while increasing flexibility and speed in marketing processes.

In particular, algorithm-based targeting systems enhance the effectiveness of digital marketing activities by enabling precise audience segmentation and automated campaign management. This suggests that visibility and market access are increasingly shaped by platform logics and data-driven targeting mechanisms.

Additionally, the use of artificial intelligence in areas such as digital photography and video production has made content creation more flexible and scalable. By eliminating the high costs associated with traditional shoots, these tools enable rapid adaptation during the season and are fundamentally transforming how brands reach consumers.

At the production level, digital transformation is evident, particularly through the digitization of patternmaking and workflow processes. The shift from manual processes to digital pattern development has increased efficiency, reduced physical constraints, and enabled remote collaboration. However, findings indicate that the impact of digital transformation on the design process itself remains limited. While technologies such as 3D design and AI-assisted fashion production have emerged, commercial viability requirements and the importance of craftsmanship limit the use of these technologies. This situation demonstrates that digital transformation operates within certain boundaries in creative contexts rather than fully replacing human expertise.

In this context, the tension between digitalization and craftsmanship is one of the study's key findings. Digital transformation coexists with and complements traditional production methods rather than eliminating them. This tension is clearly articulated in the interview: *"Our brand focuses on craftsmanship… we produce items that machines cannot replicate."* (Interviewee, Zeynep Tosun). This highlights that digital transformation in downstream contexts does not replace artisanal value creation, but rather coexists with it, reinforcing differentiation through craftsmanship.

The brand consciously emphasizes elements such as handcrafted work, embroidery, and intricate craftsmanship as tools for competitive differentiation. This points to a hybrid value creation model where digital tools enhance efficiency and market access, yet craftsmanship retains its central role in brand identity and perceived value. In this configuration, digital scalability and artisanal differentiation coexist, enabling firms to combine efficiency-driven value delivery with scarcity-based value capture.

However, the digital transformation process also brings various challenges. One of the most significant challenges relates to the human factor; specifically, digital literacy and effective communication skills have become critical. As noted in the interview: *"Even when using AI,*

the way you communicate with the system is very important… otherwise mistakes can happen." (Interviewee, Zeynep Tosun). This indicates that digital transformation remains dependent on human capabilities and interpretive skills, reinforcing its organizational and human-centered nature.

Even advanced technologies such as artificial intelligence require human oversight, and errors in communication or interpretation can lead to operational and financial risks. The fact that language errors can result in serious financial consequences, particularly in international contexts, underscores the importance of human control. Additionally, the rapid pace of technological change creates pressure on companies to continuously adapt and invest in new tools. Furthermore, the accessibility of digital tools lowers barriers to market entry, intensifying competition and enabling more actors to compete in global markets. These challenges demonstrate that digital transformation is not merely a technological process but also an organizational and human-centered one.

Overall, the example of Zeynep Tosun demonstrates that digital transformation at the downstream level is characterized by disintermediation, data-driven decision-making, and algorithmically enhanced market access. At the same time, this transformation enables brands to move away from intermediary-dependent structures and evolve into more autonomous and globally connected actors within digital ecosystems. Furthermore, a hybrid model is emerging where digital technologies coexist with traditional craftsmanship, allowing firms to strike a balance between efficiency, scalability, and creative differentiation.

5.1.4 Digital Transformation in Downstream Activities: Platforms, Data, and Market Expansion (Pietro Brunelli)

The findings reveal how digital transformation at the downstream level has reshaped market access, customer engagement, and competitive dynamics, particularly for small and medium-sized fashion firms. In the case of Pietro Brunelli, digital transformation emerges as a gradual yet accelerated process that was initially limited to design and branding activities but gained momentum especially after the COVID-19 pandemic.

One of the key turning points highlighted in the findings is the rapid rise of e-commerce during the COVID-19 period. This process significantly altered consumer behavior, increasing trust in online shopping. As noted by the interviewee: *"The real transformation occurred during COVID-19… trust in e-commerce increased significantly."* (Interviewee, Pietro Brunelli). This statement highlights how external shocks can act as catalysts that accelerate digital adoption and reshape consumer behavior.

While physical retail previously dominated the Italian fashion market, the pandemic forced companies to rapidly invest in digital infrastructure, with direct-to-consumer (DTC) channels coming to the forefront. A notable finding is that although the share of digital channels in total revenue remains relatively limited, investments in these areas are disproportionately high. This suggests that firms perceive digital channels as strategically critical despite their currently limited contribution to revenue.

One of the key dimensions of this transformation is the role of digital platforms in enabling market access. The use of Shopify is seen as a critical strategic decision, as this platform significantly reduces the financial and technical barriers to establishing an online presence. As explained by the interviewee: *"Shopify enabled companies to start an online business with minimal costs… it significantly lowered the barriers to entry."* (Interviewee, Pietro Brunelli).

This demonstrates how platform-based infrastructures lower entry barriers and enable rapid participation in global markets.

Unlike traditional e-commerce solutions, platform-based models enable even small firms to rapidly enter global markets. In this sense, platforms like Shopify play a role in democratizing digital commerce by lowering entry barriers. This indicates that digital platforms function as enabling infrastructures that shape firms' access to markets and scalability potential.

In addition to platform-based transformation, the findings highlight the growing influence of artificial intelligence on marketing and customer engagement. Artificial intelligence is being extensively used in content creation, ad optimization, and customer personalization processes. As described in the interview: *"We generate multiple visual variations using AI and continuously test them… sometimes within 24 to 72 hours."* (Interviewee, Pietro Brunelli). This illustrates how AI enables real-time experimentation and continuous optimization, transforming marketing from static campaigns into dynamic, data-driven processes.

In particular, the real-time testing and optimization of marketing content represent a significant departure from traditional static campaign models. This creates a dynamic optimization process where strategic decisions are updated continuously based on performance data rather than at specific intervals. This suggests that marketing processes are increasingly becoming iterative, data-driven, and continuously adaptive

Another key aspect is the growing importance of hyper-personalization in customer interactions. Thanks to data and AI-driven segmentation tools, companies can tailor communications and product recommendations to specific customer needs—such as the different stages of pregnancy. This personalization logic is also reflected in the interview, where the respondent emphasized the importance of tailoring communication based on customer-

specific data. This indicates that customer engagement is increasingly shaped by data-driven personalization strategies and makes the customer experience more relevant and effective.

However, it is evident that the benefits derived from artificial intelligence are not distributed equally among companies. The effective use of AI requires access to large datasets and significant financial investment. As noted by the interviewee: *"AI requires large volumes of data and significant financial investment to perform effectively."* (Interviewee, Pietro Brunelli). This highlights the structural inequalities in digital transformation, where resource availability shapes firms' ability to leverage advanced technologies.

This situation allows larger firms with more resources to gain an advantage, while potentially limiting the competitive strength of smaller firms. This reflects structural differences in resource endowment, a key assumption of the Resource-Based View, where unequal access to strategic resources leads to differentiated competitive outcomes. In this context, digital transformation creates an accessibility-inequality paradox by lowering barriers to market entry on one hand, while raising the thresholds required for effective competition on the other.

The findings also highlight the limitations of digital transformation in certain operational areas. While digital tools are widely used in marketing, communication, and customer engagement, their use remains more limited in areas such as production planning and demand forecasting. This limitation is also reflected in the interview, where the respondent emphasized that data quality issues constrain the effectiveness of automated systems.

One of the main reasons for this is data quality issues. Inconsistent or unreliable data reduces the effectiveness of automated systems and leads to certain decisions still relying on manual processes. This situation demonstrates that digital transformation is not a linear or all-encompassing process; rather, it develops unevenly across different functions.

At the same time, digital transformation is expanding companies' access to global markets and enabling them to develop strategies tailored to different regions. Thanks to digital tools and AI-powered analytics, companies can identify customer segments, adapt their products, and enter new markets without resorting to costly methods such as physical expansion. Furthermore, AI tools are used not only in marketing but also in higher-level strategic decision-making processes such as market analysis, customer segmentation, and competitive positioning. These capabilities highlight firms' ability to adapt and reconfigure their strategies in response to market changes. This points to a more flexible and data-driven approach to internationalization.

The findings also indicate that content production is undergoing a transformation. Companies are now optimizing their digital content not only for human users but also for algorithms and AI-based search systems. As implied in the interview, visibility is increasingly shaped by algorithmic logic, requiring firms to adapt their content strategies accordingly. This reflects a shift toward algorithm-driven communication strategies, where visibility is increasingly determined by platform and algorithmic logic.

Overall, the case of Pietro Brunelli demonstrates that digital transformation at the downstream level is characterized by platform-based market access, AI-supported marketing optimization, and expanding global reach. More importantly, this transformation represents a shift toward data-driven strategic management; it enables companies to continuously adapt their operations, marketing activities, and positioning based on real-time insights. However, limitations and inequalities arising from factors such as data quality and resource availability also merit attention. These findings reveal that digital transformation has reshaped the strategic landscape for fashion firms by lowering entry barriers on one hand while intensifying competitive pressure on the other.

5.2 Digital Technologies and Organizational Processes Across the Value Chain

This section examines how digital technologies are applied at different stages of the fashion value chain and how they reshape organizational processes. Based on the case findings presented in the previous section, the analysis reveals both common patterns and significant differences regarding the role of digital technologies among upstream, intermediary, and downstream actors.

The findings indicate that the manner in which digital technologies are adopted and their functions are strongly tied to firms' positions within the value chain, and that this creates distinct transformation logics across the cases. This suggests that digital transformation unfolds through differentiated patterns rather than a uniform process across firms.

At the upstream level, digital technologies primarily function as mechanisms for control, verification, and coordination. Technologies such as blockchain and digital certification systems enable firms to ensure traceability, verify product origin, and support sustainability claims. In this context, data has become a strategic resource that facilitates the management of complex supply chains and the establishment of trust relationships with downstream actors. Digital transformation at the upstream level is therefore oriented toward transparency and trust-building rather than customer interaction or internal efficiency.

In contrast, intermediate actors adopt digital technologies to manage operational complexity and ensure process integration. Enterprise systems such as ERP and PLM play a central role in coordinating production activities, synchronizing information flows, and reducing interdepartmental errors. The findings indicate that digital transformation at this level is closely linked to the development of digital competencies that enhance operational control and reliability. In this context, digital technologies function as integrative mechanisms that reduce fragmentation and enable coordinated production processes.

At the downstream level, digital technologies are primarily focused on market interaction, customer experience, and data-driven decision-making processes. E-commerce platforms, digital marketing tools, and AI-based systems enable companies to engage directly with consumers, personalize communication, and expand into global markets. In particular, artificial intelligence supports the real-time optimization of marketing activities, content creation, and customer segmentation, enabling companies to continuously adapt to changing consumer preferences. This indicates that digital transformation at the downstream level is increasingly shaped by platform dynamics and data-driven market responsiveness.

