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An On-line Survey of Digital Transformation and its Current Level of Adoption by Companies in the Fashion Industry

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Έχω διαβάσει και κατανοήσει τους κανόνες για τη λογοκλοπή και τον τρόπο σωστής αναφοράς των πηγών που περιέχονται στον Οδηγό συγγραφής Διπλωματικών εργασιών. Δηλώνω ότι, από όσα γνωρίζω, το περιεχόμενο της παρούσας Διπλωματικής εργασίας είναι προϊόν δικής μου δουλειάς και υπάρχουν αναφορές σε όλες τις πηγές που χρησιμοποίησα.

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Synopsis

The research presented in this Thesis focuses in the area of digital transformation, its effects on companies of the fashion industry and explores the level of its perception and adoption by the fashion industry as a whole. In essence, the Thesis attempts to identify the different pathways through which digital evolution and relevant technologies transform the way modern fashion companies operate and deliver value to their customers. The Thesis aims to highlight the main difficulties and benefits this process can generate for fashion companies and to pinpoint technologies and practices with instrumental role in this, sometimes crude, transformation.

To achieve these objectives, a literature review was initially conducted, detailing basic concepts, characteristics and current technology status of the fashion industry, followed by an extensive review of digital transformation and how the technology advancements it introduces can act as catalyst for igniting changes and transformation for companies in the fashion industry. This search led to an initial set of assumptions regarding the state of adoption of digital transformation by fashion industry and guided the formulation of certain research hypotheses, which are the basis for the following statistical analysis. An on-line survey, based on a well thought and designed questionnaire, was carried out to obtain the necessary information from executives with experience in the industry. The survey remained online for 28 days, 73 responses were collected and 13 incomplete responses were excluded, after detailed study of the initial sample. The final sample, after the necessary preparations, was subjected to statistical analysis using SPSS, at a level appropriate for the size of the sample and the particular characteristics of the survey. The results of the analysis, mainly the statistical correlations between answers to selected questions and their evaluation based on statistical indices, like Kendall's tau_b and Spearman's rho coefficients, serve to test the initial hypotheses. Not all of them were verified, however new interesting patterns were established and useful overall conclusions regarding the research questions posed were drawn, which may prove useful to executives of the fashion industry involved in the strategic planning of their companies' digitalization process and efforts.

The main outcome of the statistical analysis in this Thesis, likely to draw the reader's attention, would be the verified assumption that although fashion companies have already begun to adopt digital transformation as part of their operation, they seem to be lagging in the needed actions to integrate a consistent approach of digital transformation in their overall strategy. They seem to focus on customer's satisfaction and the digitalization of customer experience, neglecting other important areas like research and innovation processes and the digitalization of product manufacturing. Furthermore, it seems that a certain resistance towards change and digital transformation still exists within many fashion companies along with a lack of organization and consistency in their digital strategies. Finally, digital transformation seems to be a job for selected executives within the company, rather than include the involvement of the total of a fashion company's human resources. Overall, it is concluded that digital transformation is still at an early stage of adoption by fashion companies and there are still many opportunities to be grasped and progress to be made in that specific area of both research and industrial practice.

Περίληψη

Αντικείμενο της παρούσας Διπλωματικής Εργασίας αποτελεί ο ψηφιακός μετασχηματισμός, η επιρροή και ο βαθμός πρόσληψης και υιοθέτησής του συνολικά από τη βιομηχανία της μόδας. Διερευνώνται ουσιαστικά οι διάφοροι τρόποι με τους οποίους οι ψηφιακές τεχνολογίες επιδιώκουν να μεταμορφώσουν τη λειτουργία και την προσφερόμενη αξία των σύγχρονων εταιριών μόδας. Στόχος της εργασίας είναι να αναδείξει τις βασικές δυσκολίες που ενέχει αυτή η διαδικασία, καθώς και τα οφέλη που μπορεί να έχει για τις εταιρίες. Παράλληλα στοχεύει να επισημάνει τις ψηφιακές τεχνολογίες και πρακτικές που παίζουν καθοριστικό ρόλο στη διαδικασία του έστω και αρχικού ψηφιακού μετασχηματισμού της βιομηχανίας της μόδας.

Προς επίτευξη των στόχων, έγινε αρχικά βιβλιογραφική ανασκόπηση σχετικά με τις βασικές έννοιες, τα χαρακτηριστικά και την τρέχουσα τεχνολογική κατάσταση της βιομηχανίας της μόδας, ακολουθούμενη από ευρεία ανασκόπηση του ψηφιακού μετασχηματισμού και του πως η τεχνολογική πρόοδος μπορεί να γίνει καταλύτης αλλαγών. Η επισκόπηση οδήγησε σε ένα σύνολο αρχικών συμπερασμάτων για το επίπεδο υιοθέτησης του ψηφιακού μετασχηματισμού και διατυπώθηκαν σχετικές υποθέσεις έρευνας, οι οποίες αποτελούν τη βάση για τη στατιστική ανάλυση. Οργανώθηκε διαδικτυακή έρευνα, με κατάλληλα διατυπωμένο ερωτηματολόγιο και στόχο την αναγκαία πληροφόρηση από έμπειρα στελέχη της βιομηχανίας μόδας. Η έρευνα διήρκεσε 28 ημέρες, συλλέχθηκαν 73 απαντήσεις και μετά λεπτομερή αρχική μελέτη του δείγματος αποκλείστηκαν 13 ελλιπείς απαντήσεις. Στο τελικό σύνολο, μετά την αρχική επεξεργασία, έγινε στατιστική ανάλυση με χρήση του λογισμικού SPSS, σε ένα επίπεδο κατάλληλο για το μέγεθος του δείγματος και τα ιδιαίτερα χαρακτηριστικά της έρευνας. Ο έλεγχος των υποθέσεων από την ανάλυση, κυρίως από τις στατιστικές συσχετίσεις και την αξιολόγησή τους με δείκτες, όπως οι συντελεστές τ_b του Kendall και ρ του Spearman, δεν επαλήθευσε όλες τις αρχικές υποθέσεις, ωστόσο οδήγησε σε νέες ενδιαφέρουσες συσχετίσεις και συμπεράσματα, σχετικά με τα αρχικά ερωτήματα που τέθηκαν και τα οποία μπορεί να φανούν χρήσιμα στα διευθυντικά στελέχη της βιομηχανίας της μόδας κατά την διαμόρφωση στρατηγικών ψηφιακού μετασχηματισμού στις εταιρίες τους.

Το βασικό συμπέρασμα που θα τραβούσε την προσοχή του αναγνώστη, θα ήταν η επιβεβαίωση της υπόθεσης ότι οι εταιρίες μόδας, αν και έχουν ξεκινήσει να εντάσσουν τον ψηφιακό μετασχηματισμό στις διάφορες λειτουργίες τους, υστερούν στην πλήρη και συνεπή αφομοίωσή του ως ολοκληρωμένο κομμάτι της στρατηγικής τους. Φαίνεται να εστιάζουν κυρίως στην ικανοποίηση του πελάτη και την ψηφιοποίηση της εμπειρίας του, αμελώντας σημαντικές περιοχές όπως η έρευνα και η καινοτομία, καθώς και η ψηφιοποίηση της παραγωγής νέων προϊόντων. Επιπλέον παρατηρείται μια αντίσταση στην ψηφιακή αλλαγή μαζί με έλλειψη στρατηγικής οργάνωσης και συνέπειας. Τελικά, ο ψηφιακός μετασχηματισμός φαίνεται να αφορά κυρίως επιλεγμένα διευθυντικά στελέχη και όχι τόσο το σύνολο του ανθρώπινου δυναμικού της. Συνοψίζοντας, ο ψηφιακός μετασχηματισμός βρίσκεται ακόμη σε ένα αρχικό στάδιο υιοθέτησής του από τις εταιρίες μόδας, ενώ υπάρχουν πολλές ευκαιρίες και δυνατότητες προόδου στην συγκεκριμένη περιοχή ερευνητικής και βιομηχανικής πρακτικής.

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1 Introduction

The general subject area of the present Diploma Thesis is the digital transformation (DT), with specific focus on how it is implemented within the fashion industry. "*Digital transformation can be briefly defined as the reimagining of business in the digital age".* (What is digital transformation?, 2019). In essence, the concept of Digital Transformation embodies all the pathways that digital evolution and technologies may change the way any company operates and delivers value to the customers, thus adapting to the modern era. Digital transformation is one of the most discussed terms in the current business world, with hundreds of books and articles being written about it and methods being developed on how companies may successfully take advantage of it. It is a slow and continuous process, which affects all industries, at different levels and in different ways, according to their special characteristics. Digital strategies are now an essential part of most businesses and new departments are being created within them, especially dedicated to DT. The main research question posed in this Thesis concerns the current situation in the fashion industry regarding DT, in particular whether DT is being adopted by fashion companies, at which level and to what extent.

1.1 Thesis objectives – research approach

The objective of the Thesis is to address key questions regarding the digital transformation in the fashion industry and the companies operating within it. The most important of these questions concern: the current level of adoption of digital transformation by fashion companies, the challenges this process presents, the potential benefits arising for the companies, as well as the practices that play an instrumental role throughout this process. Obtaining answers to these questions will increase the awareness and understanding of company executives and other employees on DT and, thus, enhance the chances that a fashion company will make informed and successful choices in adopting to the greatest extent the necessary practices to implement digital transformation at all levels of its operation.

To achieve this goal, a broad literature search of the current state of digital transformation and its implementation in the fashion sector is first conducted, followed by an on-line survey based on a carefully designed questionnaire and seeking actual feedback from experienced professionals working in fashion companies. The initial search, based on multiple literature sources and experts in DT and the fashion industry sector, aims to achieve an in depth understanding of DT general concept, as well as of the particularities of the fashion industry. This knowledge allows to put forward hypotheses regarding the implementation of digital transformation in the fashion industry, taking into account the current state of affairs and future trends. The analysis of the on-line survey results constitutes the main tool of the Thesis for actually testing these hypotheses and obtaining a realistic insight into the fashion business, from which valid conclusions can be drawn, regarding the level of adoption of digital transformation by the fashion companies.

The successive stages of the research approach followed in this Thesis are shown schematically in **Figure 1.1.**

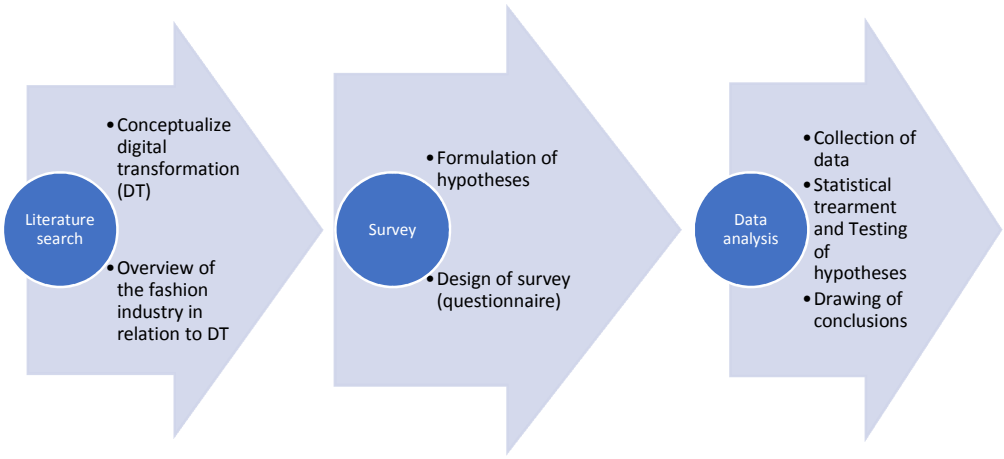

Figure 1.1: Schematic representation of the research approach.

1.2 Constraints

It is obvious, even from its definition, that digital transformation is a broad concept that influences every aspect of a company's functions from production to sales. Moreover, the digital technologies and the ways they can be used in order to transform these functions are countless. The present Thesis cannot aspire to cover all of the above subjects in depth, nor is its goal to do so. On the contrary, it focuses on presenting a general picture of the fashion industry scenery and the level of digital transformation within it without going into great details regarding specific digital technologies and how they work or can be implemented into different sectors of the fashion companies. It is clear that they can be examined separately and in greater detail, but for the purpose of this Thesis they are examined from a more holistic point of view. Furthermore, the approach of the original question takes place from a more strategic rather than practical point of view, so this Thesis will not provide specific steps on how to implement digital initiatives, however it would allow any particular company to evaluate its respective strategies within the general picture arising from the survey results. Suggestions for further research within the general concept of digital transformation in the fashion industry are also made in the last Chapter of the Thesis.

1.3 Thesis outline

The present Chapter is an introduction into the main research questions and objectives of this Thesis, as well as the limitations of the research area covered therein, along with a brief content preview of the subsequent chapters.

Chapter 2 is basically a broad literature review about the fashion industry and includes some basic definitions, a presentation of the various subsectors and a brief historical overview of fashion. It also examines the social and economic importance of the fashion industry and presents the trends that are expected to influence the sector in the following years.

Chapter 3 presents an extended description of the notion of digital transformation and the ways it affects the core aspects of a company's strategy, as well as the new business environment being formed in the digital era. A mention of the 4th industrial revolution is included while a few of the basic digital technologies are also outlined.

Chapter 4 serves as the preparatory stage for the research and presents the various ways that digital transformation affects the fashion industry along with the Thesis author's assessment regarding the opportunities and challenges this new situation presents. The tentative conclusions reached in this Chapter are the basis for the formulation of several hypotheses concerning the research questions posed in this Thesis.

Chapter 5 constitutes the core of the Thesis and describes in detail the research method that was chosen, namely the questionnaire and the on-line survey, which are based on the concepts and issues described in **Chapter 4** and serve to check the formulated research hypotheses. The implementation of these methods, along with the subsequent statistical analysis and the results and correlations that were generated from this analysis, are also part of the fifth Chapter.

Finally, **Chapter 6** is dedicated to the overall presentation of the Thesis conclusions that were mainly drawn from the survey, along with suggestions for further research. Questions posed throughout the Thesis and the validity of the original hypotheses are also discussed in the sixth Chapter.

2 Fashion industry

This Chapter takes a closer look into the fashion industry and its main subsectors. An overview of its role throughout history is presented and its importance for modern society and economy is examined, including the special characteristics of the entire sector. This is important in order to later appreciate the influence of these characteristics in the shaping of the new fashion environment and the role of the companies within it. To begin with, the following definitions, can be used to describe the notions of fashion and fashion industry: (John S. Major, 2018).

*"**Fashion** is best defined simply as the style or styles of clothing and accessories worn at any given time by groups of people".*
*"**Fashion industry** is a multibillion-dollar global enterprise devoted to the business of making and selling clothes".*

2.1 Subsectors

This Thesis extends the notion of fashion industry not only to clothes, but also to accessories, jewelry and cosmetics. The various subsectors are briefly outlined in the following paragraphs.

Apparel-Footwear

Apparel is a more formal word for clothing and within the fashion industry it is used to describe "*clothes of a particular type, when they are being sold in a shop".* (Apparel, 2019). Some observers distinguish between the fashion industry (which makes "high fashion") and the apparel industry (which makes ordinary clothes or "mass fashion"), but by the 1970s the boundaries between them had already become blurred (John S. Major, 2018). It constitutes the biggest subsector of the fashion industry.

Cosmetics

The cosmetic industry is a huge industry that currently generates an estimated annual turnover of US$170 billion. (cosmetic industry, 2019). It can be considered and analyzed separately from the fashion industry, but for the purposes of this Thesis it will be studied as part of it, given the close relationship between the two industries and the number of brands which operate in both (for example, most luxury fashion brands). The cosmetic industry offers a variety of products, including perfumes and make-up and is currently dominated by a small number of multinational corporations.

Accessories

*"A **fashion accessory** is an item used to contribute, in a secondary manner, to the wearer's outfit, often used to complete an outfit and chosen to specifically complement the wearer's look. It has*

the capacity to further express an individual's identity and personality, as there are accessories that come in different, shapes, sizes, hues etc. The term came into use in the 20th century. Fashion accessories can be loosely categorized into two general types: those that are carried and those that are worn". (Fashion accessory, 2019).

From these definitions, provided by Wikipedia, it becomes evident that there is a vast range of products that can be labeled as accessories, including jewelry. In many cases, accessories are part of the product range of big brands, such as Gucci or Dior that also design and sell clothing. In other cases, there are big fashion brands specialized in one type of accessory, such as Bvlgary (jewelry) or Hermes (bags and scarves).

Luxury goods

The luxury goods sector is a subsector of the fashion industry, considered by many as the most influential of all. It includes companies that operate in all of the previously described subsectors, with the difference that their products are labeled as premium, come at higher prices and originally were destined for the "select few", even though this has changed significantly in recent decades. Although the luxury industry is populated by no more than several hundred brands, its importance for the fashion world is great, as it often serves as inspiration for the numerous mass-market brands and creates the new fashion trends of the day. Moreover, the luxury fashion market continues to grow in terms of economic value, with its revenue amounting to US$100,577m in 2019. (Luxury Fashion-worldwide, 2019).

Even though each of the above subsectors presents its own particular characteristics, they also share a lot of common attributes especially in regards to the customer perception and behavior towards them. Moreover, most fashion companies operate in more than one, sometimes even all, of the above subsectors. This is why, throughout this Thesis they will be studied as a whole and their differences will be highlighted, whenever they are of significant value for our purposes.

2.2 A brief history

Even though the fashion industry is a product of the modern age, the concept of fashion, defined simply as the style or styles of clothing and accessories worn at any given time by groups of people, has been present ever since the antiquity. As far back as the Egyptian, Greek and Roman Empires, fashion was a key social element that reflected the society through apparel, accessories and cosmetics.

Ancient Egypt-Ancient Greece-Roman Empire

In Ancient Egypt fashion constituted an important aspect of everyday life with handmade garments and made-to-measure attires being designed and manufactured by skilled craftsmen and artists. Beyond its practical purpose, clothing also served as a sign of social status. For

example, the Pharaohs opted for clothing and jewelry made only by the finest and most expensive materials, introducing for the first time the luxury aspect of fashion. This era roughly marks the appearance of the first cosmetics and make-up products, identifying well the importance of personal grooming for the ancient Egyptians. The same principles applied in Ancient Greece, where clothing was designed with great taste in order to flatter the bodies and the first perfumes were introduced.

During the period of Roman Empire, fashion became more international and grew even more significant as a social status indicator. For the first time, there is a distinction between men and women's fashion, as well as the emergence of the notions of seasonal fashion (different clothing for different periods of the year) and 'elevated' fashion (clothing and jewelry solely for the upper classes). During this era, we witness the birth of the Italian shoe manufacturing industry, which holds its prominent position even to this day.

450 a.c. - 1500 a.c.

The beginning of this time period is characterized by the dominance of the Byzantine Empire, which in terms of fashion was an evolution of the Roman Empire, marked by the development of personal style and the imitation of the fashion choices of the empress by the rest of the women, though with cheaper materials.

The Middle Ages, which followed, were unremarkable in terms of fashion style evolution but contributed to the evolution of the fashion industry. It is also during this period, that differences appear for the first time between nations, regarding their attitude towards fashion and beauty, as well as their choices. Among the most remarkable landmarks of this era one can list the following, as highlighted by Uche Okonkwo in his book *Luxury Fashion Branding*. (Okonkwo, 2007, p. 19).

1. *"England became known for its growing textiles industry".*
2. *"The influence of professional tailoring in France soared to such an extent that by 1300, there were 700 active tailors in Paris".*
3. *"Luxury materials such as silk were heavily imported from Asia, whose textile industry was considered to be more advanced than Europe's".*
4. *"The rise of the Italian influence in international fashion became more visible"*.

Renaissance-Baroque Period (15th-17th century)

The 15th century in Europe was a time of invention, discoveries, communication and art. The cultural development which characterized the Renaissance period enhanced the importance of fashion for the people of that time, with most European countries recognizing its importance. Clothing kept its role as a social status indicator and the aristocratic families of the day became the first fashion "role models" influencing the rest of the people via their fashion choices. During this era, the first fashion trends were invented, e.g. shoulder pads, and there was a further evolution of make-up products which were by now greatly employed. The prominence of Italy

in the Renaissance period as a fashion and cultural center was undisputable, due to its growing textile industry and an economic policy that favored the further development of the fashion industry in the country.

Moving to the 17th century and the Baroque period, there are some notable changes in the fashion scene. France emerges now as the new center of culture and lifestyle, setting the example for the rest of the world. The clothing choices of the time were more focused on comfort and started for the very first time to become more homogenous between different social classes. What is more, clothes cease to be restricted to made-to-measure, following the increase of apparel production. The use of jewelry and accessories, such as handbags, was also common during this period.

18th-19th century

The 18th century found France keeping and increasing its status as the world's fashion and cultural center setting the new trends for the rest to follow. This tendency was made easier by the appearance of the first fashion magazines and the emergence of French socialites as the fashionistas of the day. Meanwhile, there is a development of the luxury fashion sector, mainly in Paris, and the growth of the retailing of clothing in London.

Following the increased demand of luxury goods of the previous years, the 19th century signified the birth of some luxury brands. The most significant evolution in terms of production happened in this century, enabled by Europe's fast industrialization and improvement of manufacturing techniques. Sewing machines were introduced to everyday women, heralding the onset of the ready-to-wear trend.

Meanwhile, America was increasing its economic and cultural role, though still greatly influenced by Europe. Fashion for masses was greatly developed there, while the creation of paper dress combined with the sewing machine provided the means for copying the style of French and English women. Further progress in mass production techniques led to wide adoption of ready-to-wear goods in New York between the 1860s and 1890s. Another retail innovation of this period was the introduction of the decorative window display at retail stores. The American fashion advancement of the nineteenth century also continued with the emergence of other luxury fashion department stores in New York that continue to exist today. In total, a rapid growth is witnessed in the fashion retail industry of New York during this century.

20th century

The 20th century marked the transformation of fashion into an established industry. Fashion products now include accessories and cosmetic, with the first cosmetics companies being launched in the beginning of the century. World wars changed the attitudes of women towards fashion with a greater need for simplicity, while the Hollywood stars of the day served as fashion

icons. At the same time, one observes the launch of many luxury brands of today which marked the establishment of the modern fashion luxury industry and led to the development of business concepts like trademarks and global branding. In America, however, department stores are preferred to Parisian style boutiques for the retailing and distribution of fashion goods. This resulted in fashion being more visible and accessible to the growing American middle class. That was an important step for the successful retailing of ready-to-wear fashion which began in New York.

The 1970's was the decade of the growth and prosperity of fashion manufacturers, notably the American ready-to-wear mass producers. The advancement in manufacturing technology and expertise led to rapid design and product turnover and increased ready-to-wear exports all over the world. During this time people became less interested in haute couture and opted for a more casual and individual look through their fashion choices. (Okonkwo, 2007).

The 1980's was the decade of the punk culture, which meant a more rebellious attitude towards fashion. Fashion of the day showed more ethnic influences and was linked with art and music. Fashion designers and supermodels gained the status of celebrity while the importance of branding was clearer than ever.

During the 1990's, the fashion world is changing with the dominance of big conglomerates and corporate brands such as LVMH or the Gucci group and the rapid growth of mass fashion brands such as Zara and H&M. An innovation is witnessed in selling strategies, enabled by modern technology, while Internet emerges as a new channel for retail and distribution.

Following the dotcom crash and the failure of the first fashion e-retail start-up, the early 2000's marked the first successful e-retail operations. The fashion scene is now global in terms both of customers and production. Countries with lower labor costs are used for the production stage and technology is present in every operational aspect of a fashion company from design to logistics and retail in order to improve efficiency. It is the era of celebrity worship and so the rich and famous are the ones who influence the fashion choices of everyday people. Another significant change is observed in the fashion customer of the day who is more informed, with ever-changing needs and shifts its preference between well-established brands and emerging designers. (Okonkwo, 2007).

2.3 Social and economic impact

The modern fashion industry, which counts only a few centuries of life, is one of the biggest and highest grossing industries in the world with growing tendencies and serves as a huge employer with 890,000 jobs supported across the industry solely in the United Kingdom (Sleigh, 2018), while it employs more than 1,8 million people in the United States. (Maloney, 2019). Therefore, it has a significant social and economic impact, which are discussed in the following subsections.

The environmental impact of the fashion industry and especially that of the fast fashion trend, which has both social and economic aspects, is also significant and constitutes one of the biggest challenges that fashion executives will have to face in the years to come. This issue is further discussed in **Subsection 2.4.1.**

2.3.1 Social impact

It has become evident from the discussion of **Section 2.2** that fashion has been a central aspect of social life throughout history. By studying its evolution, one can draw conclusions about the political and social conditions of each period and the relationships between different social groups. Clothes and accessories are an indispensable part of many social events such as weddings or celebrations, while they can serve as a unifying factor between members of the same social or professional group. Moreover, fashion choices often serve as a unique indicator of each person's personality, taste and preferences and in many cases affect the opinion we form when meeting a new person. The role of the fashion industry isn't solely to provide products that satisfy the practical needs of people (e.g. protection from the cold) but to satisfy their social and psychological needs as well. Persons use clothes as a mean to express themselves, show that they are part of a broader group and, in general, project the image they wish to the rest of the world. As a result, one can safely say that the social impact of fashion is huge, at both the individual and collective level. That is the case, nowadays in particular, as we live in a society of image and the social expectations from fashion are higher and more complicated than ever.

2.3.2 Economic impact

The fashion industry is one of the highest grossing industries with an estimated worth of US$2,4 trillion. Still, there are only a few players who dominate the industry, with 20 companies gaining the 97% of economic profits of the whole industry, as shown in **Figure 2.1**. These companies have established their position as leaders of the fashion industry and most of them are in the luxury segment (McKinsey&Company, 2019).

In the following paragraphs, a few indicative numbers are given for each subsector of the fashion industry regarding their revenue, as well as the growth of the fashion industry as a whole during the last few years and an estimation of its progress in the years to come.

Luxury fashion

- Revenue in the Luxury Fashion segment amounts to US$100,577m in 2019. The market is expected to grow annually by 1.1% (CAGR 2019-2023).
- The market's largest segment is that of Luxury Apparel with a market volume of US$72,755m in 2019.
- In global comparison, most revenue is generated in United States (US$25,046m in 2019).

- In relation to total population figures, per person revenues of US$13.67 are generated in 2019.