A common finding across all cases is the increasing central role of data in organizational processes. Companies are shaping decision-making processes across various areas—from supply chain coordination to production planning and customer interaction—based on data. However, the value of data depends largely on its quality and usability. Data inconsistencies and integration gaps can limit the effectiveness of digital systems, demonstrating that data-driven transformation depends not only on technological investments but also on organizational alignment and interpretive capacity. This highlights that the effectiveness of digital transformation is conditioned by firms' ability to manage, interpret, and integrate data across different functions.

Overall, these patterns suggest that digital technologies operate as stage-contingent organizational enablers, shaping distinct process logics across the value chain rather than producing uniform digital maturity trajectories. Rather than transforming organizations in a uniform manner, digital technologies reorganize specific activities in ways that reflect firms' structural positions within the value chain.

5.3 Business Model Transformation

This section analyzes how digital transformation translates into differentiated patterns of business model evolution across the fashion value chain. Building on the previous findings, digital transformation is conceptualized not merely as a technological shift, but as a restructuring of firms' value creation, value delivery, and value capture mechanisms. Rather than producing a uniform transformation process, digital technologies generate context-dependent business model reconfigurations shaped by firms' structural positions and capability configurations.

The findings indicate that business model evolution varies systematically across upstream, intermediary, and downstream actors, reflecting distinct transformation logics embedded within each value chain position.

At the upstream level, digital transformation is primarily associated with the reconfiguration of value creation mechanisms. Firms such as Lenzing increasingly integrate traceability systems, certification platforms, and data-driven verification services into their offerings. This reflects a shift toward servitization, where competitive advantage derives not only from material production but also from data-enabled transparency and compliance infrastructures. From a Resource-Based View perspective, proprietary datasets, traceability systems, and verification capabilities function as strategic assets that are difficult to imitate. Simultaneously, Dynamic Capabilities are reflected in firms' ability to sense regulatory pressures, seize sustainability-related opportunities, and reconfigure their business models toward hybrid product–service architectures. Value capture mechanisms evolve accordingly, as firms leverage digital transparency to justify premium pricing and strengthen long-term B2B relationships.

At the intermediary level, business model transformation is more incremental and primarily centered on value delivery optimization. Rather than radically altering revenue structures,

digital technologies such as ERP and PLM systems enhance coordination, reduce operational errors, and increase production flexibility. In this context, digital transformation reinforces efficiency and integration within existing business models. The transformation logic here reflects capability deepening rather than business model substitution. From an RBV perspective, operational integration systems and process know-how represent firm-specific capabilities, while Dynamic Capabilities manifest in continuous process adaptation under volatile demand conditions. Business model evolution at this stage therefore occurs through refinement and recombination rather than structural disruption.

In contrast, downstream firms exhibit more pronounced transformations across all three dimensions of the business model. Digital technologies enable disintermediation and platform participation, thereby reshaping value delivery mechanisms through direct-to-consumer channels, omnichannel integration, and global digital reach. Simultaneously, value creation becomes increasingly data-driven, as firms utilize customer analytics, algorithmic recommendation systems, and AI-supported design processes. Most significantly, value capture mechanisms are redefined through subscription models, dynamic pricing strategies, platform monetization, and data-enabled personalization. These shifts illustrate how digital transformation in downstream contexts often results in more visible and market-facing business model reconfigurations.

However, the findings also reveal asymmetries in access to digital resources. Firms with greater data accumulation capacity and stronger technological infrastructures are better positioned to experiment with new revenue models and platform-based strategies. This observation reinforces the relevance of RBV in explaining heterogeneous business model outcomes. At the same time, successful transformation depends not only on resource ownership but also on the ability to continuously reconfigure those resources under shifting market conditions, highlighting the importance of Dynamic Capabilities.

Importantly, digital transformation does not lead to the complete replacement of traditional business models. Instead, many firms adopt hybrid business model configurations, where digital technologies complement rather than eliminate established practices. Craftsmanship, brand identity, and human creativity remain central components of value creation, particularly in design-driven segments. Accordingly, business model evolution in the fashion industry is best understood as a process of recombination, where digital and traditional elements coexist within adaptive organizational structures.

Taken together, the cross-case evidence demonstrates that digital transformation conditions business model evolution through value chain position rather than firm size alone. Upstream actors institutionalize verification-based value creation and lock-in-oriented value capture; intermediary firms reinforce efficiency-driven delivery logics while protecting margins; downstream firms reconfigure all three dimensions through platform participation, data centrality, and disintermediation. These findings confirm that business model evolution under digital transformation is structurally embedded in value chain dynamics and mediated by firms' capacity to mobilize digital resources within their specific positional constraints.

5.4 Benefits and Challenges of Digital Transformation

This section examines the key benefits and challenges associated with digital transformation across the fashion value chain. The findings indicate that these elements are not independent outcomes; rather, digital transformation operates as a dual process that simultaneously creates opportunities and introduces new constraints. This suggests that digital transformation should be understood as a process that simultaneously enables and constrains organizational change.

One of the most significant benefits across all cases is the increased transparency and traceability, particularly at the upstream level. Digital technologies such as blockchain and

certification platforms enable companies to track raw materials throughout the supply chain and verify product origin. This not only enhances operational control but also strengthens trust—a critical factor in fragmented global value chains. In this context, digital transformation contributes to the emergence of verification-based value systems, where trust is established through data rather than assumptions.

Another key benefit is the increase in operational efficiency and process integration. At the intermediary level, digital systems such as ERP and PLM facilitate the coordination of complex production processes, reduce errors, and enhance cross-departmental consistency. This indicates that digital transformation improves organizational reliability by reducing operational fragmentation and human error.

At the downstream level, digital transformation facilitates expanded market access and deeper customer engagement. E-commerce platforms and digital marketing tools enable companies to reach global markets and establish direct relationships with consumers. Artificial intelligence further enhances this process through real-time optimization, personalized communication, and data-driven targeting strategies. This shows that digital transformation increases firms' ability to respond dynamically to changing customer preferences.

Another common benefit across the entire value chain is that data has become a central organizational resource. Companies are increasingly shaping their strategic and operational decisions based on data. However, the findings point to a significant paradox: despite the increasing volume of data, issues related to data quality, integration, and interpretation limit its effective use. This "data paradox" indicates that the value of digital transformation depends not only on data availability but also on firms' ability to interpret and utilize that data effectively.

Despite these benefits, the findings also highlight significant challenges. The first is resistance to organizational change. Since the adoption of digital technologies requires changes in existing

work practices, skills, and mindsets, it can lead to friction within the organization. This highlights that digital transformation is not only a technological process but also a deeply organizational one.

Another significant challenge is the disparity in digital maturity among actors within the value chain. The fact that companies possess varying levels of technological capability complicates system integration and limits the effectiveness of digital solutions, particularly in multi-stakeholder supply chains.

The findings also point to issues related to data governance. Topics such as data privacy, cybersecurity, and regulatory compliance are becoming increasingly critical alongside companies' growing reliance on digital infrastructure.

One of the most significant insights emerging from the analysis is the tension between democratization and inequality. While digital platforms lower entry barriers and facilitate small firms' access to global markets, advanced technologies like artificial intelligence—which require significant financial resources and big data—can reinforce large firms' competitive advantage. This demonstrates that digital transformation is a process that simultaneously increases accessibility while deepening competitive inequalities.

In this sense, organizational scale emerges not as a primary explanatory variable, but as a contextual condition that shapes firms' ability to benefit from increasingly advanced digital technologies.

Finally, the findings reveal that digital transformation is an unequal and incomplete process. While areas such as marketing and customer interaction are highly digitized, fields like production planning and design still rely heavily on human expertise. This situation leads to the emergence of hybrid organizational structures where digital and traditional practices coexist.

Overall, the findings suggest that digital transformation should not be viewed solely as a positive or disruptive phenomenon; rather, it is a complex and multidimensional process that encompasses both opportunities and constraints. The impact of this process is shaped by the alignment between technological investments, organizational capabilities, and the broader ecosystem in which firms operate.

In this respect, organizational scale operates as a conditioning variable rather than a primary explanatory lens, influencing the depth and sophistication of digital deployment without determining the fundamental transformation logic shaped by value chain position.

5.5 Chapter Conclusion

This chapter has presented the empirical findings of the study by examining how digital transformation shapes business model evolution across different stages of the fashion value chain. Drawing on the case studies of Lenzing, Metraco, Zeynep Tosun, and Pietro Brunelli, the analysis demonstrates that digital transformation does not unfold as a uniform or standardized process. Instead, it emerges as a structurally differentiated phenomenon, shaped primarily by firms' positions within the value chain and, secondarily, by their organizational capabilities and resource configurations.

The findings reveal that digital transformation follows distinct logics across upstream, intermediary, and downstream activities. In upstream contexts, transformation is primarily oriented toward control, verification, and traceability, as firms respond to increasing pressures for transparency and sustainability compliance. In intermediary activities, digital transformation is mainly associated with process integration, operational coordination, and efficiency enhancement, enabling firms to manage complex and fragmented production systems. In downstream contexts, transformation is more strongly market-oriented, reshaping

customer engagement, digital communication, market access, and data-driven decision-making processes.

At the same time, the findings demonstrate that digital transformation influences not only organizational processes but also the structure of business models. Across the cases, digital technologies reconfigure value creation, value delivery, and value capture in different ways. Upstream firms increasingly combine physical products with digital verification services; intermediary firms strengthen existing business models through efficiency-driven process optimization; and downstream firms adopt more visible market-facing transformations through disintermediation, platform participation, personalization, and direct-to-consumer strategies. These patterns indicate that business model evolution under digital transformation is embedded in value chain–specific dynamics rather than following a single pathway.

The chapter also highlights that digital transformation generates both opportunities and constraints. While digital technologies enhance efficiency, transparency, responsiveness, and global market access, they also create new dependencies on digital platforms, expose firms to data-related risks, and intensify the need for continuous organizational adaptation. In this sense, digital transformation appears not simply as a technological upgrade, but as a multidimensional process that simultaneously enables and constrains strategic action.

Overall, the findings provide strong empirical support for the central argument of this thesis: digital transformation in the fashion industry is best understood as a context-dependent and value chain–specific process that drives differentiated forms of business model evolution. The following chapter builds on these findings by discussing their theoretical contributions, managerial implications, and broader significance for the literature on digital transformation and business models.

Chapter 6: Conclusion

6.1 Discussion of Findings

The findings of this study challenge the widespread assumption that digital transformation in the fashion industry is a homogeneous or purely technological process, offering a more nuanced and context-sensitive understanding of this phenomenon. Digital transformation emerges not as a standard organizational change process, but as a structurally differentiated phenomenon shaped by firms' positions within the value chain. While previous studies have primarily addressed digital transformation at the firm level (Vial, 2019; Verhoef et al., 2021), this research demonstrates that the meaning, drivers, and outcomes of transformation vary significantly among upstream, midstream, and downstream actors.

An important insight emerging from the findings is that digital transformation in the fashion industry has evolved from a strategic choice into a structural necessity. Firms are turning to digital technologies not out of choice, but due to increasing supply chain complexity, rising transparency requirements, and intensifying competitive pressures. In this context, digital transformation functions not as an innovation-driven initiative but as a fundamental prerequisite for operational and competitive sustainability.

However, this necessity does not create a homogeneous transformation process. On the contrary, digital transformation proceeds with different logics along the value chain. At the upstream level, as seen in the Lenzing example, the transformation is focused on control, traceability, and verification. Blockchain and digital certification systems enable transparency and coordination. Intermediaries (such as Metraco) play a bridging role between production and market demands by using digital tools to enhance integration and responsiveness. At the downstream level, digital transformation is closely linked to customer engagement, brand management, and operational efficiency. While Zeynep Tosun's AI-powered content production

reflects a cost- and speed-focused approach, Pietro Brunelli is integrating digital channels into an evolving business model. These findings indicate that digital transformation should be viewed not as a singular organizational change but as a set of processes specific to value chain stages.

Another critical insight emerging from the study is the growing dependence on digital systems and platforms. While digital transformation enhances efficiency and offers new forms of value creation, it simultaneously creates new structural dependencies. Companies are increasingly operating within digital ecosystems where platforms, data infrastructures, and technological standards are decisive. This situation demonstrates that digital transformation not only creates value but also restructures control and dependency relationships within the value chain. In this context, while digital transformation empowers companies, it can also limit strategic flexibility by creating dependencies on specific systems.

The findings also indicate that digital transformation is intensifying pressure for speed and efficiency across the industry. Digital tools enable faster decision-making, shorter production cycles, and more flexible supply chains, which directly create a competitive advantage.

However, this acceleration creates a structural pressure on firms to work faster and more efficiently, reinforcing a performance-driven competitive environment.

At the same time, the study reveals that organizations are evolving from human-centered structures toward system-centered ones. As digital technologies become more integrated into organizational processes, decision-making increasingly relies on data, automation, and algorithmic systems. While this enhances efficiency and scalability, it also brings risks such as reduced human intervention, limited flexibility, and increased dependence on technological infrastructure. In some cases, digital transformation also contributes to the restructuring of the workforce and a reduction in certain areas.

Additionally, the study shows that digital transformation is not always synonymous with innovation. In many cases, digital technologies are used to optimize existing processes, reduce costs, and increase efficiency rather than to create radical innovations. This finding challenges the common assumption in the literature that digital transformation is often equated with innovation and suggests that transformation may be a more gradual and context-dependent process.

Finally, the findings indicate that digital transformation blurs the boundaries of traditional value chains. As upstream actors engage more with downstream stakeholders, brands are also establishing more direct connections with suppliers and production processes. This increasing interconnectedness, driven by digital technologies that enable data sharing, coordination, and visibility, indicates the emergence of a more integrated and mutually dependent sector structure.

More importantly, the findings demonstrate that digital transformation functions as a central driver of business model evolution, reshaping how firms create, deliver, and capture value across the fashion value chain. While digital transformation enhances efficiency, transparency, and value creation on one hand, it also creates new dependencies, intensifies competitive pressures, and reshapes organizational structures on the other. By adopting a value chain perspective, this research offers a more comprehensive and nuanced understanding of how digital transformation unfolds in practice, thereby providing significant contributions from both theoretical and practical perspectives.

6.2 Theoretical Contributions

This study contributes to the literature by challenging the tendency to view digital transformation either at the firm level or as a homogeneous process, and by developing a more nuanced and structurally grounded understanding of how digital transformation unfolds in the

fashion industry. While previous studies have mostly examined digital transformation at the firm or sector level (Vial, 2019; Verhoef et al., 2021), this research presents a value chain-focused perspective, clearly highlighting the structural differences across various stages of the sector. In this regard, the study demonstrates that digital transformation is not merely an internal firm-level process but a phenomenon embedded within broader value creation systems.

First, the study contributes to the literature by conceptualizing digital transformation not as a homogeneous organizational process but as transformation logics specific to value chain stages. The findings indicate that transformation processes are shaped not only by internal firm characteristics but also by structural positioning within the value chain. While upstream actors adopt a transformation focused on control and verification; midstream actors focus on integration and efficiency; and downstream actors develop transformation strategies centered on the market and customer experience. This approach repositions digital transformation not merely as an organizational process but as a structurally embedded phenomenon.

While firm size was not treated as the primary analytical lens of this study, the findings suggest that differences in resource availability and organizational scale indirectly shape how digital transformation unfolds across cases. In this sense, organizational scale should be understood as a contextual condition that interacts with value chain positioning, rather than as a standalone basis for comparison.

Second, the study introduces the concept of hybrid business model transformation to the business model innovation literature. While existing literature largely treats digital transformation as a radical and disruptive change (Teece, 2010; Zott & Amit, 2017), the findings of this study point to a more gradual, layered, and convergent transformation process. Rather than completely overhauling existing value creation mechanisms, firms are creating hybrid configurations by integrating digital technologies with existing structures. This finding challenges dominant assumptions in the literature by demonstrating that sector-specific

characteristics—such as creativity, craftsmanship, and brand identity—shape transformation processes.

Third, the study contributes to the literature on data-driven transformation by introducing the concept of the "data usage paradox." Companies are producing increasingly more data and treating it as a strategic resource; however, their capacity to transform this data into meaningful insights has not developed at the same pace. This situation highlights the gap between data access and data utilization capabilities and demonstrates that competitive advantage stems not merely from data ownership but from the capacity to interpret and apply this data (Bharadwaj et al., 2013; Vial, 2019).

Fourth, the study reveals the bidirectional and asymmetric impact of digital technologies on competitive dynamics. While digital platforms and online channels lower entry barriers and facilitate market access for small firms, technologies such as artificial intelligence and advanced data analytics—which require greater resources—strengthen the competitive advantage of large firms. This demonstrates that digital transformation is a process that simultaneously expands opportunities while deepening inequalities.

Fifth, the study shows that digital platforms and data infrastructures are reshaping power and dependency relationships within the value chain. Digital transformation not only facilitates coordination and efficiency but also generates new forms of dependency. Actors who control platforms, certification systems, or data flows gain structurally advantageous positions and can influence—or even direct—the behavior of other actors. This finding reveals that digital transformation is not merely about innovation but also involves the restructuring of power distribution.

Finally, the study contributes to the literature on dynamic capabilities by emphasizing that digital transformation is not a one-time technological change but a continuous, capability-based

process. In line with Teece's (2007) framework, firms must continuously sense opportunities, seize them, and transform their organizational structures. The success of digital transformation depends on the alignment between technological investments, organizational processes, and strategic orientation.

Overall, this study contributes to the literature by integrating digital transformation, business model evolution, and value chain analysis within a holistic framework. The findings demonstrate that digital transformation is not merely a technological or organizational process; it is also a structural phenomenon that reshapes value creation, dependency relationships, and power distribution within the fashion industry.

6.3 Managerial Implications

The findings of this study provide several strategic implications for managers operating within the fashion industry, particularly in navigating the complexities of digital transformation across the value chain.

First, the results suggest that digital transformation should be approached as a structurally contingent strategy, rather than a universally applicable model. Managers must recognize that the value of digital technologies depends on their firm's position within the value chain and the specific mechanisms through which value is created and delivered. This implies that upstream firms should prioritize digital investments that enhance traceability, verification, and system-level coordination, while downstream firms should focus on customer-facing digital capabilities, such as personalization, digital branding, and omnichannel engagement. Intermediary actors, in turn, must balance both dimensions by investing in integration and coordination technologies that connect supply and demand. This perspective shifts managerial

focus from technology adoption to strategic alignment between digital investments and value chain positioning.

Second, the findings indicate that managers should reconceptualize digital transformation as a process of business model augmentation rather than substitution. Rather than replacing existing models, firms can achieve competitive advantage by layering digital elements onto established practices. In the context of the fashion industry, where symbolic value, creativity, and brand identity remain critical, this implies that digital technologies should be used to enhance—not standardize—creative and experiential aspects of value creation. Managers should therefore adopt a selective and integrative approach to digital transformation, focusing on complementarities between digital and traditional capabilities.

Third, the study highlights a significant gap between data availability and data utilization, suggesting that investments in digital infrastructure do not automatically translate into improved performance. Managers should move beyond data accumulation and prioritize the development of organizational mechanisms that enable effective data utilization, including cross-functional integration, decision-making processes, and analytical capabilities. This reinforces the idea that competitive advantage is not derived from data itself, but from the ability to interpret and operationalize it.

Fourth, the findings emphasize the importance of ecosystem-level coordination in digital transformation. Given the interdependent structure of the fashion value chain, the effectiveness of digital initiatives often depends on the alignment of multiple actors, including suppliers, manufacturers, and brands. However, this increasing interconnectedness also creates new forms of dependency on digital platforms and shared infrastructures. Managers should therefore not only invest in collaboration and integration, but also critically evaluate their level of reliance on specific systems and platforms, balancing efficiency with strategic autonomy.

Fifth, the results reveal a critical tension between accessibility and competitive asymmetry in the digital landscape. While digital platforms and tools lower entry barriers and enable smaller firms to participate in global markets, advanced technologies such as artificial intelligence and data analytics tend to reinforce the competitive advantage of resource-rich firms. Managers should therefore adopt a strategically selective approach to technology adoption, focusing on technologies that align with their resource base and competitive positioning, rather than attempting to adopt all available digital solutions.

Sixth, the findings suggest that digital transformation introduces important trade-offs between efficiency and human-centered processes. While digital technologies increase speed, reduce costs, and improve operational performance, they may also lead to over-reliance on automated systems and reduce the role of human judgment and creativity. In the context of the fashion industry, where creativity and design remain central, managers should ensure that digital tools support rather than replace human input. This highlights the importance of maintaining a balance between technological efficiency and creative value.

Finally, the findings indicate that digital transformation should be understood as a continuous capability-building process rather than a discrete strategic initiative. Managers must develop dynamic capabilities that allow them to continuously adapt to technological and market changes. This includes not only investing in new technologies but also fostering a culture of experimentation, learning, and organizational flexibility.

Overall, the study highlights that effective digital transformation requires a shift from a technology-centric mindset to a strategy- and capability-driven approach, where digital tools are integrated into broader organizational and value creation logics. At the same time, managers must remain aware that digital transformation is not only enabling but also constraining, as it creates new dependencies, reshapes human roles, and redefines competitive dynamics within the industry.

6.4 Limitations

While this study provides valuable insights into digital transformation and business model evolution within the fashion industry, several limitations should be acknowledged.

First, the study is based on a limited number of case studies, with data collected from four interviews. While this is consistent with qualitative research approaches that prioritize depth over breadth, the relatively small sample size limits the scope of empirical variation captured. The findings should therefore be interpreted as analytically generalizable rather than statistically representative.

Second, the study relies on interview-based data, which reflects the perceptions and interpretations of individual participants. Although this enables in-depth insights into managerial perspectives, it may also introduce subjective bias. In particular, the findings are shaped by how participants frame digital transformation within their organizational context, which may not fully capture all operational realities. To mitigate this limitation, interview data were interpreted in relation to existing literature and supported by secondary sources.