(Luxury Fashion-worldwide, 2019)

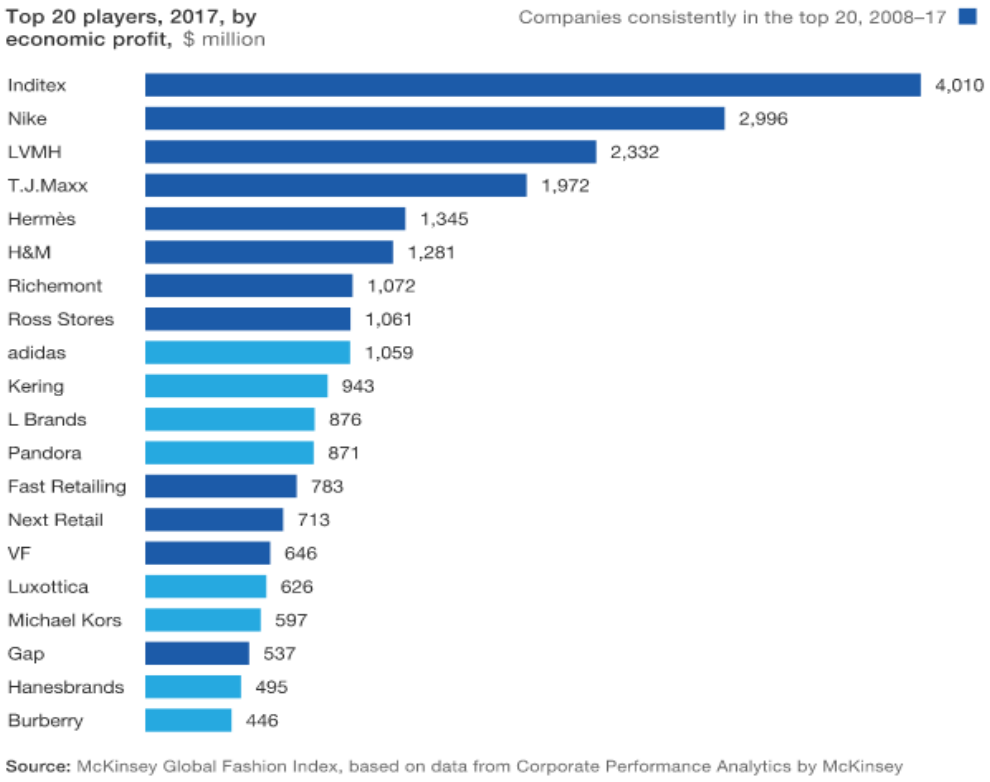

Figure 2.1: The highest grossing fashion companies for 2017. (McKinsey&Company, 2019).

Apparel

- Revenue in the Apparel market amounts to US$1,838,554m in 2019. The market is expected to grow annually by 4.6% (CAGR 2019-2023).
- In global comparison, most revenue is generated in United States (US$348,300m in 2019), as shown in **Figure 2.2**.
- The market's largest segment is the segment Women's & Girls' Apparel with a market volume of US$669,875m in 2019, as shown in **Figure 2.3** .
- In relation to total population figures, per person revenues of US$249.80 are generated in 2019.

(apparel-worldwide, 2019).

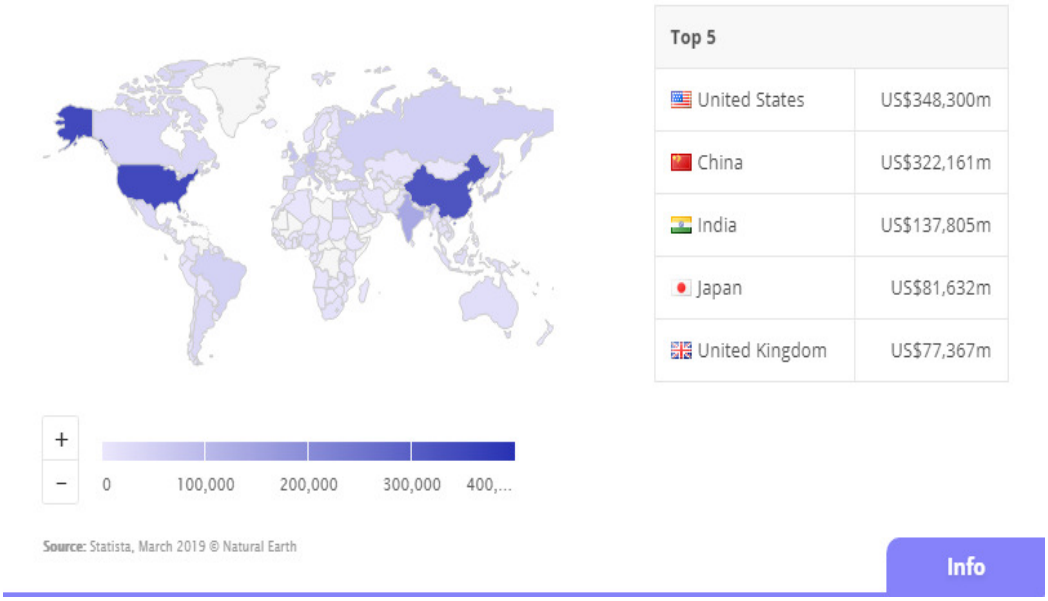

Figure 2.2: The apparel's industry global comparison by revenue. (apparel-worldwide, 2019).

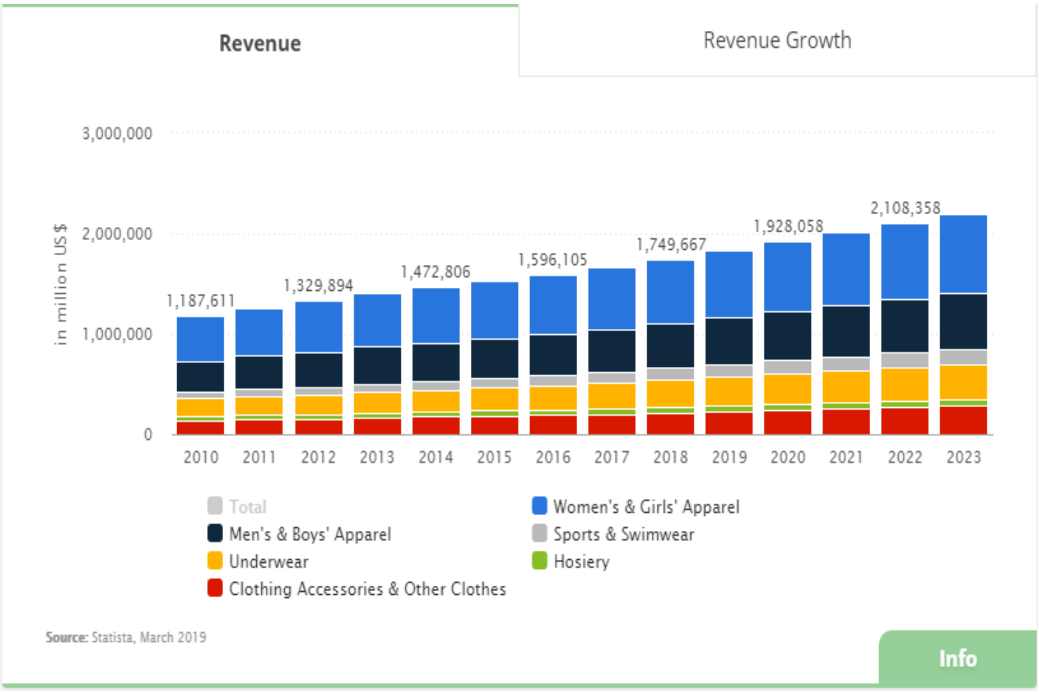

Figure 2.3: Apparel's industry revenue by category. (apparel-worldwide, 2019).

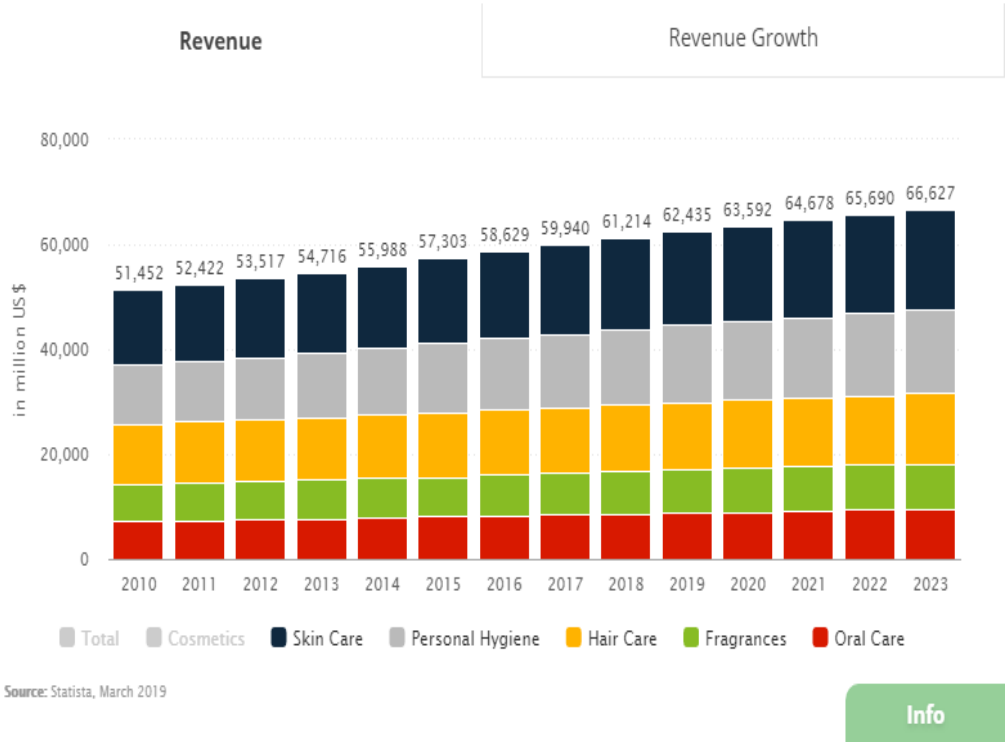

Figure 2.4: The cosmetic's industry revenue by category. (Cosmetics&Personal Care-United States, 2019).

Cosmetics

- Revenue in the Cosmetics & Personal Care market amounts to US$79,814m in 2019. The market is expected to grow annually by 1.8% (CAGR 2019-2023).
- The market's largest segment is the segment Skin Care with a market volume of US$17,769m in 2019, as shown in Figure 2.4.
- In global comparison, most revenue is generated in United States (US$79,814m in 2019), as shown in Figure 2.5.
- In relation to total population figures, per person revenues of US$242.53 are generated in 2019.

(Cosmetics&Personal Care-United States, 2019).

Accessories

- Revenue in the Accessories market amounts to US$55,990m in 2019. The market is expected to grow annually by 1.1% (CAGR 2019-2023), as shown in Figure 2.6.
- In global comparison, most revenue is generated in China (US$109,430m in 2019).
- In relation to total population figures, per person revenues of US$170.14 are generated in 2019.

(Accessories-United States, 2019).

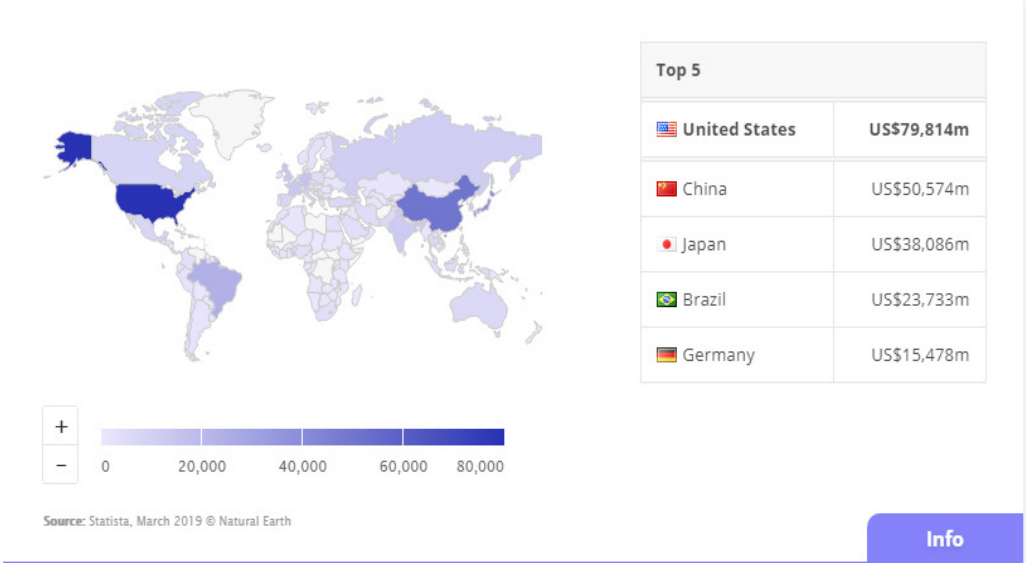

Figure 2.5: The cosmetic's industry global comparison by revenue. (Cosmetics&Personal Care-United States, 2019).

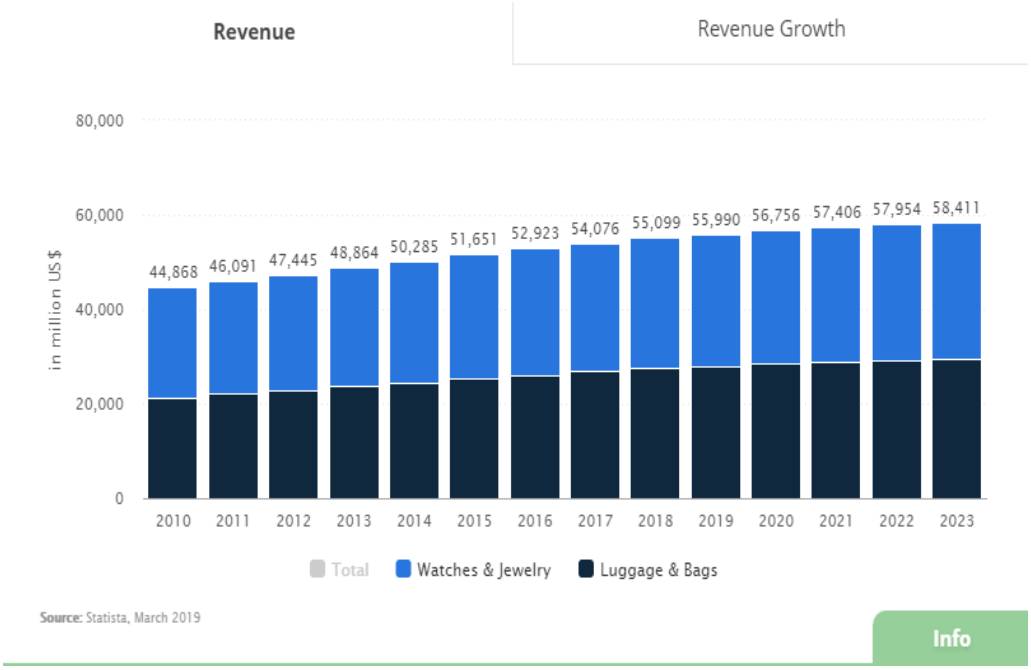

Figure 2.6: The accessories' industry revenue by category. (Accessories-United States, 2019).