Third, while the study adopts a value chain perspective, the number of cases within each stage remains limited. Although the selected cases provide meaningful representation across upstream, intermediary, and downstream activities, a larger number of firms within each segment would allow for a more fine-grained comparison of transformation dynamics within specific value chain positions.

Fourth, the study focuses exclusively on the fashion industry, which is characterized by specific structural and symbolic dynamics such as creativity, branding, and rapid trend cycles. As a result, the findings may not be directly transferable to industries with different value creation logics or lower levels of market dynamism.

Fifth, the study captures digital transformation at a particular point in time, while the phenomenon itself is continuously evolving. Rapid developments in areas such as artificial intelligence, data analytics, and platform-based business models may significantly reshape transformation processes in the near future.

Finally, and more importantly, the study highlights a structural limitation related to the visibility of digital transformation processes across the value chain. While firms increasingly operate within interconnected digital ecosystems, access to full system-level data remains fragmented. As a result, the analysis is based on firm-level perspectives rather than fully integrated value chain observations, which may limit the ability to capture the complete dynamics of digital transformation across all actors.

Despite these limitations, the study provides a meaningful and context-sensitive contribution by offering in-depth insights into how digital transformation shapes business model evolution across different stages of the fashion value chain.

6.5 Final Conclusion

This study set out to examine how digital transformation influences business model evolution within the fashion industry, with a particular focus on variations across the value chain. By adopting a qualitative, multi-case study approach, the research provides a context-sensitive understanding of how digital transformation is experienced, interpreted, and implemented by firms operating at different stages of the industry.

The findings of this study challenge the common assumption that digital transformation in the fashion industry is a uniform or purely technological process. Instead, it emerges as a context-dependent phenomenon shaped by firms' positions within the value chain. Rather than following a single trajectory, transformation unfolds through distinct logics across upstream,

intermediary, and downstream activities. This highlights the importance of moving beyond firm-level generalizations and adopting a more differentiated, value chain–oriented perspective.

A central conclusion of this study is that digital transformation has evolved from a strategic option into a structural necessity. Firms are increasingly compelled to adopt digital technologies not only to gain competitive advantage, but to remain operational, visible, and credible within interconnected and data-driven ecosystems. In this sense, digital transformation is no longer a question of "whether" but of "how" and "to what extent."

At the same time, the findings reveal that digital transformation is inherently a double-edged process. While it enhances efficiency, transparency, and coordination, it also introduces new forms of dependency, particularly on digital platforms, data infrastructures, and technological systems. This growing reliance reshapes power dynamics within the value chain and may reduce strategic flexibility, especially for firms that lack control over digital infrastructures.

Furthermore, the study highlights the increasing importance of speed and efficiency as defining characteristics of digital transformation. The ability to operate faster, respond more quickly, and optimize processes has become a key source of competitive advantage. However, this acceleration also creates continuous performance pressure, reinforcing a highly competitive and time-sensitive industry environment.

In addition, the findings point to a gradual shift from human-centered to system-centered organizational structures. As digital technologies become more embedded in decision-making and operational processes, firms increasingly rely on data-driven and automated systems. While this enhances scalability and efficiency, it also raises important questions regarding the role of human judgment, creativity, and labor within digitally transformed organizations.

The study further demonstrates that digital transformation does not necessarily lead to radical innovation, but often manifests as a hybrid and incremental process. Digital technologies are

integrated into existing business models rather than replacing them entirely, resulting in layered configurations where digital and physical elements coexist. This is particularly relevant in the fashion industry, where creativity, identity, and symbolic value remain central to value creation.

Overall, this study shows that digital transformation is not a linear or universally beneficial process, but a complex and evolving phenomenon that simultaneously creates opportunities and constraints. It reshapes how value is created, delivered, and captured, while also redefining organizational structures, competitive dynamics, and inter-firm relationships.

As digital technologies continue to evolve, future research may build on these findings by examining broader industry contexts, incorporating larger samples, and exploring the long-term structural implications of digital transformation. In particular, further research is needed to better understand how dependency, power, and control are redistributed within increasingly digitalized value chains.

Ultimately, the study demonstrates that digital transformation in the fashion industry is best understood not as a singular technological shift, but as a differentiated process of business model and value chain reconfiguration.

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Appendices

Appendix A: Interview Questions and Guide

This appendix presents the semi-structured interview guide used in this study. The questions were developed based on the theoretical framework and aim to explore digital transformation processes, value chain dynamics, and business model evolution in the fashion industry.

Interview Questions

1. How do you define digital transformation in the context of your company, and what role does it play in your overall business strategy?
2. When did your company begin integrating digital technologies, and what were the main drivers behind this process?
3. What types of digital technologies or digital solutions have been implemented?
4. Which phases of your value chain have been most affected by digital transformation (e.g., design, production, distribution, or sales channels such as e-commerce or direct-to-consumer)?
5. How has digital transformation influenced your business model (e.g., revenue model, customer interaction, or distribution channels)?
6. How have digital technologies impacted your internal operations (e.g., production, design, inventory management, supply chain)?
7. What are the main benefits and challenges associated with digital transformation in your company?

Appendix B: Interview Transcripts

The following section presents the interview transcripts used in this study. The transcripts have been lightly edited for clarity and readability. Non-relevant conversational elements (e.g., greetings) and sensitive information have been removed or anonymized where necessary.

Appendix B.1 Interview with Mert Canlı (Lenzing Group)

Position: Marketing & Branding Specialist (Textile Engineer)

Company: Lenzing Group

Interview Transcript

(00:14)

Interviewer: First of all, I would like to thank you for accepting my invitation and for agreeing to support my thesis. I have a couple of questions about digital transformation because, as you know, I am writing my thesis on digital transformation in the fashion industry. Lenzing plays a critical role at the upstream level of the fashion value chain, which makes your perspective particularly valuable for understanding digital transformation across the entire industry. May I start with my first question?

Interviewee (Mert Canlı): Sure.

(01:06)

Interviewer: Lenzing operates as a global fiber producer, with a strong focus on sustainability and innovation. In this context, what does digital transformation mean for your company, and how does it influence your overall business strategy?

(01:36)

Interviewee (Mert Canlı): Thank you for the opportunity to invite our company to this interview. I would like to start by explaining our position. Since we are a fiber producer, we do not directly contribute to the fashion industry. Our direct customers are spinners. If you consider the textile value chain, we are at the starting point. The process continues with yarn producers, fabric producers, garment manufacturers, and finally brands. However, as Lenzing, especially through the Istanbul office, we aim to engage with every stakeholder in the textile value chain. Brands also have demands from us. Therefore, we use digital transformation initiatives to support these demands. Digital transformation in our company mainly relates to transparency and traceability. These are the most important aspects. Brands want to be sure that the products they purchase are genuinely produced with our fibers. To address this, we use a certification and licensing system. We have a platform called Lenzing Pro. It is the core of our digital transformation initiatives. It functions as an umbrella under which all our services are collected. Through this platform, we manage certification and licensing processes. Brands use this platform for transparency. We provide documents and certifications. To issue a certification, fabric samples are sent to Austria, where they are tested. Based on the results, we issue certificates. These documents support traceability and allow brands to manage their manufacturers. Manufacturers are required to obtain certifications and licenses in order to use our logos and brand names. This system also supports brand initiatives. Most brands aim to make their collections sustainable. Since our company's vision is based on sustainability, we are recognized as one of the leading companies in this area. When our company name is associated with a product, brands trust its sustainability performance. Therefore, brands require their manufacturers to use our platform to prove that their collections are sustainable.

(05:45)

Interviewer: As a company operating at the upstream level of the fashion value chain, when did Lenzing begin integrating digital technologies, and what motivated this transformation?

(06:24)

Interviewee (Mert Canlı): Digital transformation in our company relates to reliability, transparency, and traceability. One of the technologies we use is blockchain. For each bale of fiber, we create a digital identity called a fiber coin. We use a platform called TextileGenesis. When we sell fibers, each bale is associated with a fiber coin, which is transferred to the customer through the system. When the spinner produces yarn and sells it to the fabric manufacturer, the fiber coin is transferred along with the product. This continues through the garment manufacturer and finally to the brand. This system enables traceability from the fiber stage to the final garment. It represents what digital transformation means for Lenzing, as it builds trust with customers. Customers purchase our products because they trust our brand.

(08:42)

Interviewer: When did Lenzing start integrating digital technologies, and what were the main motivations?

(08:54)

Interviewee (Mert Canlı): Digital transformation started around 2018–2019. It was not too early and not too late; it was appropriate timing for our industry. The main motivation was the increasing need for traceability. Customers want to know whether the product they purchase truly belongs to Lenzing. Lenzing products also provide performance consistency, so it is important for manufacturers to know what they are purchasing. Another reason is the increase in sustainability regulations in the global fashion industry. These regulations directly affected Lenzing and created additional motivation. The textile value chain is complex. This complexity increases the need for traceability. These companies approach us with such demands. Another motivation is the need for proof. Brands want to verify claims. If a product is claimed to be Lenzing, they require certificates or licenses as proof. Additionally, end consumers are

becoming more aware of sustainability and demand proof from brands. This also motivates our digital transformation.

(12:05)

Interviewer: Approximately how many customers do you have?

(12:17)

Interviewee (Mert Canlı): It is difficult to quantify because we operate globally. Our primary customers are spinners. Brands also interact with us, but they do not purchase directly. Overall, we work with thousands of customers.

(12:52)

Interviewer: Which digital technologies have had the most significant impact on your company, and which phases of your operations are most affected?

(13:46)

Interviewee (Mert Canlı): This is somewhat subjective. One important technology we use is Microsoft CRM. Through this system, we track all customer interactions and manage relationships. It allows us to follow up on meetings and monitor partnerships, making customer relationship management more efficient. Traceability technologies in the supply chain have the greatest impact. Certification processes are also highly influenced by digital technologies. Production operations are affected to a lesser extent compared to these areas.

(15:03)

Interviewer: Have digital technologies influenced your business model?

(15:44)

Interviewee (Mert Canlı): Yes, definitely. Digital transformation has strengthened our direct relationships with brands and increased customer loyalty. The services we provide, such as certification and licensing, add value to our products. If our products are priced higher than competitors, we can justify this through the additional services we offer. Digital technologies also improve sustainability reporting and increase operational efficiency. The data generated through these systems supports future business planning.

(17:30)

Interviewer: How have digital technologies influenced supply chain management?

(18:03)

Interviewee (Mert Canlı): It depends on the region. The Istanbul office is responsible for Turkey, Africa, and Commonwealth countries. Since Turkey is a manufacturing hub, we mainly work with manufacturers. We also collaborate with international brands that produce in Turkey. Therefore, the supply chain is interconnected, and digital technologies support coordination across these relationships.

(19:10)

Interviewer: What are the benefits and challenges of digital transformation?