Footwear

- Revenue in the Footwear market amounts to US$435,270m in 2019. The market is expected to grow annually by 4.2% (CAGR 2019-2023).
- The market's largest segment is the segment Textile & other Footwear with a market volume of US$202,792m in 2019.
- In global comparison, most revenue is generated in United States (US$91,187m in 2019).
- In relation to total population figures, per person revenues of US$59.14 are generated in 2019.

(Footwear-worldwide, 2019).

Having stated the estimated revenue for each of the aforementioned subgroups, one can get a better idea of the economic size and importance of the fashion industry. Furthermore, to appreciate the steady growth this industry shows, as well as the relative weight of each of these subgroups**, Figure 2.7** presents the fashion industry's sales growth by region, category and value segment, taken from the Mckinsey's Global Fashion Index.

Figure 2.7: The fashion industry's sales growth by region, category and value segment. (McKinsey&Company, 2019).

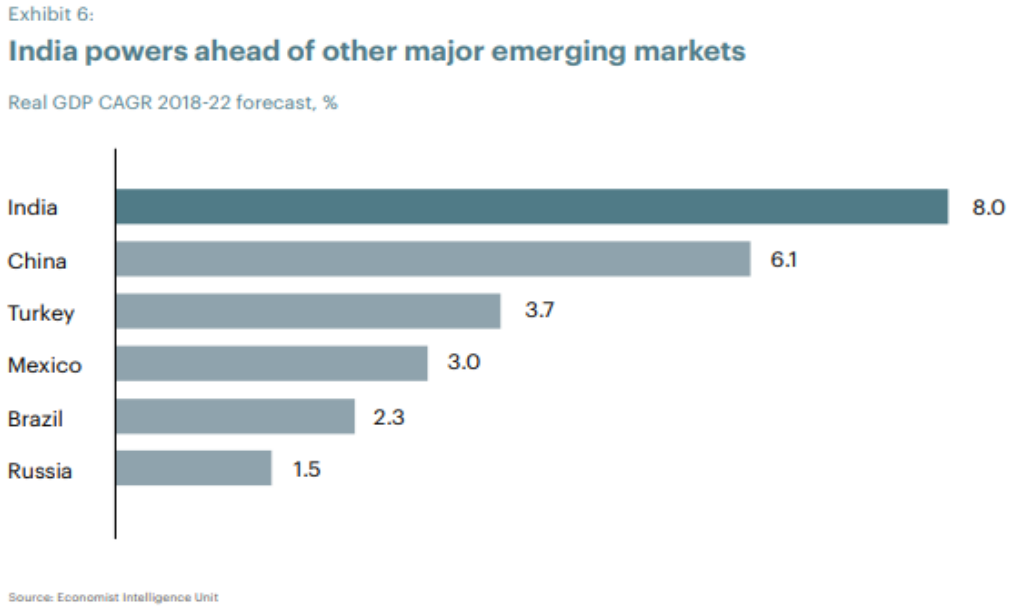

Figure 2.8: The biggest emerging markets by percentage. (McKinsey&Company, 2019).

Finally, another significant factor that contributes to the economic development and presents new opportunities for further growth for the fashion industry are the emerging new markets for fashion goods beyond the traditional ones (Europe and USA). The countries that constitute these emerging markets and are expected to play a major role in the development of fashion industry in the near future can be seen in **Figure 2.8**, taken from the Economic Intelligence Unit.

2.4 Current trends

In this Section, a closer examination will be made of the concept of fast fashion, which caused a revolution in the fashion retail business in the beginning of the 21st century, as well as of some of the new trends and challenges that are expected to strongly affect the scene of the fashion industry in the following years. The digital aspect of these trends as well as other digital related practices will be discussed at a greater extent in **Chapter 4**.

2.4.1 Fast Fashion

To begin with, the concept of fast fashion has radically changed the fashion and retail scenery in the last decades and is expected, perhaps even at a greater extent, to continue prevailing in the years to come. "*Fast fashion is the term used to describe clothing designs that move quickly from the catwalk to stores to meet new trends".* (Fast Fashion Definition, 2019). The collections usually are based on the designs which are presented at fashion weeks by the high-fashion brands. The idea behind fast fashion is to provide customers with the ability to buy the current clothing styles at a much lower price. This concept has transformed the shopping attitude of

customers by changing the frequency in which people buy new fashion products from a few times a year to few times a month or even a week! This was accomplished by the continuous introduction of new products and the renewal of the provided collections multiple times a week to stay on trend. In order to turn this concept into reality fast fashion companies had to innovate their supply chain, designed around producing articles of clothing quickly and cost efficiently. Moreover, fast fashion companies need to be prepared at all times to enable their operations to adapt to the fast-shifting consumer demands. The whole concept of fast-fashion is based on a customer-centered model of clothes manufacturing rather than a product-centered one.

Fast fashion's biggest company, which has almost identified her brand name with the term is the Spanish chain Zara. Other large retailers that have adopted this concept include H&M, Primark and Topshop. These retailers, even though they offer products of a comparatively lower quality are now competing with traditional fashion houses in order to attract the customer's attention and ultimately their preference.

Despite the obvious attractions and benefits of fast fashion for both the retailers and the customers, it has also been subject to a lot of criticism, mainly for its environmental impact and regarding the issue of intellectual property. The fact that fast fashion encourages the continual purchasing of new items means that a large number of "old" items is being disposed of every year. Furthermore, the enhanced load of fashion products that is being produced means additional harm for the aquatic, terrestrial and atmospheric ecosystems due to the emission of polluting gases and release of various pesticides and dyes throughout all stages of textile production. Poor working conditions in the developed countries and minimum wages for the workers employed are an additional source of criticism of fast fashion. Finally, the fact that the collections sold by fast fashion chains are mainly based on the collection presented from various fashion houses during fashion weeks raises the question of intellectual property and how it's threatened by fast fashion. These negative impacts constitute the challenges that fast fashion retailers must face and resolve if they wish to maintain their position in the fashion world and remain an attractive option for the increasingly socially-aware customers of tomorrow. (Fast Fashion Definition, 2019). (Fast fashion, 2019).

2.4.2 New Challenges

Fashion is an ever-changing industry, where trends succeed one another and companies must constantly rethink and adapt their products and strategies in order to maintain their position and assure customers' preference and loyalty. The next thing to examine is the trends that are expected to disrupt the fashion industry in the years to come, as those have been pinpointed by the online publication Business of Fashion and the management consultancy firm McKinsey & Company in their joint report *The State of Fashion 2019.*

Self-disruption

In the modern fashion industry, the entry barriers for new, smaller companies are significantly low, mainly thanks to the dominance of social media as a mean of communication and advertisement. Through the publicity they get from platforms like Instagram and the support they have from various celebrities, new fashion brands manage to attract quickly a large number of customers, especially from younger generations which present less loyalty to traditional brands and are inclined to support up and coming fashion brands. This phenomenon has disrupted the fashion industry and constitutes a potential threat for the big fashion companies with years of existence, which until now have been considering their position in the fashion world firmly established. In order to face this disruption and reach the younger customers, traditional fashion brands need to rethink their whole strategy regarding their brands' image and aesthetics as well as their whole business model and customer channels. In order to become more relevant for the younger crowd they seek collaborations with street fashion representatives while they try to enhance their presence in social media. Moreover, they need to invest in new innovations to keep up with the ever-changing fashion trends. The challenge throughout for the long-established fashion brands, is to make this possible without losing their true core and personality which attracted their customers in the first place. On the other hand, even though gaining fast fame can be an easy task for the emerging fashion brands, finding a way to stay relative and establish a firm position within the ever so competitive fashion scenery is not nearly as easy. Finding a differentiating factor and strongly promoting it is necessary in order to not only survive but even thrive in this market. This factor will intrigue the customers and manage to separate the fashion company that provides it from the rest. The question is which of the new brands can actually bring something new in the fashion industry and how easy is it to remain unique in an era of constant reproductions? In any case, it becomes clear that in order to prevail in the modern fashion scene, both old and new companies have to adopt a strategy of continual change and quick response to customers' evolving needs.

New markets

As briefly mentioned in the previous section, the emergence of new markets for fashion goods constitutes one of the biggest challenges and at the same time opportunities for the fashion brands of today. Those markets can be mainly found in the East, with India standing out between them (**Figure 2.8**). To better understand the room for opportunities that exist within these new markets let us examine closer the case of India. The conditions there are extremely favorable given that its economy is set to grow by 8% annually between 2018 and 2022 and its apparel market is estimated to have a worth of 59.3 billion dollars by 2022. In addition, India's middle class which can serve as a target group for most fashion brands is set to expand at 19.4 percent a year between 2018 and 2022. It is therefore obvious that the Indian population has the means and the will to transform into one of the biggest market place for fashion companies. However, in order to be successful in the Indian market, fashion brands which wish to enter it need to

really understand Indian customers and adapt their strategies to their needs which could differ greatly from those of western customers. For example, the climate of the country is different and people have a closer relation with their tradition, both factors that have a direct effect on the choice of clothing purchased. Another factor that should be taken into consideration are the social and economic inequalities that define India's population. Finally, infrastructure challenges might lead fashion brands to begin with alternative selling channels such as e-retail. All of the above should be taken into consideration when planning the strategy to approach the Indian market, from the clothing collections that will be provided to the actual ways of providing and promoting them. Meanwhile, other eastern markets such as China are expected to keep and even enhance their position as one of the biggest fashion markets in the world and should be given the according attention, again with respect to its own particularities.

Consumer awareness

Nevertheless, the challenges the new fashion scene poses for the companies do not limit themselves to practical and strategic aspects. A company's philosophy and social practices are nowadays another part of the equation. It is undisputable that we live in an era of social awareness manifested in every aspect of everyday life. It is only logical that the fashion world couldn't remain unaffected by this. The new generations of customers show an increasing concern regarding social and environmental issues to the point that it affects their shopping behavior. Consumers are now, more than ever, ready to favor brands that align with their beliefs and boycott those who don't share the same principles. The cases where such actions have taken place are numerous the latest years and have been turned to organized campaigns via social media. For example, a social media campaign against footwear brand New Balance was started due to the company's support to USA's controversial president Donald Trump, with thousands of people posting photos of them destroying their New Balance shoes. Fashion companies, acknowledging the situation, seem ready to respond by taking an active stance regarding social issues such as feminism, racism etc. They achieve this through expressing their support to movements like MeToo, integrating social messages to their campaigns or even brand images and collaborating with N.G.O.'s in order to provide financial aid to sensitive groups (e.g. refugees). But fashion customers aren't satisfied with just a socially awake image from the part of the fashion brands. They need to see that their operations align as well with these principles. Even the personal relations and interests of a company's highest executives might be part of this. It is, therefore, obvious that fashion companies now need to integrate an overall philosophy as part of their brand name and image that does not restrict itself to matters of style and aesthetics but to social issues and principles all around. Such a strategy cannot happen with the view of satisfying all potential customers however, seeing that this is impossible. For that reason, companies should choose the philosophy that actually aligns with the brand's history and essence and meanwhile take extra care when choosing how to express it.

Changing lifecycle processes

Lately, there is a change observed across industries in the consumer behavior of millennials, which amounts to a preference of renting goods rather than buying them. This trend has begun to show itself in the fashion industry as well, where a continuous need for new clothes combined with an increased interest for sustainability urges young consumers to seek alternative options for their fashion goods. This phenomenon along with the elevated prices of luxury goods in recent years has made room for a new market within the fashion industry, based on rental, resale and refurbishment models. There is a number of companies already operating in this market (e.g. Rent the Runaway) and their success is expected to attract more brands to get into this business. In order to keep their relevance to the younger customers, traditional fashion brands need to find a way to embrace this reality either by cooperating with rental and resale companies (as is the case for Stella McCartney) or by providing that option through their own brand. At the same time, fashion companies have to find a way to increase their products lifetime through recycling or reusing parts of them, a practice which has already been adopted by a few brands. The constant need of customers for new fashion trends along with the major environmental issue of sustainability is predicted to enhance the position of the rental-resale market within the fashion industry in the next few years while making rental goods a potential substitute for the products of major existing fashion brands.

Speed to market

Modern technologies have enabled customers to expect a quick delivery of services across many industries (from transportation to products delivery). That is also the case in the fashion industry, where customers wish to find the products they seek at a fast pace, creating a challenge for the fashion companies. This specific need for fast delivery and fast renewal of products is where the whole concept of Fast Fashion, that was studied earlier, is based. It is also a fact that modern customers draw inspiration for their purchases from many sources including social media, influencers etc. They know what they want and don't expect from the fashion brands to shape their desires rather than quickly provide them with the products they are searching for. The need is clear for fashion companies to address this problem by taking the amount of work needed for the product identification off the shoulders of the customer. In order to achieve this, big fashion brands and retailers have already began using modern technologies to develop tools or partnering with technological companies to better fulfil this need of the consumers for fast acquirement of their desired items. The different ways this can be achieved as well as the technologies that enable it will be discussed more thoroughly in **Chapter 4.**

2.4.3 Overall thoughts and questions

The truth is that fashion companies are now faced with a new and unexplored reality and are still figuring out how to adapt to it. Traditional and long-standing fashion brands have faded into

obscurity while new ones appear every day. Moreover, the relationships between partners and rivals are changing and the new scenery cannot be predicted. The expectations for them are getting higher and higher but opportunities arise meanwhile for them to take advantage of. The big question is what it takes for a fashion company in order to prevail in the modern scenery? Which barriers must be overcome? How can all different challenges that need to be tackled, and which at times can be contradictory, be fitted into one overall strategy? Careful planning and consideration will be indispensable for fashion executives along with a readiness to disregard old and perhaps successful strategies and replace them with new and daring ones. If one thing is certain, this is that fashion companies who choose to stick to their old and traditional ways will lose their position in the industry. Change is necessary and willingness to stay ahead of time and drive the evolutions instead of merely following them can prove to be a valuable practice for the companies. In any case, the main driver for all changes, that are shaping up and are expected to reform both the industry and the fashion companies, is digital transformation, the concept of which as well as its implications will be examined in **Chapter 3**. (McKinsey&Company, 2019).