(19:46)

Interviewee (Mert Canlı): The main benefits include traceability of fibers throughout the value chain, increased transparency in the supply chain, and stronger trust between Lenzing and brands. These technologies also allow us to respond quickly to changing customer demands and strengthen our relationships with brands. The main challenge is resistance to change among stakeholders. Change management is crucial. Many stakeholders are not familiar with digital technologies, and integrating them into these systems takes time. Manufacturers, in particular,

have lower levels of digital maturity compared to brands. They require continuous guidance throughout the process. This creates challenges in coordination between brands, manufacturers, and Lenzing. Additional challenges include data privacy, data security, and differences in regulations across countries.

(23:00)

Interviewer: How has digital transformation reshaped Lenzing's role within the fashion ecosystem?

(23:11)

Interviewee (Mert Canlı): Digital transformation has strengthened our role in enabling sustainability. Through transparency and traceability, we encourage brands to create more sustainable collections. Storytelling has become increasingly important in the fashion industry. Sustainability is often used as a narrative, although sometimes only for marketing purposes. Companies need to genuinely implement sustainability rather than using it superficially. Lenzing contributes by providing certifications and proof, ensuring credibility. Additionally, artificial intelligence is being used by brands in design processes, although this is not directly related to Lenzing.

(25:37)

Interviewer: Do you think smaller companies can keep up with digital transformation?

(25:55)

Interviewee (Mert Canlı): Yes. Smaller companies may have an advantage because they are more flexible. Large organizations often face resistance to change, while smaller firms can adapt more quickly. Although smaller companies may have fewer resources, their flexibility allows them to integrate digital transformation more effectively.

(26:51)

Interviewer: Thank you, that concludes my questions.

(27:15)

Interviewee (Mert Canlı): Thank you.

Appendix B.2 Interview with Bedir Zidan (Metraco)

Position: Sales Executive (R&D Department)

Company: Metraco

Interview Transcript

(00:05)

Interviewer: First of all, thank you, Mr. Bedir, for accepting my invitation.

(00:15)

Interviewee (Bedir Zidan): You are welcome. Thank you.

(00:18)

Interviewer: First of all, could you give me some general information about Metraco? I would also like to include it in my thesis so that it will be much clearer.

(00:28)

Interviewee (Bedir Zidan): Yes, of course. First of all, my name is Bedir. I am the Sales Executive at Metraco and also responsible for Research and Development. I am actually the newest person in the company, and I have been here for about one and a half years. Metraco is actually a 30-year-old company, which is a family-owned company. We are a jersey garment manufacturer and also a vertically integrated manufacturer. We manage all processes in-house,

from fabric to cutting, sewing, washing, printing, embroidery, and everything is done inside, in-house. Metraco is located in Istanbul, and I think that is enough.

(01:30)

Interviewer: Yes, yes, thank you.

(01:33)

Interviewee (Bedir Zidan): Our team consists of around 350 employees working together, and Metraco has a very special project which supports people with disabilities and empowers women in the company. Around 75% of our employees are women.

(02:10)

Interviewer: I did not know that. That is really interesting.

(02:13)

Interviewee (Bedir Zidan): Yes, yes. We actually received a very special award from the International Trade Chamber for supporting people with disabilities, because we have around 100 employees with different disabilities in the company, which is the first project of this kind in Turkey, actually. The Turkish Trade Chamber asked us to create similar projects in different cities, and we are planning to work on it together. Of course, it is also supported by the brands we work with. That is all, I think.

(03:02)

Interviewer: Yes, thank you. That is really nice to hear. As you know, my thesis is generally about how digitalization and digital technologies affect companies. So my first question is about Metraco, but also about what digital transformation means for your company, and how it influences your overall business strategy.

(03:34)

Interviewee (Bedir Zidan): Firstly, digital transformation really plays an important role in

Metraco's operational strategy, especially as a garment manufacturer working with international brands. We rely on digital systems to manage product development, order tracking, and production planning. Working with this kind of high-level international brand forces you to keep developing and to start digitalization, actually, in order to continue working with them, because they are very developed and very fast-growing brands all around the world. That is why we have to keep this digitalization growing internally in Metraco as well. For example, we are using SANTIS as an ERP system, which is a textile and garment industry software that allows us to track an order from A to Z, from the moment we receive the official purchase order until we make the shipment to the brand. In SANTIS, we enter all order details, such as fabric type, trims, quantities, and delivery dates, and we can track through SANTIS the cutting, how many pieces have been cut, how many pieces are in sewing, and everything is planned depending on this, actually. We can even check how much capacity we still have available in order to receive another new order or not. Depending on that, we can give the delivery timeline for new orders for different customers. These details are visible to the production team, the planning department, and the warehouse teams, allowing everyone to work based on the same data. This means that nothing is written by hand or saved on the phone or anything like that. Everything is digitalized, which actually helps us coordinate complex production processes while maintaining transparency and efficiency across departments. Sometimes our merchandisers have to manage, for each season and for different brands, a minimum of 15 to 40 styles, and each style has different trims, different washing effects, yarn dyes, fabric dyes, or garment dyes. So there are a lot of details in the styles, which can easily be confused or mixed up, and something can happen. That is why it is very important for Metraco to have everything digitalized across all departments and to share the same data from one source, using only one source. If anything in a style is updated or changed, the whole team can be notified

automatically by email that something has changed or been updated in that style. That is why it is important.

(08:05)

Interviewer: Okay, thank you. I was just curious, because you apply a lot of digital technologies in your company. Do you know exactly when they started to implement these? Because you told me that the company is 30 years old, right? Thirty years ago, digital technologies were not so common.

(08:38)

Interviewee (Bedir Zidan): Okay, I understand that too. Actually, SANTIS has been in use for about five to six years as an ERP system. That was the oldest software they were using in the company. Of course, during these years, they improved a lot inside SANTIS as a process. For example, they were not using SANTIS as an accounting program at the same time, and they could not use SANTIS for tracking orders because it was not integrated with the sewing machine or the cutting machine yet. But in the last two years, or before two years, as far as I know, because I am not 100% sure since I am new in the company, they integrated the system with the sewing machines. So now they can track everything through the system. They can track how many pieces are being sewn at that exact moment, and by using the automated cutting machine, which is also integrated into the system, they can track that as well. That happened, I think, two years ago, as far as I know.

(10:16)

Interviewer: Okay. In the past five or six years, the company started to implement a lot of technologies, which I am really interested in, and it is surprisingly good. I just wanted to ask, according to the other side as well, since you mentioned a lot of technologies, which one do you think is the most efficient or most useful for your company? It can be in terms of time-saving or profit. How would you consider it?

(10:55)

Interviewee (Bedir Zidan): Actually, as I told you, the ERP system is the most important system in this kind of company, because you are minimizing the errors that can happen during the production process. And in this kind of company, minimizing the errors, I think, is the most profitable thing you can do. This is not only financially, by the way, but also in terms of time. Because if you are strict with the production timeline and any error happens in production, you are going to lose time, and your production will be delayed in delivery. In consequence, in your agreement with the brands, there are many penalties, which will cost you a lot of money. So using this kind of system, of course, minimizes errors. And this is very good on the manufacturing side because you can track everything. Even if you are going to be delayed, you can notify early. You can tell the customer or the client that you are going to be late by one extra week, or that you need one or two extra weeks. So when everything is clear, you can actually predict everything. So I think the ERP system is very good. But in the meanwhile, of course, in 2026, we are living in the future, I think. So AI is the most usable thing that can be done right now. That is why we are now working on AI-powered CRM systems, which help us do research on our potential clients without even travelling around the world to find customers who might not even be your potential clients, or attending fairs and spending a lot of money for nothing. So AI is now also integrated into our system. As the research and development team, we are working on AI a lot, also on the marketing side, even with AI-powered CRM systems. Of course, when you are in the office, at your desktop, working with AI, and you find a potential client and start communication with them, and you have the first meeting without paying any additional costs, and then you have their first collection and do the SMS for them, and then go for bulk production and receive the official purchase order, of course it is a very nice thing, because you did not even travel and you did not even meet the people behind the screen, and

you have done everything. So, of course, it is cost-efficient. AI is the key, I think. But of course, the ERP system is also very important in this kind of business.

(14:55)

Interviewer: Which type of AI-based system do you use?

(14:55)

Interviewee (Bedir Zidan): Actually, I can say that, no problem. Right now, we use it in a semi-automated way. We use Zoho CRM integrated with AI, but sometimes we also create our own AI solutions depending on what we need, such as using Google Sheets with different AI websites, triggered by ChatGPT, to do some things automatically. It is a shortcut for the marketing department to find a potential client and send follow-up emails and everything. If that usually takes two hours of an employee's working day, it can become just five minutes to check the draft emails generated by the AI-powered system. The employee only needs to check if everything is correct, click send, and everything is done. So it only takes five minutes from their time. It is very efficient, actually.

(16:34)

Interviewer: Yes, the use of AI sometimes scares me, but sometimes it is really useful. What can I say?

(16:40)

Interviewee (Bedir Zidan): Yes.

(16:44)

Interviewer: Mr. Bedir, in our interview you mentioned many benefits, and we know that side, but can we also talk a little bit about the challenges? Because we know that when you start implementing this type of digital technology, it takes a lot of time and sometimes costs a lot.

Even while teaching AI to organize some things, you need to spend a lot of time, and you have to teach accurately what you need. So could you highlight the challenge side as well?

(17:33)

Interviewee (Bedir Zidan): Yes, of course. Of course it is costly to use this kind of software, because not all software companies can be trusted, actually, and I think this is one of the biggest problems in using software. Your company is going to be open to the software company, so if it is not a trustworthy company, they can use the kind of data you have on their software without you even knowing, and they can sell this kind of data to different competitors. We hear a lot of stories about this, actually. So choosing cheap software can affect your company in the long term. That is why it can be costly, but this is something that should be done depending on the safety of your software and your company's data. Because now it is not easy, especially for us in Turkey in the fashion industry, to find a new potential client. This data actually has a monetary value for different companies, your competitors, and others in the industry. So being safe and keeping this data safe is the most important thing you should be careful about, whether you have your servers inside your company, as we do, or whether it is on the cloud. Of course, it is costly in this way. Another challenge in digital transformation is ensuring that digital systems are properly integrated into your daily workflows. In a manufacturing environment, production teams must adapt to new digital processes while maintaining efficiency on the factory floor. Because if, for example, we buy a software program like an ERP system, and it is really costly because it is specially made for your company and based on your internal processes, and each department has different access to different data on that system, then it is costly. But if nobody can use the system, then you have just paid for nothing. So making sure that the software you buy for your company is really integrated into your daily workflows and used by your teams is very important. Especially, the biggest problem we had actually, I am sorry, the biggest problem we had, was the difference between generations in our company. It

is a family-owned company, so integrating this kind of software for different people from different generations is very hard. For the long-standing teams, especially people who have been working in the company for more than 20 years, if you suddenly come and try to integrate something called software for them, and try to make them use this kind of system, it is very hard. Sometimes it is not workable for these people. But sadly, this is real life in 2026. However, once these systems are properly implemented, they significantly improve operational transparency, planning accuracy, and production efficiency, actually.

(26:34)

Interviewer: Okay, I understand your point. But from the challenging side about generations, I was just curious: approximately how many people, or what percentage, are from the young generation, and what percentage are from the older generation? I do not want to say old generation, but—

(26:55)

Interviewee (Bedir Zidan): Let us say long-standing teams. You mean what percentage is young people?

(27:00)

Interviewer: Yes, approximately. I was just curious.

(28:06)

Interviewee (Bedir Zidan): Actually, in our company most people are new people, but the team leaders or the managers are the long-standing teams. They have been in the company for a very long time, like 15 or 20 years, and that is a lot for one person. So yes, it is hard, really hard, to integrate these long-standing teams into such new things, software and similar tools, because until now they were used to working with white paper and pen. So when you give them tech packs on the screen, they can be a little confused too. Yes, they understand the process, but

sadly this is one of the biggest challenges. By the way, I noticed this challenge in a lot of companies. It is really hard for many people working in these kinds of companies.

(28:25)

Interviewer: Yes, yes. For our generation, the new generation, of course learning digital tools is much easier.

(28:34)

Interviewee (Bedir Zidan): Exactly, exactly.

(28:35)

Interviewer: And what do you think about the challenges on the other side, for example in production? Do you think there were also some problems with printing, maybe stitching, or from other sides?

(29:00)

Interviewee (Bedir Zidan): From other sides, what do you mean?

(29:04)

Interviewer: I mean in-house departments such as pattern making, printing, or stitching. Before trying to implement these digital tools, did you also have some type of challenges there? Because learning AI or investing in digital tools is more on the operational side of the company, right? I was just curious about the production side, because it is a manufacturing company. Maybe there were no problems, but I just wanted to ask if there were.

(29:38)

Interviewee (Bedir Zidan): Of course, of course. Actually, let us talk about the PLM systems, which solve many of these problems. The PLM system is something called the Product Lifecycle Management system. Before having this kind of system, a lot of errors could occur because a lot of emails were going around among the teams, and you could not find one thing

related to one style. For example, I told you that each merchandiser has around 15 to 20 styles per season, and that can be more for different customers or different brands. So imagine you have 15 styles, and each style has different details, and everything is communicated by email. You have to scan your emails every day to find out what happened with one style. For example, the customer sends the first email describing the tech pack, and then a second email because the file is too big, so they cannot attach the whole thing in one email. At that time, there was nothing like WeTransfer or reducing PDF size. So they had to send different emails for each size and each file. The artwork of the style comes in one email, the tech pack comes in another email, and then when you send the proto, they comment on it in another email. And if anything happens and there is an update needed for this style, that comes in another email. And if you have 15 to 20 styles per season, that means in one year you have at least 60 to 80 styles, and you have to follow all of them. Some of them are happening at the same time. So you may have to follow 30 to 40 styles at the same time with the merchandiser, with the production team, and on the other side with the brand itself. You have to follow all of those details without a system. The production team may ask the merchandiser about something wrong with the pattern or the artwork. Then you have to ask the brand, get the solution from them, and inform the production team again. This is total chaos, really total chaos. Sadly, even now, there are still brands that do not use PLM systems. And it is really chaos because you cannot find where the lab dip confirmation is, you cannot find the first proto comments or the second proto comments. I do not know if you know what proto means.

(33:04)

Interviewer: Yes, yes.

(33:05)

Interviewee (Bedir Zidan): Proto is the first simple sample of the style. We make the proto, then we receive the first comments on the proto. If they ask for a second proto with updates or

changes in measurements or something else, we do the second proto. Then we go for the SMS, which is the salesman sample. After that, we go for the shipping sample. Then after that, we go into production, bulk production, confirmation, and shipment. So the process for each style is very long. If it is not controlled well and not secured well, imagine if you miss any update from the brand and you do not tell the production team, for example that the fabric quality has been changed on this style, and then the production team processes the style with the old fabric quality. And imagine the quantity of that style is 3,000 pieces, and these 3,000 pieces go from your factory to the brand, and then they do not accept the goods from you. They either send the goods back to you or ask for a discount because you did not follow properly that they updated the fabric quality. So that is a completely wrong production, which will cost you a lot of money and a lot of time, and you used your fabric factory or manufacturing capacity for nothing. Even your reputation as a company is not the same as before, because they start asking themselves whether they are going to give you another order or how the process is followed in your company, because you did not follow something so important. It is very important to follow the fabric quality, for example, or the trims, because sometimes the brands have the same style in different seasons, the same stars, same everything, and only the artwork is changed. So if you do not follow this, you are messed up, seriously. So this is very important. Imagine we had a lot of big problems, as they told me, before this kind of system. Even I told you before, in one sentence, that with the ERP system, if anything is updated in the system, the whole team is notified by an automated email that something has been updated in this style, in this section, in the fabric or trim or artwork or embroidery or anything. So all the teams are notified that there is something changed in this product, and they should be careful. This could not be done before, because we are human, and sometimes people get tired. So they cannot be 100% focused on this kind of thing all the time. Sometimes the email goes to spam for no reason. Sometimes the brand sends emails, but your server is full, so the email does not reach your inbox. So we had

a lot of these kinds of problems before, sadly, as they told me, because I was not there at that time. But yes, sadly. So that is very important for production, because it can really cause that kind of thing.

(37:32)

Interviewer: Yes, okay, thank you. And as a final question, I was just curious: how many partnerships do you have? Do you have more foreign customers? As far as I know, you also have international ones, but we never talked about that.

(37:56)

Interviewee (Bedir Zidan): Actually, all our customers are international. We only sometimes partner with Turkish brands, small Turkish brands, boutique ones.

(38:10)

Interviewer: Okay.

(38:12)

Interviewee (Bedir Zidan): And that only happens if they match our values or our strategy, and if we have the capacity to produce for them. Sometimes we use the sampling house. We have the manufacturer, which does the bulk production, and we have the sampling house, which is a small manufacturer only for doing small quantities of pieces, for example the SMS, which is a sample. So that is done in the sampling house, and it is usable. We actually work with international brands. I can tell you which brands we are working with: Lacoste, Gant, Barbour, Lyle & Scott. We worked a lot with Scotch & Soda. We were the biggest manufacturer for Scotch & Soda. We also worked with McGregor, which is specialized in polo. We are working with a new client called J. Lindeberg. I do not know if you know them. They are a well-known brand in golf sports. They are similar to Lacoste, but Lacoste is for tennis and J. Lindeberg is for golf. We are also working with brands in the GCC area, such as a new brand called Editorial,

and they also own a good brand called Riva in the GCC, meaning the Gulf countries such as Dubai, Kuwait, and Qatar. We worked with many complete brands, but I do not remember all of them. If you want, I can share the company profile with you so that you can check them there.

(40:24)

Interviewer: That would be very nice. Thank you.

(40:25)

Interviewee (Bedir Zidan): You are welcome. Okay.

(40:31)

Interviewer: Thank you. I think I do not have any more questions, because you answered all of them.

(40:46)

Interviewee (Bedir Zidan): Thank you. You are welcome. I hope this can be useful for you.

(40:47)

Interviewer: Yes. To be honest, I did not know that you were applying or using that many digital tools, because of course I did a little research before the interview and before looking into your company, but it was not that clear on your website. On the internet, I could not find much information about that. So I am really satisfied, to be honest.

(41:15)

Interviewee (Bedir Zidan): Thanks. That is good, that is good.

(41:20)

Interviewer: Thank you very much. After preparing the transcript, if you want, I can share it with you as well.

(41:25)

Interviewee (Bedir Zidan): Yes. So, thank you.

Appendix B.3 Interview with Zeynep Tosun

Position: Founder & Creative Director

Company: Zeynep Tosun

Interview Transcript

(00:07)

Interviewer: First of all, could you briefly explain how Zeynep Tosun was established and how this journey began?

(00:15)

Interviewee (Zeynep Tosun): You can find some information on the website, but briefly, we are a third-generation family of designers. My grandmother was one of the most skilled tailors of her time, and my mother was a knitwear designer. Later, they were involved in establishing brands such as Twist and İpekyol. Therefore, I grew up within this environment. My father is an architect.

Before founding my own brand, I studied in Italy. I attended summer schools, and since I had already studied at a French school, I learned Italian very quickly. I then studied at Marangoni, where I was also accepted into the master's program due to a strong portfolio. After that, I worked at Alberta Ferretti for one year. Then I returned to Istanbul. At that time, there was a very prestigious competition organized by İTKİB, now known as COZA, where I placed third. Simultaneously, I started my own brand. I began in 2008 and started selling in 2009. I have been running my brand since then.

(01:40)

Interviewer: Yes, I had already researched this, but I wanted to hear it from you. Thank you.

(01:46)

Interviewee (Zeynep Tosun): We operate in various parts of the world. Over the past 3–4 years, we have fully transitioned into ready-to-wear. Previously, we were producing both made-to-measure couture and a ready-to-wear version of couture. However, we are now fully focused on ready-to-wear.

(02:14)

Interviewer: How many employees do you have?

(02:17)

Interviewee (Zeynep Tosun): We have a team of 12 people. In addition, we outsource many processes.

(02:28)

Interviewer: As you know, my thesis focuses on digitalization. Your brand has a strong creative identity. In this context, what does digital transformation mean for your company, and how does it play a role in your overall strategy?

(02:47)

Interviewee (Zeynep Tosun): Before COVID-19, Turkey was not as digitally engaged as it is today. Our products were not selling online because customers preferred to try them on physically, especially since they were occasion-based products rather than everyday wear. However, during COVID-19, online shopping increased significantly. Turkey has a very large digital user base, but adapting to online purchasing habits took time. Even today, some products

are still tried on in showrooms before being purchased. Nevertheless, digitalization has significantly expanded our sales network.

Previously, we were dependent on intermediaries such as wholesale showrooms. These intermediaries strongly influenced our design decisions, often directing us based on what they believed would sell. With digitalization, we have been able to eliminate many of these intermediaries. We can now sell directly to customers worldwide. For example, we have sold products to Australia, Japan, and China. Although the volumes are not large, the accessibility itself represents a major shift. One of the most important aspects of digitalization is data. We can now track what customers view, what they purchase, and why certain products perform better than others. Previously, when products were placed in stores, we had no clear understanding of who was purchasing them. Now, we have access to objective data. Digitalization has also significantly transformed production processes. Previously, pattern-making was entirely manual, involving large physical patterns and a very complex workflow. It required substantial physical space and time. Now, we create patterns digitally, almost like working in Photoshop. This has completely changed the process. As a result, pattern makers no longer need to be physically present. They can connect remotely and work through our systems. This provides significant advantages in terms of both time and cost. Another important development is that we no longer conduct physical photoshoots for all products, as they are extremely costly. Instead, we use AI to digitally dress models with our products. This allows us to quickly introduce new colors or products during the season. We can even generate videos using AI. Since photoshoots can cost between $5,000 and $10,000, and campaign shoots can go up to $15,000, this represents a significant cost-saving. Given that we primarily use social media rather than large-scale global campaigns, AI provides a much more efficient solution. AI is continuously evolving, and I believe it will become even more advanced. I personally adopt

digital tools only when they genuinely simplify my work. In particular, AI is extremely useful for handling small stock quantities or responding quickly to market demands.