3 Digital transformation

According to the most generic definition of the concept that has been already introduced in **Chapter 1**, "*Digital transformation can be briefly defined as the reimagining of business in the digital age".* (What is digital transformation?, 2019). To be more specific, "*Digital transformation is, in fact, the integration of digital technology into all areas of a business, fundamentally changing how you operate and deliver value to customers. It's also a cultural change that requires organizations to continually challenge the status quo, experiment, and get comfortable with failure".* (What is digital transformation?, 2019). From the definition it becomes clear that digital transformation doesn't amount to a set of new technologies used to optimize operations within a company. Those can be useful tools but the true concept of digital transformation requires a more holistic view and the rethinking of the whole company's strategy to include it. In order to be successful, digital transformation must become an essential part of the culture of a company and be embraced by its leaders. In general, digital transformation drives businesses towards a more customer centric approach. It all begins and ends with the customer, while at the same time transforming other key aspects of a business strategy and operation such as competition, data management, innovation and value, all of which will be analyzed in a greater extent in this Chapter. Through digital transformation these aspects can be improved in order to enhance a company's ability to respond to current market requirements.

Having taken a closer look into the notion of digital transformation, it can be concluded that it presents two main challenges for the existing companies.

1. Developing new ideas regarding the company's products, procedures and overall value.

2. Transforming these ideas into efficient strategies and successfully implementing them into the company's everyday operations, thus making them part of the company's DNA. (Rogers, 2016, p. 240).

These two challenges present different levels of complication and difficulty for each company, depending on the company's nature and size. For example, bigger and long-established companies might find it harder to transform their whole strategy and business model, compared to new startups, which show more flexibility.

3.1 A new business environment

Having made clear the significant impact that digital transformation has or could have on modern companies, the next step is to examine how they adapt in this reality and which is the current state of affairs.

3.1.1 The challenge for long-established companies

It becomes clear that transforming a company that predates the digital age presents greater difficulties than starting a new company, which will embrace current trends from its beginning and will be designed to address customer's new needs. These difficulties can be justified by the necessity for a change not only in the company's operations and mode of function but also in the mentality of the people behind it, from the CEO to the last employer. Changing a business model that has been proven successful for decades isn't an attractive prospect for any big executive, nevertheless it is a necessary one. People must overcome their natural instinct to rely on well-known paths and dare to be tested and adapt to the digital era. Besides the question of mentality, logistics can often be a significant obstacle towards that direction. A huge company with presence in multiple countries and a complex supply chain will find it much harder to transform its operations. It would be a costly and time-consuming venture. Many might even question if it's worth it. A look at cases of various multinational companies and their different approaches towards digital transformation is enough to answer this question.

Indicative is the case of Encyclopedia Britannica, which after years of successful operation realized that modern technologies made its products less relevant to the customers. Instead of insisting on the established business model, it decided to rethink the proposed value to the customers by developing new product offerings and keeping intact its main focus, which is to provide high editorial quality. On the contrary, photographic film maker Kodak refused to rethink its proposed value to the customers when faced with the competition of digital cameras. Instead, it chose to stick to a traditional products and business model, which in the end brought about its bankruptcy.

The conclusion that can be drawn from these cases is obvious. Companies which, despite the difficulties, succeed at responding to the challenges of digital transformation will be able to maintain their position in the industry and accomplish further growth, while those failing to adapt will fade into obscurity.

3.1.2 The rise of startups

One of the biggest impacts of digital technologies and especially the Internet on the business world, is the lowering of barriers for new companies or startups to enter an industry. Furthermore, modern technologies have brought to the surface new needs on the part of the customers, thus creating room for companies designed to address these exact needs. Let us consider the case of Airbnb and Netflix. Both are companies of this century born into the digital era who managed to understand a need of consumers that had not been manifested before and succeeded at fulfilling this need in an effective and unprecedented way. This is the reason why both companies managed to grow at a spectacular rate, creating a huge client basis and

overshadowing their competitors, each in its own industry. They managed in fact to disrupt entirely those industries.

It is important to note, though, that not all startups venturing into an industry by taking advantage of current digital technologies and the way these shape customer's expectations and behavior would result in disrupting the industry. Only the companies that offer far greater value to the customer, in a way that existing firms cannot compete with, will have a strong disrupting effect. That doesn't mean though that the new companies who don't provoke this effect cannot be successful. The majority of start-ups, nowadays, manage to survive in the competitive business environment and even grow, without disrupting the industries within which they operate. (Rogers, 2016).

3.2 Impact on key aspects of a company's strategy

Having outlined the concept of digital transformation and how it has shaped the current business environment, the next step is to examine how it has transformed each of the key aspects of a company's strategy and operation. The following analysis has been chosen in order to underline once more the fact that digital transformation requires an overall and consistent approach and does in fact influence all the vital parts of a company.

3.2.1 Industry 4.0 - digital transformation in operations

The way digital transformation has shaped the manufacturing and operative stage of a company is strongly linked to the fourth industrial revolution or the so-called Industry 4.0. What this revolution basically expresses is a transformation regarding the way products are being produced thanks to the digitization of manufacturing. What has already started with the introduction of computers in the third industrial revolution, is now being evolved to create in the end a new smart factory. Based on digital technologies, like Internet of things (IoT), Cloud Computing and Artificial Intelligence (AI), a new interconnected network of machines is being developed which automizes industrial processes, constantly circulates information and data and finally is able to make simple decisions without the necessary human intervention. The implications of this new factory model are enormous in terms of cost-saving, productivity and wastefulness. More specifically, in terms of operations, digital technologies can help towards quicker identification of problems during the manufacturing stage and thus faster solutions. They can also transform and optimize the logistics and supply chains, as an interconnected system will directly accommodate the new information and adjust the operations accordingly. Moreover, the introduction of robotics and 3-D printing results in guaranteeing a standard quality and uniformity between products. It is therefore obvious that Industry 4.0 amounts to the digital transformation of the manufacturing process for companies, but as it has been already mentioned, this is not where its effect stops.

3.2.2 Customer Relationships

Right from its definition, it is clear that digital transformation has at its center the customer. In the digital age, customers are not passive consumers but form dynamic networks that interact with each other and the companies. This signifies a new two-way relationship between companies and customers, which is based in a form of collaboration between them, creating value at the same time. Brands cannot hope to use mass-marketing strategies in order to persuade consumers to buy their products but need to inspire purchase instead. They also need to understand the new opportunities this relationship presents for them, as modern customers can even act as ambassadors for their brands. For that reason, companies must now focus not only on providing high quality products, but also on improving the overall customer experience through every aspect of their relationship with them. These aspects and the ways a brand can enhance the customer experience through them, taking advantage of digital technologies, are presented below.

Access*:* Modern customers need to have a quick, easy and continuous access to data, content and interactions and the companies that manage to provide that will have a significant leverage in gaining their preference. Luckily, the digital era provides many tools which can be used towards that goal. To begin with, given that mobiles are almost on the verge of substituting the computers for a number of operations, companies need to use mobile commerce in order to make the process of purchasing even easier for the customers. But focusing on only one channel of purchase isn't nearly enough. Instead they should provide an omni-channel experience with an interaction of digital and physical touchpoints, through the use of related apps for instance. The introduction of the Cloud within their operations and the launch of on-demand services for the customers can also aid in achieving a successful access strategy.

Engage*:* Following the successful adoption of an access strategy, businesses need to find a way to engage the customers' attention. To be able to do that in a time were consumers keep being flooded with advertisements throughout all social media and platforms, brands need to provide them with valued content. There are different tools that can be employed towards that end, including product demos, the use of storytelling or the development of content aiming at utility. All these tools, even though they appeal to different parts of a customer's mindset from emotion to logic, can lead to the same desirable effect: captivating the customer. Moreover, modern technologies and social platforms have made it easier to create advertisements of high quality and interaction.

Customize*:* Customization constitutes one of the biggest trends of our-time as well as one of the most effective ways to respond to current customer demands. Digital technologies including e-commerce, the digitalization of media products, 3-D printing technologies and the accessibility of big data have made it possible for brands to customize and personalize their products and services. In order to achieve this and satisfy their customers, companies can offer search engine

recommendations (like Netflix), personalized interfaces and products, as well as personalized content and messages through their social media platforms.

Connect: In order to gain a customer's loyalty, brands must find ways to connect with him and better understand his needs and preferences. Social media may prove to be an indispensable tool for that purpose. First and foremost, companies have to engage in social listening and the improvement of their social customer-services, which will provide them with valuable information. They should also find ways to join the conversation and, through that, ask for ideas from the customers regarding new products or services. An even small participation in the shaping of a brand's products or image is sure to make consumers connect with it more.

Collaborate: The last part of a brand's relation with its customers is collaboration. Taking it a step farther from just asking for ideas, companies can actually invite consumers to actively participate in order to develop a new product or campaign. This contribution can vary from the simple agreement to provide data useful for the company to providing personal content for the purpose of a marketing campaign. The use of crowdfunding and the introduction of collaborative platforms can also contribute to the enlistment of customer's collaboration. In any case, building this kind of relationship with the customers can strongly increase the chances of acquiring their loyalty as well as having them advocate for the brand.

3.2.3 Competition

In modern digital era, the landscape of competition has undergone significant changes and companies must rethink their strategies regarding it. The emergence of startups, as a factor that enhances the competition within the industries, has been already described and now three other major shifts will be examined.

First of all, the relationship between direct rivals is changing. Companies which operate in the same industry sector and are based on similar business models were considered until now enemies, each trying to gain customer's preference over the other. In the modern business environment though, there are times that these companies have to cooperate in order to provide a better value for their customers or face an outside threat (emerging perhaps from a different industry, as discussed below). Accepting this reality and adapting their strategies accordingly is a necessary step for business executives. Another factor that contributes to this phenomenon is that modern digital companies (like Apple or Google) operate in more than one front. For this reason, they might compete with each other regarding one aspect of their services, while cooperating in order to provide a different service or product. Finding a way to manage this multilevel relationship with other firms is perhaps one of the biggest challenges for the companies of today.

A second shift to be noticed concerns the boundaries between industries which are becoming more and more blurry. Modern companies no longer face competition only from other

companies operating in the same industry and based on the same business models. Instead, they have to face competition from firms which operate based on a different business model and come from a different industry, but nevertheless manage to offer the same value to the customers. One might think of hotels and Airbnb, as an example. These competitors are sometimes even more dangerous than the traditional ones, as they find alternative ways to fulfill the same need of the customers. This is the reason that businesses have to focus and build their strategies around providing better value for the customers rather than finding ways to overshadow their competitors.

Finally, the third shift, which is related to the transformation of the notion of competition as we know it, is the changing relationship between businesses and their partners in the supply chain. This can be seen in two seemingly exactly opposite effects: the disintermediation and the intermediation.

Disintermediation: The disintermediation refers to the removal of an intermediary from a series of business transactions. Internet has facilitated this phenomenon providing companies with the ability to directly reach their end customers without the need of a middleman. This can have a negative impact on companies traditionally operating as middlemen, which now find that the value they offer is no longer relevant to the customers or their business partners. In order to avoid this result, companies operating in this field must find a way to add a significant value to their service, such that cannot be overcome by their partners in the supply chain.

Intermediation: The reverse phenomenon of the one described above is being fueled by digital platforms. A platform is defined as a business that creates value by facilitating direct interactions between two or more distinct types of customers. These businesses tend to emphasize on building ecosystems with their key assets often residing in outside networks. Digital technologies have served as a catalyst for the rise of platforms in all industries, offering them the ability to easily acquire customers. In addition, digital technologies provide the companies with universal availability (no need for physical presence) and, most importantly, the chance to grow at a rapid rate, often disrupting the industry within which they operate. The platform business model can be employed separately or in combination with a non-platform business model. Clearly, platform businesses compete with each other as well as with traditional companies depending on the value they offer.

3.2.4 Data Management

In the era of digital transformation, data has evolved from being a useful tool to constituting one of the key strategic assets of a company. Data nowadays can be found almost everywhere in different forms and the main difficulty lies into finding a way to process them and turn them into useful information that can be used for value creation. This difficulty can be noticed mainly concerning big data, the major trend in the data world, which come in an unstructured form.

Fortunately for the companies, new technologies can significantly facilitate data processing, data's accessibility is bigger than ever before (due to the Cloud) and new start-ups specialized in data analytics are more than willing to offer their services. There exist different sources from which businesses can collect data, as well as ways the latter can provide value for a company.

Sources

Perhaps the most important data that a business can collect come from the customers. Those must be collected with the agreement of the customers and there are ways to achieve this while providing customers with added value. A good example of this practice are loyalty programs, where consumers willingly provide companies with personal data for some additional benefits that come with the programs. A sub-category of this source are data that come from lead users, those customers that are more loyal to the brand and interact the most with it. Creating exclusive communities addressed to these customers can provide customers with data of an elevated importance.

Companies can also collect data from their business partners as part of a deal between them and to the mutual interest of both parties. The circulation of data between business partners is not an uncommon occurrence nowadays. Data can also be collected from external sources that do not interact directly with the company such as public organizations (in which case they are usually free) or from firms specialized in data generation (in which case the provided data comes at a price). But the big issue with data is not where to find it but how to turn it into useful information. So how can modern companies take advantage of it and use it for their own benefit? A few ways are described below.

Insight: Obviously, data provide companies with valuable information regarding their customers. They can be indicators of patterns of customer behavior and increase understanding of customer's psychology. These elements can and should strongly affect decisions regarding a company's advertising strategy.

Targeting: Data can also serve as a targeting tool, identifying, for example, the most loyal customer group or highlighting the differences between subgroups within a brand's customer basis.

Personalization: Having identified customer groups with different needs or driving forces, data can be used to design a more personalized experience for each one of them. This may include different campaigns according to each group's characteristics or even slight differences on the services provided by the company to each of them.

Context: The notion of context within data basically amounts to how a customer's data compares to that of the rest. This way companies can identify potential perils for their future

and make useful correlations between a customer's attitude towards their brand and his personal characteristics.

In any case, companies when deciding their data management strategy should be careful to gather diverse data types and combine separate sets of data in order to effectively apply them to product innovation, as well as use it for decision making.

3.2.5 Innovation

Innovation can be defined as any change in a business product, service or process that adds value. The process of innovation, by which new ideas are developed, tested and brought to market, has changed significantly nowadays due to digital transformation. It used to be an often lengthy, difficult and costly process, based on creating the ideal finished product which was then released to the market. Now it can happen in a much easier and cost-effective way mainly thanks to modern digital technologies, such as software programs, data analytics, 3-D printing and computer simulation. What is more, the core and objectives of innovation has changed. It used to be all about finding the perfect solution to an observed problem, whereas now it is identifying the right problem and generating a number of different solutions, which will be further tested and validated. Those solutions, whether products or services, can be now presented to the potential market at a pretty early stage in order to provide valuable feedback for the companies, thus significantly reducing the innovation cycle time. Continuous learning is at the center of modern innovation techniques, which are mostly based on rapid experimentation. In fact, one can divide the experiments that companies run, as part of their innovation process, in two categories:

Divergent experiments: These are the experiments that usually happen at the early stages of innovation and whose goal is to present a chosen sample of customers with a rough prototype of a product or service and record their reactions to it. This kind of experiments have been facilitated by the easier and cheaper creation of prototypes and results in either providing the company with an answer to the original problem or raising more questions.

Convergent experiments: Convergent experiments, on the contrary, usually take place at the late stages of the innovation process and their goal is to present a representative sample of customers with the product or service almost in its finished form in order to find out whether it will be accepted by the market in general. This kind of experiments can happen continually in digital companies such as Google where final changes on the finished product can be applied easily and quickly. Convergent experiments are useful for optimization and aim to provide companies with a definite answer.

Despite their differences, both kind of experiments share the common objective of increasing a company's knowledge, testing the already made assumptions and getting answers from an outside group. Their successful implementation requires a willingness to learn rather than to

decide. The importance of innovation in digital era is extremely high as the need for companies to differentiate themselves is urgent. Innovation techniques can result in the achievement and introduction of this exact differentiating factor in the company's products and offerings.

Therefore, it becomes obvious that in the digital era companies should invest in innovation making it part of their everyday operations and encouraging all employers to occupy themselves with it, without fear of failure.

3.2.6 Value

The value proposition of a company can be defined as the benefits received by a customer from a company's offering. The notion of value and how companies see it has changed significantly due to digital transformation. Even from the definition of digital transformation that we gave earlier becomes obvious that the constant rethinking of a company's value to the customers is an essential part of it. Modern businesses cannot hope to stick with the same value proposition they have offered for decades and expect the same results in terms of popularity and profits. As indicated more than once, modern customer's ever-changing needs signify not only the adaptation of a company's relation with them, but also the constant evaluation of the value proposition's relevance to them. There are numerous cases of companies who failed because their value offerings had no longer relevance to their customers because of the digital era.

In contrast with the analog era, a company's value is nowadays defined by the customers and not the industry within which it operates. Internet and modern technologies have rendered some previously dominant products and services unnecessary, while at the same time have created room for new ones. Rethinking your value, for a company, means identifying your ability to cover current customers' needs and then accordingly adapt your products and services to better fulfill that goal. Are the products or services you provide useful, or rather necessary, to the customers? And, if not, how can you change that? These are the questions modern companies need to keep asking themselves and then act accordingly. In some cases, it means changing the nature of the company's products, while in others changing the addressed market. In any case, a constant search for new opportunities based on customers' new evolving needs and preferences can help towards creating a better value and it's a practice that should be adopted by all companies and not only those that find themselves in a declining position.

It is obvious that changing a company's value is a difficult process, which requires a rethinking of the whole of the company's strategies and operations. Nevertheless, a constant improvement and slight adjustment of a company's value can happen quite easily and with beneficial results for any company, helping them stay ahead of their time. (Rogers, 2016).

3.3 Digital technologies that stand out

In this Section, a closer look will be taken and some definitions will be presented regarding the digital technologies that stand out and play an instrumental role in the process of digital transformation, both in general and within the fashion industry in particular. Their direct implications in the fashion industry will be discussed more thoroughly in the next chapter.

Internet of things: The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. **(**https://en.wikipedia.org/wiki/Internet_of_things). It amounts to a network of interconnected, identifiable entities able to exchange information, basically transforming the physical word into one big information system. An IoT ecosystem consists of web-enabled smart devices that use embedded processors, sensors and communication hardware to collect, send and act on data they acquire from their environments. IoT devices share the sensor data they collect by connecting to an IoT gateway or other edge device where data is either sent to the cloud to be analyzed or analyzed locally. Sometimes, these devices communicate with other related devices and act on the information they get from one another. The devices do most of the work without human intervention, although people can interact with the devices -- for instance, to set them up, give them instructions or access the data. But what is its utility for modern companies?

IoT can be a valuable tool as it provides businesses with a real-time look into how their companies' systems really work, delivering insights into everything from the performance of machines to supply chain and logistics operations. Furthermore, it enables companies to automate processes and reduce labor costs. It also cuts down on waste and improves service delivery, making it less expensive to manufacture and deliver goods as well as offering transparency into customer transactions**.** (Rouse, internetofthingsagenda, 2016).

Big data -Data analytics: Big data is a term applied to data sets whose size or type is beyond the ability of traditional relational databases to capture, manage and process the data with low latency. Big data has one or more of the following characteristics: high volume, high velocity or high variety. Current usage of the term *big data* tends to refer to the use of predictive analytics, user behavior analytics, or certain other advanced data analytics methods that extract value from data. Big data analytics is a form of advanced analytics, which involves complex applications with elements such as predictive models, statistical algorithms and what-if analysis powered by high-performance analytics systems.

Big data has the potential to provide companies with valuable insights into their customers which can be used to refine marketing campaigns and techniques and increase customer engagement and conversion rates. Brands and businesses who utilize big data hold

a competitive advantage over those who ignore the data since they have the ability to make faster and more informed business decisions. Furthermore, utilizing big data enables companies to become increasingly customer-centric. Past and real time data can be used to assess the evolving preferences of consumers, consequently allowing businesses to update and improve their marketing strategies and become more responsive to customer desires and needs.

The different branches of information found in big data include:

- Comparative analysis - This includes the cross examination of user behavior metrics and the observation of real time customer engagement in order to compare one company's products, services and brand authority with those of its competition.
- Social media listening - This is information about what people are saying on social media about a specific business or product that goes beyond what can be delivered in a poll or survey. This data can be used to help identify target audiences for marketing campaigns by observing the activity surrounding specific topics across various sources.
- Marketing analysis - This includes information that can be used to make the promotion of new products, services and initiatives more informed and innovative.
- Customer satisfaction - All of the information gathered can reveal how customers are feeling about the brand, if any potential issues may arise, how brand loyalty might be preserved and how customer service efforts might be improved.

(big data analytics, 2019). (Rouse, searchbusinessanalytics, 2019).

Cloud computing: Cloud computing is a kind of outsourcing of software, data storage, and processing. Users access applications and files by logging in from any device that has an internet connection. Information and programs are hosted by outside parties and reside on a global network of secure data centers instead of on the user's hard drive. This frees up processing power, facilitates sharing and collaboration, and allows secure mobile access regardless of where the user is or what device is being used. Cloud computing is a more efficient way of delivering computing resources. With cloud computing, software and service environments are subscription-based — users pay a monthly fee instead of buying licenses. Software and platforms are managed by the providers and are updated continuously for maximum performance and security. Computing power is remote instead of centralized, so users can tap into extra capacity if business spikes. Multiple people can access a shared program or file and collaborate in real time

Cloud-based apps can be up and running in days or weeks, and they cost less. With a cloud app, you just open a browser, log in, customize the app, and start using it. Here are some reasons why cloud computing is better:

- Accessible from anywhere — Applications and data are not tied to a device. They are accessible from anywhere, enabling real-time collaboration by remote teams.

- Flexible and scalable — Cloud-based applications are infinitely customizable. It is easy to increase power, storage, and bandwidth as users' needs change.
- Cost-effective — Businesses only pay for what they use, usually on a per-month, per-seat basis. There is no hardware taking up space and using electricity 24h a day /7d a week.
- Hassle-free updates — Web-based software is constantly updated. The vendor handles maintenance, backups, and troubleshooting.
- Fast — Service is delivered on demand through a global network of secure data centers that are constantly upgraded for maximum efficiency and performance.
- Secure — Information is not vulnerable to a flood, fire, natural disaster, or hardware failure in one location. Security protocols and infrastructure are constantly analyzed and updated to address new threats.

Businesses are running all kinds of apps and for many purposes in the Cloud, like customer relationship management (CRM), human resources (HR), accounting, and much more, using the services of specialized companies. (cloud-computing, 2019).

Artificial intelligence: Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction. Particular applications of AI include expert systems, speech recognition and machine vision.

In business, robotic process automation is being applied to highly repetitive tasks normally performed by humans. Machine learning algorithms are being integrated into analytics and CRM platforms to uncover information on how to better serve customers. Chatbots have been incorporated into websites to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT analysts. (Rouse, searchenterpriseai, 2017).

Virtual and augmented reality: Virtual Reality (VR) is the use of computer technology to create a simulated environment. Unlike traditional user interfaces, VR places the user inside an experience. Instead of viewing a screen in front of them, users are immersed and able to interact with 3-D worlds. By simulating as many senses as possible, such as vision, hearing, touch, even smell, the computer is transformed into a gatekeeper to this artificial world. The only limits to near-real VR experiences are the availability of content and cheap computing power.

Virtual Reality and Augmented Reality (AR) are two sides of the same coin. You could think of Augmented Reality as VR with one foot in the real world: Augmented Reality simulates artificial objects in the real environment; Virtual Reality creates an artificial environment to inhabit. In Augmented Reality, the computer uses sensors and algorithms to determine the position and orientation of a camera. AR technology then renders the 3-D graphics as they would appear from

the viewpoint of the camera, superimposing the computer-generated images over a user's view of the real world. In Virtual Reality, the computer uses similar sensors and math. However, rather than locating a real camera within a physical environment, the user's eyes are located within the simulated environment. If the user's head turns, the graphics react accordingly. Rather than compositing virtual objects and a real scene, VR technology creates a convincing, interactive world for the user. (Bardi, 2019).

Blockchain technology: A blockchain is, in the simplest of terms, a time-stamped series of immutable record of data that is managed by cluster of computers not owned by any single entity. Each of these blocks of data (i.e. block) are secured and bound to each other using cryptographic principles (i.e. chain). This is a powerful technology, which has industry disrupting capabilities. The reason is that a blockchain network has no central authority — it is the very definition of a democratized system. Since it is a shared and immutable ledger, the information in it is open for anyone and everyone to see. Hence, anything that is built on the blockchain is by its very nature transparent and everyone involved is accountable for their actions. (Rosic, 2016).

Social media: Social media refers to websites and applications that are designed to allow people to share content quickly, efficiently, and in real-time. Many people define social media as apps on their smartphone or tablet, but the truth is, this communication tool started with computers. This misconception stems from the fact that most social media users access their tools via apps. The ability to share photos, opinions, events, etc. in real-time has transformed the way we live and, also, the way we do business. Retailers who use social media as an integral part of their marketing strategy usually see measurable results. But the key to successful social media is to not treat it as an extra appendage but to treat it with the same care, respect, and attention you do all of your marketing efforts. (Hudson, 2019).

3.4 Future evolution

Digital transformation is just getting started and its future is impossible to predict. There are new technologies developing every day and customer's expectations from modern companies will keep on changing as well. For that reason, companies must be ready to rethink their business models at any time and keep evolving their proposed value in order to adapt to the new scenery. Embracing the philosophy of constant evolution and adopting a flexible business model can help companies facilitate this process and treat digital transformation not as a threat but as an opportunity. Following this first overview of the wave of digital transformation and its impact on the business environment and the main strategic areas of a company's operations, the next step is to proceed to the main research objective of this Thesis, namely how digital transformation is shaping the modern fashion scenery and how do companies operating within it are adapting to this new reality?

4 Digital transformation and fashion industry

The fashion industry, being one of the biggest and most profitable industries worldwide, has not remained unaffected by the wave of digital transformation. Nevertheless, the way fashion companies have embraced this new reality and have adapted their strategies accordingly differs significantly from company to company. It is undeniable that digital transformation, can offer to them a great benefit and can help them respond to the requirements of the modern era, however at the same time this process entails challenges and risks that the companies need to overcome. This chapter examines the level of adoption of digital transformation by fashion companies and highlight the ways they have incorporated it to their strategies, while at the meantime pinpointing the challenges this process presents. Perhaps the biggest challenge for fashion companies, while planning their digital strategies, is to find a way to adapt their services and products to meet modern demands, without endangering their brand name in the process. This is an especially hard challenge for luxury brands, for which their brand image and name is their main source of attraction for the customers.

4.1 Key aspects analysis – Current state – Opportunities

Having already described in **Chapter 3** how digital transformation has shaped the key aspects of a company's strategy and operations with the help of some of the main digital technologies, the following step is to examine how these aspects are being currently digitally transformed in the fashion industry, which challenges and opportunities lie within each one of them and which are the digital practices that transform the fashion and retail scenery.