(12:00)

Interviewer: Yes, you have already answered many of my questions. Thank you.

(12:02)

Interviewee (Zeynep Tosun): Of course, but you can still ask your questions again and I can elaborate further if needed.

(12:03)

Interviewer: Rather than repeating the same questions, I would like to ask the following: considering all the digital technologies you mentioned, which stages of your value chain have been most affected by digital transformation?

(12:04)

Interviewee (Zeynep Tosun): I would say both production and marketing have been equally affected.

Marketing, in particular, has changed significantly. As I mentioned earlier, we have been able to eliminate intermediaries such as wholesale showrooms. Previously, these actors played a dominant role in shaping our decisions. Reaching international markets from a developing country was also very difficult. There were trust issues regarding production capacity, delivery timelines, and reliability. I personally had meetings with strong distributors in the United States, but their requirements and contractual obligations were extremely demanding, and it was difficult to meet those expectations at the time. With digitalization, we have been able to bypass these intermediaries. Today, our advertising processes are also heavily supported by AI. Even the external agencies we collaborate with use AI to optimize advertising campaigns. Previously,

we would manually target specific locations, for example, focusing on a particular area in Miami where our products performed well. However, today, AI handles this process automatically by analyzing large volumes of data.Through cookies and digital tracking systems, customer data is continuously collected and analyzed. As a result, AI can generate highly accurate customer profiles and target audiences more effectively than manual methods. Therefore, digital transformation has influenced every aspect of our operations. It has simplified processes, but at the same time, it has increased competition, since these tools are accessible to everyone. For example, we once had a customer who turned out to be Jeff Bezos' wife. Without digitalization, it would have been almost impossible for someone like her to discover a designer based in Turkey. Previously, in order to enter international markets, we would have needed to work with physical stores and distributors, which required significant effort and investment. Now, by collaborating with influencers and using digital marketing tools, our visibility has increased significantly. If a customer follows a particular influencer, they are automatically exposed to our products through targeted advertising. This entire system is driven by complex algorithms working in the background. In this sense, digitalization has both positive and negative aspects. It simplifies operations and increases accessibility, but it also intensifies global competition. At the same time, it affects every aspect of our work. Even writing emails has become easier through digital tools.

(16:03)

Interviewer: I was going to ask about design as well.

(16:04)

Interviewee (Zeynep Tosun): In design, I would say the impact is still limited. For example, I would like to have a sewing robot, but that is not yet possible.

(16:08)

Interviewer: Are all sewing processes still done manually?

(16:10)

Interviewee (Zeynep Tosun): Yes, they are still done manually. Only certain categories such as knitwear or seamless products have become more automated. However, for garments such as evening dresses, manual craftsmanship is still essential. I personally do not see this as a problem. However, managing human labor can be challenging, especially due to psychological factors. I remember seeing a demonstration by Boston Robotics, where robots were shown working continuously without interruption. Even when they were pushed or interrupted, they continued their tasks without any reaction. This example highlights an important difference: when working with machines, you do not have to deal with human psychology. In contrast, in our work, managing people can sometimes be the most challenging aspect. Therefore, if possible, I would prefer to integrate AI further into production processes, although this is not yet feasible.

(17:44)

Interviewer: Has digitalization influenced the design process?

(17:48)

Interviewee (Zeynep Tosun): Yes, to some extent. New materials, fabrics, and even 3D-designed garments have emerged. I appreciate the creativity of designers working with these technologies. However, I personally do not actively use them at this stage. One reason is that many of these products remain experimental. As a ready-to-wear brand, we need commercially viable designs. Additionally, due to the current economic conditions in Turkey, we are operating in a survival mode. Therefore, investing in experimental design projects is not a priority at the moment. While there are designers who actively explore digital design, I prefer to focus on materials and craftsmanship. For example, I have worked with unconventional

materials and techniques even before digital tools became widespread. However, I find that many 3D-produced materials do not yet meet my expectations in terms of quality. Our brand focuses on craftsmanship. We produce items that machines cannot replicate, such as hand embroidery and complex detailing. This allows us to differentiate ourselves in a highly competitive market. While digitalization is transforming the industry, I believe that brands that successfully combine digital tools with traditional craftsmanship will have a competitive advantage.

(22:30)

Interviewer: Thank you.

(22:30)

Interviewee (Zeynep Tosun): I am not sure whether I am answering your questions directly, but I assume I am covering them in the process.

(22:47)

Interviewer: Yes, I am getting the answers I need. Thank you. I am also curious about how digital technologies have affected your customer communication. Since you collect data through various channels, has this influenced how you develop your collections? For example, do you adapt your designs based on data, or do you prefer to maintain your creative direction?

(23:23)

Interviewee (Zeynep Tosun): We do maintain our design identity, but data has significantly influenced our decision-making process. For instance, we may strongly believe in a product, but if it does not sell, we can now clearly understand why. It may be due to insufficient visibility or lack of targeted marketing. We are now able to track performance through data. This allows us to move beyond subjective assumptions and make informed decisions. We still design

products we believe in, but we also prioritize those that perform well in the market. In some cases, certain products are developed primarily for their marketing value. Overall, data enables us to define our strategies much more effectively.

(24:55)

Interviewer: I was also going to ask about customer relations.

(25:00)

Interviewee (Zeynep Tosun): Customer communication has changed significantly. In the past, communication channels were limited. For example, during my mother's time, communication was conducted via fax, and responses could take a long time. Today, customers can reach us through multiple channels simultaneously—phone calls, emails, forms, and even WhatsApp. If they cannot reach us within a few minutes, they may become frustrated. This reflects a broader shift in customer expectations. Despite providing what we consider to be a high level of service, some customers still perceive delays. However, digitalization has made it almost impossible for customers not to reach us. We can also track all interactions, including how often a customer contacts us and through which channels. This allows us to build detailed customer profiles and offer personalized services. For example, we can target specific customers for exclusive events such as sample sales. We have not yet fully transitioned to AI-based customer service. From my observations, fully automated systems still struggle to provide satisfactory responses. In some cases, even large global brands use AI systems that provide limited and repetitive answers. I believe that further development and investment are required for AI to reach an acceptable level in customer service.

(28:35)

Interviewer: We discussed many benefits. Could you also elaborate on the challenges you faced during digital transformation?

(29:01)

Interviewee (Zeynep Tosun): One of the key challenges is the human factor. The effectiveness of digital tools depends on the capabilities of the people using them. For example, even when using AI, errors can occur if the user does not have sufficient language skills. In our case, inaccurate communication in English can lead to serious issues, particularly in international customer interactions. For instance, a small mistake in wording during a return process can escalate into a financial dispute, such as a chargeback in the United States. This process can result in significant financial and operational complications.

Therefore, human oversight remains essential. Even with advanced digital tools, we still need people to monitor and correct outputs.

Another challenge relates to workforce skills. If employees are not digitally literate, it becomes difficult to implement new systems effectively.

For example, we may collaborate with highly skilled pattern makers, but if they are not familiar with digital tools, we cannot continue working with them. This highlights the importance of education and training in digital transformation. Another issue is that digital technologies evolve very quickly. Tools become outdated rapidly, and constant updates are required. If systems are not updated regularly, they quickly lose their value. There are also broader structural challenges. In Turkey, the education system does not always adequately prepare individuals for digital transformation. This creates a gap in skills such as digital literacy, language proficiency, and global awareness. Despite these challenges, I believe that craftsmanship will continue to remain valuable. While digital tools are advancing, certain aspects of fashion production, particularly handmade elements, cannot be fully replaced by technology. In fact, we deliberately focus on products that require manual craftsmanship, such

as hand embroidery and complex detailing, in order to differentiate ourselves. This strategy allows us to maintain a unique position in the market.

(36:05)

Interviewer: I do not have any further questions. Thank you very much.

(36:12)

Interviewee (Zeynep Tosun): If you have additional questions, you can contact me later. I would also suggest exploring the psychological impact of digitalization. Social media and digital platforms create unrealistic comparisons among individuals. Many online representations are heavily edited and do not reflect reality. This has a significant impact on human psychology.

(38:02)

Interviewer: Thank you, I will definitely consider that.

(38:10)

Interviewee (Zeynep Tosun): You are welcome.

Appendix B.4 Interview with Pietro Brunelli (Pietro Brunelli)

Position: Founder & CEO

Company: Pietro Brunelli

Interview Transcript

(00:18)

Interviewer: First of all, if you do not mind, I would like to briefly explain the scope of my thesis so that we can establish a common understanding. My research aims to explore how fashion companies adopt and implement digital technologies and how these transformations influence business models, operational processes, and strategic positioning. In recent years, technologies such as artificial intelligence, data analytics, e-commerce platforms, and digital supply chain systems have significantly reshaped the industry. Therefore, my focus is on understanding how fashion firms integrate digital technologies into their value chain activities, from design to customer engagement and supply chain management. Accordingly, I have several questions, and I would be very happy to hear your managerial perspective.

(01:18)

Interviewee (Pietro Brunelli): Yes, of course. I can speak about our company. Large companies such as Armani or other major groups started digital transformation much earlier than we did. In our case, the initial adoption of digital technologies began approximately 20 years ago. At that time, digital tools were primarily used in design and production. For example, instead of designing collections by hand, we began using software such as Photoshop. We also launched a website, which initially functioned more as a digital showcase rather than a transactional platform. It was mainly used for branding and marketing purposes, to present the company and its values. Therefore, in the early stages, digital technologies were mainly applied to design, production, and marketing. Around 10 years ago, companies in markets such as the United States, the United Kingdom, and France began expanding their online sales significantly. However, in Italy, the situation was very different. Consumers preferred physical stores, as they wanted to see and try on products before purchasing. Before COVID-19, online sales represented only a very small share of the fashion industry, approximately 1%. One of the early players in Italy was Yoox, which later merged with Net-a-Porter. Despite this, the overall adoption of e-commerce in the Italian fashion market remained limited. The real transformation

occurred during COVID-19. With physical stores closed, consumers were forced to shop online. During this period, they became familiar with online purchasing, including returns and payment systems. As a result, trust in e-commerce increased significantly, and online sales grew rapidly. Before COVID-19, our company had some online-oriented clients, such as Zalando, but these were primarily B2B relationships. We sold to them, and they sold to final consumers. However, during COVID-19, we started to invest heavily in our own online channels. Even though online sales represented a relatively small share of our turnover at the time, around 5%, we allocated a disproportionately high level of investment, approximately 40–50%. Between 2020 and 2023, our online business grew by 80–100% annually. We launched our online store using Shopify, which was a very important strategic decision. Before Shopify, platforms such as Magento or PrestaShop were widely used, but they required very high investments, often exceeding €100,000. In contrast, Shopify enabled companies to start an online business with minimal costs. For example, the basic subscription cost is around $40 per month, and ready-made themes can be purchased for approximately $300. This significantly lowered the barriers to entry and allowed even small companies to establish an online presence. Therefore, Shopify played a key role in democratizing e-commerce within the fashion industry. Following this, we also started to invest in digital marketing, particularly through platforms such as Meta, including Facebook and Instagram. We collaborated with influencers and high-profile celebrities, which significantly enhanced brand visibility, which contributed significantly to brand visibility. Additionally, we implemented automated marketing systems, including newsletters and customer segmentation strategies.