4.1.1 Customer relationships (Social media- Omnichannelling)

As already pointed out in this Thesis, digital transformation has brought the customer at the forefront. He/she is the one who makes the rules now and that is the case more than ever in the fashion industry. Digital technologies have empowered the customers, providing them with continuous information and the ability to share this information (for example, through social media). As a result, their expectations from fashion companies are more complex and elevated than ever. Fashion companies can no longer hope to fit them into categories and rely on the "one solution to satisfy them all" method. Customers need to feel special and be heard at a more personal level.

Fortunately for the companies, digital technologies provide them with the tools to respond to these needs. First of all, social media now have an instrumental role in shaping a relationship between fashion brands and their actual and targeted customers. First of all, they can be used to establish a connection and even entice an actual participation of the consumers in shaping a brand's page e.g. by sharing photos of themselves wearing the company's fashion products.

Swedish multinational clothing company, H&M, has a whole section of their website dedicated to photos of customers wearing the brand's products, under the hashtag #HMxME, encouraging them to share their personal style and offering advantages to those who share their photos, such as participation in contests etc. Social media can also be used as a valuable tool to gain insight about customers and pinpoint the current trends that will shape their preferences in the near future. The unstructured data provided by social media can be turned into useful information thanks to modern data analytics, as described in a following paragraph. Moreover, social media is one of fashion companies' most prominent marketing tools. New collections are being first announced via Instagram, backstage photos are being shared, competitions are being announced and multiple other marketing techniques are being used in order to captivate people's attention and engagement. Finally, social media can serve as an extremely important advertising platform for fashion brands either via a number of celebrities and influencers who are paid to promote a brand's products through their posts or by the customer's themselves who willingly act as their favorite brand's advocates and ambassadors simply through their uploaded photos. It is evident that via all the aforementioned practices, fashion brands can reach a huge audience at a quite small cost. This has become clear to almost all of modern fashion brands which have incorporated social media as an indispensable part of their strategy.

The next opportunity for fashion companies, in terms of enhancing their provided customer experience is the adoption of an omni-channel approach, interconnecting, in other words, their digital and physical selling points and providing the customers with an overall shopping experience. After all, even though fashion customers are becoming more and more digital, choosing e-shops for a large number of their fashion purchases, there is still a great part of fashion customers who prefer to visit physical stores and get a real-time image of the fashion product before buying it. Interconnecting the two options can greatly facilitate the shopping process for customers and strongly enhance the image of the fashion brands which provide it. Imagine being able to quickly track the desired items you saw on the e-shop at the physical store of the brand. Instrumental in achieving this approach is the Internet of Things, which can be used for the tracking of the fashion goods, originally found on-line. But the opportunities for up-scaling a customer's shopping experience do not stop here. Online shopping can be upgraded with the use of Augmented Reality enhanced applications which allow the potential customer to virtually "try" the desired objects before buying them. Such tools could radically transform the on-line shopping experience but very few fashion brands have begun to implement them. Among them a few beauty companies can be listed such as L'Oreal and Maybelline which have launched kiosks in selected stores, where consumers can "try on" the desired make-up product with the aid of virtual reality technologies. Furthermore, applications and on-line services are being developed that provide customers with style advices, thus enhancing their shopping experience. Amazon, for example, has launched Prime Wardrobe Service (allowing customers to try on clothes at home before purchasing them) as well as The Echo Look which turns the Alexa voice assistant into your personal stylist, featuring a voice-activated camera that snaps

photos of you posing in your favorite outfits. The accompanying app has a "Style Check" feature that uses Artificial Intelligence to pick an outfit that both suits your "unique look" and is in tune with the latest trends. The on-line retail game is obviously changing and brands need to level up. Finally, one of the latest trends in fashion shopping, which can also consist an important aspect of omni-channeling, is the mobile commerce. Shopping through your mobile phone is an especially easy and fast option that younger generations seem to prefer. Multiple applications have enhanced this option by providing customers with the ability to try on the items before buying them, as well as quickly tracking on-line the products one has spotted at a store. This practice, called "showrooming" is gaining more and more fans, but only a few retailers seem ready to respond. One of them is fast-fashion pioneer Zara, which has launched a concept store in London, where customers can try on clothing, and immediately shop it online using their phone. In addition, the clothing pieces in the store feature RFID technology, which when taken to a changing room will send matching items to the shopper's smartphone. It is obvious that the opportunities for fashion brands and retailers to completely transform the customers' shopping experience are numerous, thanks to digital technologies, and the ones who fail to respond to modern requirements will soon be out-staged by their more digitally-advanced competitors. (Morais, 2018).

4.1.2 Innovation-Manufacturing

Being able to achieve a stage of constant innovation is indispensable for the modern fashion companies, if they wish to stay relevant for their customers and keep their position in an increasingly competitive environment. They need to constantly experiment in order to evolve and adapt their products to the modern needs. Digital technologies provide the tools to make this possible through 3-D techniques and computer stimulations, which greatly facilitate the production of prototypes at a much lower cost and much quicker pace. Innovation in terms of products mainly amounts to the development of smart products, like smart clothes and accessories, which basically means fashion goods with digital offerings included.

These digital offerings provide customers with health services, communication services, environmental monitoring and more. They can also connect with smartphones giving the user the opportunity to share the information he gets from them with other people and keep a record of it, as well. The smart clothes are mainly based on the concept of Internet of Things and have already been introduced by several fashion companies. For example, Under Armour has launched Athlete Recovery, a range of clothes that absorb heat from the human body and reflects it back onto the wearer's skin as Far Infrared light, a safe energy that is said to encourage better muscle recovery and enhance relaxation (**Figure 4.1**). Under Armour's smart clothes are able to do this due to the implementation of a bioceramic print which is printed onto the underside of each garment. The company has also used this technology in a range of Athlete Recovery bed sheets and pillowcases so you can bathe your entire body in Far Infrared light while you sleep. (Stephenson, 2019). Still there is great room for evolution and experimentation,

especially in the luxury goods industry, where their presence remains notably limited. The same principle applies to smart beauty products which due to the advances in technology and medicine can become even more specialized and be connected to smart devices providing health services to the consumer as well. The unmistakable challenge for fashion companies regarding smart products is to find ways, so that the products keep their aesthetically pleasing role, which is their main function, and are not let be overshadowed by their new utility role. (Behr, 2018).

Figure 4.1: Under Armour Athlete Recovery Sleepwear (Get better night's sleep with Under Armour Athlete Recovery Sleepwear, n.d.).

Of course, the innovation in the fashion industry doesn't restrict itself at the development of new products. It can also be applied throughout the whole process of product manufacturing. The process of sampling can be digitized by combining 3-D simulations of clothing with direct data transfer in Virtual Reality and Augmented Reality applications. This makes room for an adoption of constant experimentation, a policy which can prove extremely beneficial for the fashion companies. The mere process of producing fashion goods can also become much more cost efficient and fast, thanks to technologies such as 3-D printing and robotics. Other technologies that have significantly upgraded the manufacturing process include laser cutting or linear digital printing which already are extensively used by fashion manufacturers and result in the absence of defaults in the final fashion goods. Another technology that should be mentioned is additive manufacturing which could be especially useful in the production of three-dimensional accessories such as buttons or zippers and is yet to be generally applied. Moreover, digital technologies can aid towards the goal of making the fashion goods production more sustainable and environment friendly. The environmental impact of the fashion industry, mainly

because of the short lifecycle of its products, is one of the greatest sources of criticism and one of the biggest challenges that fashion companies must face, especially in this era of increasing environmental awareness from the part of the consumers. Finally, other core processes of a fashion company, such as inventory management and forecasting can be simplified by the application of machine learning techniques. Internet of things can aid in the creation of an integrated digital infrastructure that covers all processes from production to delivery and guarantees total transparency and control over them. That way, business executives can intervene immediately when the system detects a fault, while at the same time all operations will be greatly simplified as the human intervention will not be necessary in the normal course of events. A case where this system can prove to be extremely useful is with luxury goods, where a complete control of their lifecycle can serve as a guarantee of their authenticity and avoid cases of lost or counterfeit goods.

Overall, the implementation of an integrated system which will connect factories with networks and finally retailers can aid not only in increasing the efficiency and sustainability of fashion companies but also shorten production cycles, enabling companies to quickly move from the design stage to the final display of the products. This can result in the production of more customer driven products, while at the same time facilitating the constant innovation approach. The challenge and one of the possible reasons fashion companies are reluctant to proceed with such a plan is that many times fashion goods, especially luxury ones, are intertwined with the concept of exquisite craftsmanship and the handmade touch. This however does not exclude such brands from making the most of the available digital technologies. On the contrary, those two concepts can be combined with most of the manufacturing processes realized by machines leaving room for a few final touches made by expert craftsmen. Such a practice leaves plenty of room for the personalization of fashion products as described in the next section. (Paola Bertola, 2018).

4.1.3 Data Management (Personalization-Information availability)

Data, nowadays, constitute one of the most valuable tools in the hands of a company, as it provides a very useful insight into the customers' preferences, habits and interests. That is also the case for the fashion companies. A careful and directed data management can therefore be used to enhance the overall customer experience, mainly through one of the biggest demands of modern fashion customers: personalization.

Personalization can be defined as the action of designing or producing something to meet someone's individual requirements. In the case of the fashion industry it means designing an overall shopping experience, from the services provided to the customer up to the product itself, which is tailored to each customers' individual characteristics. As indicated earlier in this Thesis, modern customers need to feel special and sense that the brands can understand and connect with them in a more personal way. What could be more personal than a product designed

specifically for yourself? Modern manufacturing techniques, as those presented in the previous section, have made it possible for fashion companies to provide individual tailor-made features to their products such as engravement of initials or the final customization of products according to the customers' choices. Indicative is the case of luxury accessories brand Luis Vuitton (**Figure 4.2**), which gives its customers the opportunity to customize their favorite products by adding their initials on them. (Charlton, 2017).

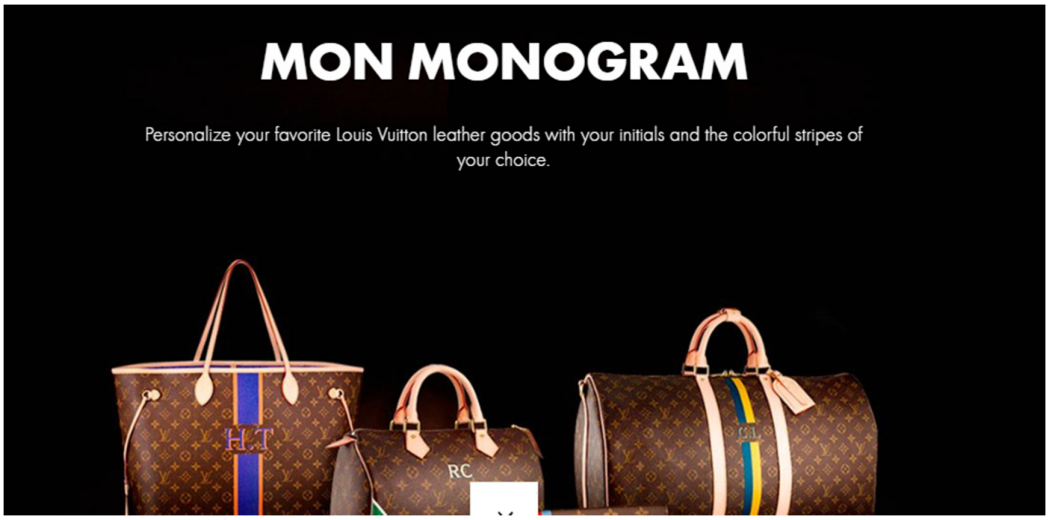

Figure 4.2: Products from Louis Vuitton's personalized collection Mon Monogram (MONMONOGRAM, n.d.).

Providing the option of customization at the final processes of a product's manufacturing can satisfy peoples' need of individuality and personal attention avoiding at the same time lengthy and costly processes. On the other hand, personalizing the services provided to consumers and their overall shopping experience is an even easier task for fashion companies. From keeping track of a customer's on-line purchases and accordingly suggest similar or matching items to sending personalized mails about new products that might interest them, the possibilities are countless and are not limited to on-line practices. Many luxurious fashion brands have created exclusive groups addressed to their most loyal customers who have the opportunity to get previews of new collections, even in person on exclusive events, organized by the companies. Others make sure that the service provided to the physical stores of the brand by the staff, is specially tailored to its customer based on the record of his previous purchases from the brand. Another practice that is being adopted by more and more fashion companies is the preparation of personalized fashion packages with a number of a brand's products which are being sent to loyal customers to choose which of them they will keep and buy after trying them on, returning the rest. All of these practices share a common goal, to satisfy modern consumers' need of feeling special, and are made possible by digital technology tools such as Big Data and Data Analytics. Actually, most of fashion brands have incorporated some method of personalization

to their product and service offerings. Still, taking into account the opportunities this prospect offers to the fashion companies, one can say that most of them are at a very early stage.

Furthermore, the data that companies collect from a huge amount of sources (**Chapter 3**), can turn into useful information for the fashion executives with the help of modern analytics. These may dictate a lot of strategic choices for a fashion company, such as the styles that will be introduced in the next collection, based on the trends people are talking about on social media. Moreover, data analytics combined with IoT and the Cloud can help accelerate the decision-making process, as the time spent from collecting the data to analyzing it, designing the new collection and starting its production will be significantly shortened.

The challenge throughout this process for the fashion companies is to find a way to make sense out of the huge amount of data being collected and more importantly to not over-focus on them, losing the inspirational note of fashion, which is one of its basic elements. Another challenge that exists in data management is that there is not enough circulation of data between departments and people within a company. This is strongly the case in fashion companies that tend to isolate the creative departments from the operating ones. Nevertheless, they need to realize that the generated data affect all sectors of a fashion company, from design to marketing and their availability and circulation should be guaranteed in order for them to be fully taken advantage of. (Lay, 2019).