(09:18)

Interviewer: I would like to ask about your communication strategy. What types of messages do you send to customers? Are they only related to products, or do they also include other types of information, such as content related to pregnancy?

(09:30)

Interviewee (Pietro Brunelli): Primarily, we focus on our collections. However, communication is increasingly personalized. For example, depending on customer characteristics such as size or specific needs, we suggest different products. We also use tools such as pop-up banners, which appear shortly after a user enters the website. These typically offer incentives, such as a 10% discount on the first order, to encourage registration. During registration, customers can provide additional information, such as whether they are pregnant and their due date. This allows us to segment customers more effectively. For instance, customers in the early stages of pregnancy tend to purchase different products, such as trousers or jeans, compared to those in later stages, who may be more interested in breastfeeding items. Therefore, communication is not limited to product promotion. We also provide content through blog articles, offering guidance on topics such as what to wear during pregnancy or how to prepare for different stages. This represents a broader shift. In the past, search engines such as Google primarily responded to keyword-based queries, for example, “maternity jeans” or “maternity clothes.” However, when users asked more complex questions, such as “what should I wear at the beginning of pregnancy?” or “what should I buy for a specific occasion?”, search engines relied more on blog content. This is why a well-structured e-commerce platform includes not only a transactional interface but also informational content, such as blogs and articles. Today, the situation has changed significantly with the emergence of artificial intelligence. We are currently very advanced in the use of AI. While we were relatively late in developing our online store, we have been very proactive in adopting AI technologies. For example, the images on our website are no longer created through traditional photoshoots. Instead, they are generated using AI tools (e.g., Gemini). The initial shoot is conducted in a studio, and the rest of the visual environment is created digitally. This represents a major transformation, particularly in advertising. AI has fundamentally changed how we approach

marketing. When we advertise on platforms such as Google or Meta, we generate multiple visual variations using AI and continuously test them. We analyze which images perform better and adjust our campaigns accordingly within very short timeframes, sometimes within 24 to 72 hours. Previously, this was not possible. Traditional photoshoots were expensive and time-consuming, and once completed, it was not possible to modify the content easily. Now, we can continuously test, adapt, and optimize our campaigns, significantly improving conversion rates.

(17:42)

Interviewer: When did you start implementing these AI-based practices?

(17:45)

Interviewee (Pietro Brunelli): We started approximately two seasons ago, with the Fall-Winter collection. AI is also integrated into our marketing automation systems. For example, we use Klaviyo, which is integrated with Shopify. At the end of each newsletter, the products recommended to customers are selected by AI algorithms. These algorithms analyze customer behavior, including browsing patterns, time spent on specific products, and preferences such as color or product category. Based on this data, customers receive personalized recommendations aligned with their interests. The objective is to show customers exactly what they are most likely to purchase. However, AI has also introduced new dynamics in the competitive landscape. While AI is highly effective, it requires large volumes of data and significant financial investment to perform optimally. Smaller companies may struggle to compete, as effective AI implementation often requires substantial advertising budgets. For example, in the past, companies could achieve reasonable results with relatively small investments in digital advertising. Today, significantly higher budgets are required to generate meaningful insights and optimize targeting. As a result, AI tends to create a competitive advantage for larger companies with greater financial resources. Another important development relates to how

customers interact with search engines. Previously, search results prioritized advertisements and product listings. However, today, AI-generated summaries, often referred to as “AI overviews,” are becoming more prominent. Customers increasingly rely on these summaries rather than browsing multiple websites. Therefore, it has become essential for companies to ensure that their content is visible within these AI-generated responses. To achieve this, we have adapted our content strategy. Previously, content was written primarily for customers, with an emphasis on engagement and readability. Now, content must also be optimized for AI systems. This involves structuring information in a way that allows AI tools to easily extract key insights. For example, we include concise and clear summaries at the beginning of articles, enabling AI systems to quickly identify and use relevant information.

(25:50)

Interviewer: How do you determine what content to produce? Do you use AI for this process as well?

(25:55)

Interviewee (Pietro Brunelli): Yes, we actively use AI to support content creation. We use AI tools to generate summaries, optimize content for search engines, and improve overall structure. AI is particularly effective in identifying what types of content perform well and how to present information in a way that aligns with search algorithms. It is important to note that effectively using AI requires training. Without proper knowledge, it is difficult to achieve meaningful results. Learning how to create effective prompts and how to guide AI systems is essential. This requires a level of expertise that is still relatively rare, as many people claim to use AI but do not fully understand its capabilities.

(27:50)

Interviewer: Have you implemented AI-based chat systems on your platform, for example for blog or customer interaction?

(28:00)

Interviewee (Pietro Brunelli): We are currently in the process of implementing such systems. Previously, we were not satisfied with the quality of responses generated by AI, which could create issues in customer communication. However, the technology has improved significantly, and we are now planning to introduce AI-based chat systems, while still allowing customers to switch to human interaction when necessary.

(29:20)

Interviewer: You mentioned that digital technologies are widely used in design and marketing. What about production? Have you implemented digital technologies in production processes?

(30:00)

Interviewee (Pietro Brunelli): In production, digital technologies have been present from the very beginning. For example, CAD systems have long been used to manage patternmaking and cutting processes. Even before broader digital transformation, these technologies were essential, as they enabled more efficient use of materials and improved accuracy in production. While certain specialized processes may still require manual intervention, digital tools have been a fundamental component of production for many years.

(31:08)

Interviewer: Would you say that implementing these technologies has improved performance, such as international sales, visibility, or market expansion? How would you evaluate the outcomes of this transformation?

(31:40)

Interviewee (Pietro Brunelli): Digital transformation has fundamentally changed our business. E-commerce has enabled us to reach global markets, allowing us to sell internationally without the need for physical presence. Moreover, digital platforms allow us to customize our offerings for different markets. For example, we can promote specific collections to targeted customer segments in different regions, based on cultural preferences or market demand. Beyond e-commerce, AI is now used extensively across various business functions. For example, when entering new markets, we no longer rely solely on traditional methods such as business trips or in-person market research. Instead, we use AI tools to analyze markets, customer segments, and distribution channels. By providing detailed prompts, we can obtain insights into customer behavior, demographics, and preferences. This allows us to identify target segments, or "buyer personas," much more efficiently.

Previously, such analyses required significant financial investment and time, often involving extensive field research. Today, similar insights can be generated within minutes using AI tools.

(35:40)

Interviewer: Did you receive any formal training to use these tools?

(35:45)

Interviewee (Pietro Brunelli): Yes, training is essential. Without proper knowledge, it is not possible to use AI effectively. Using AI requires learning how to formulate prompts and how to interpret outputs. This is a skill that must be developed, much like any other professional capability. We also use AI for operational purposes, such as cost comparisons. For example, we have logistics operations in both Italy and the United States, each with different pricing structures, units of measurement, and regional cost variations. Comparing these cost structures manually is extremely complex and time-consuming. However, by using AI tools, we can upload large datasets and obtain accurate comparisons within seconds. We primarily use

ChatGPT, but we also use other tools such as Claude and Gemini. These systems are continuously evolving, and each update changes the nature of the responses. For example, earlier versions of AI systems were more conversational, while recent updates have become more neutral, particularly due to concerns about inappropriate or potentially harmful advice.

(41:00)

Interviewer: Which stages of your value chain have been most influenced by digital transformation?

(41:10)

Interviewee (Pietro Brunelli): Digital technologies have had the greatest impact on online sales, marketing, and customer engagement. Digital tools are also important in design and production. However, the impact of AI on design is still limited. While we experiment with AI-generated designs, the results are not yet satisfactory. Therefore, design remains largely human-driven, although supported by digital tools such as Photoshop, Illustrator, and InDesign.

(42:35)

Interviewer: Are your suppliers primarily based in Italy, or do you work with international suppliers?

(42:45)

Interviewee (Pietro Brunelli): Production is entirely based in Italy. However, we source fabrics from Turkey, particularly due to cost and trade advantages.

(43:58)

Interviewer: Could you also elaborate on your sustainability strategy?

(44:00)

Interviewee (Pietro Brunelli): Sustainability has become an important aspect of brand identity, particularly due to increasing consumer awareness. Our approach focuses on the use of natural fabrics such as cotton, linen, wool, and cashmere. We also use materials such as bamboo, which is considered relatively sustainable due to lower water consumption. However, sustainability is complex. For example, while cotton is natural, it requires significant water resources. Similarly, recycled polyester presents challenges, as the recycling process itself can be costly and environmentally problematic. Therefore, we aim to reduce the use of polyester and eliminate plastic packaging, replacing it with alternatives such as bioplastics and recycled paper.

(49:00)

Interviewer: Could you provide some general information about the size and structure of your company?

(49:10)

Interviewee (Pietro Brunelli): In Italy, we are classified as a small company, with approximately €3 million in turnover and more than 15 employees. However, in the global context, we are very small compared to our competitors and clients, which include large international companies such as Nordstrom, Macy's, and Rent the Runway. Previously, we worked with smaller boutique clients. However, many of these businesses have closed, and we now primarily work with large international partners.

(52:08)

Interviewer: Do you use digital tools for demand forecasting and production planning?

(52:15)

Interviewee (Pietro Brunelli): Not extensively at this stage. We still rely largely on manual processes for production planning and demand forecasting. One of the main challenges is data

quality. The data we receive from partners is often inconsistent or inaccurate, which makes it difficult to rely on automated systems. As a result, we continue to manually analyze sales performance and returns in order to make production decisions.

(56:48)

Interviewer: What percentage of your turnover comes from international markets?

(57:00)

Interviewee: Approximately 90% of our turnover comes from international markets. Geopolitical developments have significantly impacted our business. For example, changes in trade policies in the United States have led to increased duties and cost uncertainties. Similarly, operating in markets such as Russia involves regulatory and financial complexities. These factors create significant challenges, particularly when operating in multiple international markets.

(1:02:52)

Interviewer: Thank you very much for your time.

(1:03:00)

Interviewee (Pietro Brunelli): Thank you. It was a pleasure.

(Closing remarks)

Interviewee (Pietro Brunelli): As a small company, flexibility is essential. We must continuously adapt to changing market conditions. Every few years, it is necessary to identify new opportunities in order to remain competitive. Ultimately, success is not determined by turnover alone, but by profitability.