4.1.4 Competition -A new ecosystem

The scenery of competition in the fashion industry has changed significantly in the last few decades and digital evolution is one of the main reasons why. The rise and consequent dominance of social media has made it easier for relatively new fashion brands to attract fame and customers and take a spot in the fashion industry among the traditional fashion brands, which have been prevailing in the industry for decades. Furthermore, new fashion companies have been created, whose business model differs from that of the traditional manufacturing fashion brands, with which the new ones compete for the same customers. These companies might for example work as platforms and provide rental services for fashion goods (with most characteristic the case of Rent the Runway), a concept especially popular with younger fashion consumers (**Chapter 2**). These emerging companies have greatly influenced the way fashion companies interact with each other and have transformed traditional competitors to potential partners. For example, it is not uncommon to observe alliances between high end brands and fast fashion ones for the launch of selective collections, such as the one between H&M and Moschino (**Figure 4.3**). Other collaborations happen between fashion brands and fashion platforms, as is the case of Rent the Runway (**Figure 4.4),** which eventually managed to enter into collaboration with luxurious fashion brands, which provide their products for rental despite their original hesitations. Another significant change that the digital evolution can bring to the fashion industry, in terms of competition, can be found in the rise of e-shops.

As fashion customers choose the Internet to purchase their desired fashion items, the physical stores, where these items are traditionally displayed, might lose some of their power.

Figure 4.3: Products from the H&M x Moschino collection (Here's Your First Look at the H&M x Moschino Collection, n.d.).

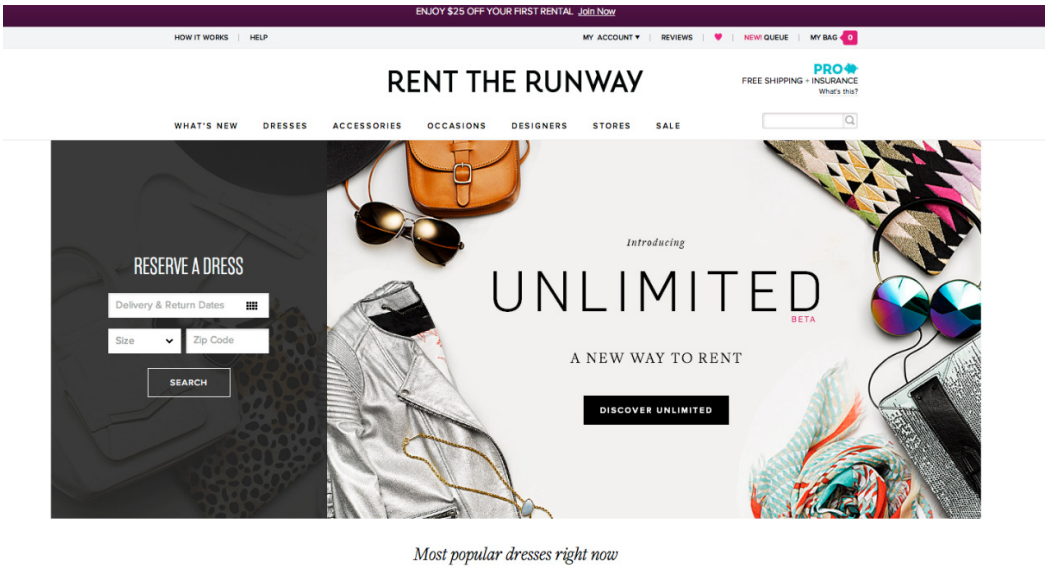

Figure 4.4: Website of the Rent The Runway platform (RENT THE RUNWAY LAUNCHES NEW ACCESSORIES PLATFORM, n.d.).

For example, fashion brands which do not own physical stores of their own might find it unnecessary to keep their collaborations with malls or other fashion department stores as they can now perform all of their transactions online. This new reality can consequently lead to the breaking of traditional partnerships between fashion brands and department stores that sell fashion products, while on the contrary it can lead to new partnerships with online fashion platforms and sites. Furthermore, the collaborations and partnerships of a fashion company's supply chain are also being affected, given the reimagining of the manufacturing and supplying chain operations described earlier. That, in some cases, means breaking the collaboration of partners whose services are no longer necessary for the companies or, in other cases, forming new ones with third parties charged with the analysis of the generated data, for example. Overall, there are new ecosystems being created which include a network of partners, consumers and competitors who share information and capabilities in order to improve the overall value offerings.

4.1.5 Value (Experience over product)

Even though the fashion industry does not belong to the industries whose products have lost their relevance to the customers due to the digital revolution (as was the case with the music industry and CD's, for example), nevertheless this does not mean there is no need for the modern fashion companies to rethink their value proposition and improve their offerings to their customers. It has been underlined many times in this Thesis that digital transformation has brought the customer in a leading position and all key decisions regarding a company's strategy should be based on this fact. The value proposition of a company, being perhaps the most important strategic decision, should therefore be based at a great extent on the customer's needs and expectations. The fashion companies constitute no exception to this rule. On the contrary, having the modern tools to understand the fashion consumers' tastes and expectations, they can now adapt their offered value to cover more needs of the modern multidimensional customer. Using all the methods mentioned in this chapter, fashion companies can evolve their offered value from being just a product to an overall experience. This can happen either by providing customers with a variety of services that will improve their shopping experience (for example sending them samples of products based on their individual taste and previous purchases), or by adding extra features to their current products (such as the aforementioned digital offerings or personalized touches in them), or even by expanding their range of products to not just fashion ones. These are all practices that have been followed successfully by a number of fashion companies. More specifically Levi's has launched a denim jacket that connects to your smartphone (The Commuter x Jacquard), while Ralph Lauren uses customer browse and purchase data, as well as data on best-selling product categories, to produce personalized product recommendations in its e-mails. (Stephenson, 2019), (Charlton, 2017).

Figure 4.5: The Roberto Cavalli home interiors collection (roberto-cavalli-home-interiors-naturalistic-chromatic-collection, n.d.).

Furthermore, a number of luxury goods brands, such as Giorgio Armani and Roberto Cavalli (**Figure 4.5**), have expanded their product range to include home decoration goods, promoting an overall luxurious lifestyle. Besides the switch from the mere production of fashion goods to the creation of an overall shopping experience, fashion brands need to find a way to make a difference in the competitive fashion market in order to attract and engage more customers. This extra differentiating factor in their products or service offerings can help them not only hold their ground but enhance their position in the industry.

Therefore, rethinking their proposed value and accordingly adapting it, is a necessary process for every fashion company, but at the same time it should be done with great attention. The companies must find a way to achieve this change, while remaining loyal to their brand's true character and core. This is why all the products and services provided by fashion companies, as well as the brand image projected throughout all the channels, should be consistent and true to the brand's essence and the company's history. This is extremely important in the case of the fashion industry, and especially the luxury goods sector, because the brand name along with its story and the notions that are connected with it, is the main element that drives the purchases of the fashion customers.

4.2 Overall challenges

Having examined the new reality for the fashion industry due to digital transformation, along with the opportunities it presents within each of the key aspects of a company's strategy, it is now time to summarize the overall challenges that digital transformation may present for

fashion companies. First and foremost, companies must realize that in order to be effective, digital transformation should amount to a whole change in the culture and organization of the company, which brings the customer at the forefront. This can be an issue for long established fashion firms whose size and organizational structure does not facilitate these changes. Moreover, mentality issues on the part of some fashion executives, who believe that the situation is fine as it is and the changes are unnecessary, may also make the implementation of a successful digital strategy a difficult process. Another point that complicates things for fashion companies is that the concept and practices of digital transformation are relatively new and there is an amount of risk involved, concerning the methods that should be followed and how those will affect the existing situation. One should also note that nowadays, especially with all the ongoing discussion concerning the personal data being circulated and people's and customers' concern over it, privacy and security issues can also constitute a barrier for the digital strategies of the fashion companies. Finally, the independent actions between different departments, when it comes to digital transformation and the lack of an overall and consistent digital strategy within the company can lead to opposite results and should be carefully avoided.

4.3 Tentative Conclusions

It has become pretty clear that the fashion scenery has been significantly influenced by digital transformation, mainly from the point of view of the customer's demands and expectations. Fashion companies have begun to react to this reality, at a slow pace however. Improving the overall- customer experience is at the center of their digital strategies and emphasis has been given on practices such as the omni-channel approach or the personalization of services. Meanwhile, innovation in terms of smart or digitally enabled products remains noticeably limited in the fashion world with just a few companies endeavoring such initiatives. From all the digital technologies available to them, social media clearly stands out as a widely used tool for almost all of the fashion companies, while technologies like blockchain and process automation are singularly unexploited. It is therefore our view that modern fashion companies hesitate to make drastic changes and take daring steps in differentiating themselves and prefer to focus on improving their services to the customers in a more controlled manner, in a number of different ways. At the same time, they do not mark the overall improvement of their operations (from production to supply chain) as a priority, but tend to focus on the marketing and sales aspects, which in our opinion are more digitally enabled. Finally, we believe that endangering their brand name and a level of commitment to long-standing strategies are the two main factors that prevent the companies from fully embracing digital transformation, with issues like organizational structure and lack of a consistent and overall strategy also serving as potential barriers for large fashion companies. At the same time, there can be observed huge differences between fashion companies worldwide in terms of how advanced they are with their digital strategies. These differences can mainly be attributed to the individual company's philosophy rather than the subsector within which it operates, as there is no evidence that even fashion

companies within the same subsector share the same attitude towards digital transformation. A potential exception can be noticed in the case of luxury fashion brands, which on the whole appear a little more hesitant in embracing digital transformation, even though significant differences in the level of adoption of digital transformation can be observed there as well. To conclude, it does not seem that modern fashion companies are taking full advantage of the digital possibilities available to them nor have they succeeded in integrating an overall digital strategy to their strategies and operations, thus leaving great room for improvement and further evolution in that area.

The above tentative conclusions, drawn from the analysis of the literature survey presented in the previous chapters, allow us to put forward certain research hypotheses, which are precisely formulated in **Subsection 5.1.4** in the next Chapter. These hypotheses are subsequently tested with the on-line survey described and analyzed in **Chapter 5**.

5 Survey – Questionnaire

Chapter 5 is the central part of this Thesis and describes in detail the chosen research method and the results obtained, in relation to the stated objectives. Section 5.1 covers the creation of the questionnaire and the on-line survey, which are based on the concepts and issues described in **Chapter 4**. Section 5.2 covers the subsequent analysis of the survey results and the correlations that were generated from this analysis.

5.1 Method

The survey method employed and the concomitant questionnaire are expected to achieve a better inside understanding of how fashion companies react to the new reality of digital transformation. Therefore, they should be able to explore the current level of adoption of digital transformation by fashion companies, as well as to reveal the related digital practices and technologies that are currently being considered as an important part of the companies' digital strategies. Furthermore, they should pinpoint the most important expected outcomes of the fashion companies' digital strategies along with the perceived principal barriers in implementing them. In addition, potential correlations between responses to different questions are sought, in order to highlight those that are of a particular significance. In the end, the survey should be a test of the hypotheses alluded to at the end of the previous chapter (**Section 4.3**) and summarized in **Subsection 5.1.4** below.

5.1.1 Sample

The on-line survey that was used is specifically addressed to people working in fashion companies. Given this limitation, the goal was to achieve the participation of a minimum of fifty people in the survey. The only common characteristic of the sample is the occupation of the participants within the fashion industry. Other than that, it includes both males and females, ranging from senior executives to employees, with their area of work within the company ranging from human resources to marketing and production. Additionally, the survey was sent to individuals from all around the world, working in different subsectors of the fashion industry. The goal was to gather a more diverse sample, to the extent that was possible. Further details regarding the characteristics of the sample are presented in **Section 5.2 (Results),** while the method of approaching prospective respondents is detailed in **Subsection 5.1.3 (Procedure**).

5.1.2 Questions

The on-line survey can be described as a social survey and for this purpose a questionnaire was designed with a total of 47 questions. The questions are all in English and are divided into 7 sections. The first section includes questions regarding the participants' and the company's profile along with a few general questions regarding the respondent's view of digital

transformation. These questions (12 in total) are meant to provide a first picture regarding the company's reaction to digital transformation. The questions in this section are of closed type and specifically multiple choice, with the additional answer option of 'Other', when this is considered necessary.

The second section falls under the general question 'Which technologies do you expect to affect more your company's digital strategy in the coming years and to what extent?' Accordingly, the participants were asked to rate a series of eight digital technologies in a 5-point Likert scale ranging from 'To a very great extent' to 'Not at all'. For the convenience of the respondents and in order to ensure there would be no misconceptions, a short description of each digital technology was provided.

Moving on to the third section, the 5-point Likert scale model is also used. The root question for this category is 'Which are the major barriers to implementing your digital strategy and how important are they according to your opinion?'. The participants were consequently asked to rate the potential barriers (Security concerns and issues, Lack of an overall and consistent strategy, Lack of technical skills, Organizational resistance to change, Organizational structure and Budget constraints) in a scale of 5, from 'Extremely important' to 'Not important at all'.

Exactly the same model is used for the fourth section, where respondents were asked to rate the importance of several outcomes for their company's digital strategy, again ranging from 'Extremely important' to 'Not important at all'. The outcomes include: Cost savings, Increase of productivity, Increasing customer service and satisfaction, Facilitation of research and innovation processes, as well as Improved decision making for senior executives.

In the fifth section, participants were asked to respond to the question 'To what extent are the following practices important for your company's digital strategy?' by rating the eleven presented practices in the same Likert-scale that is used in the two previous sections.

The sixth section is dedicated to the results observed so far by digital transformation in the fashion companies and falls under the question 'How much has your company been benefited by digital transformation in the following areas?' The different areas include: Customer satisfaction, Productivity, Information availability to decision makers and Research and Innovation processes, whereas the 5-point Likert scale in these questions ranged from 'A great deal' to 'None at all'.

Finally, the seventh and last section consists of only one question, asking the respondents to rate how effective they find their company's digital strategy so far in a 5-point scale from 'Extremely effective' to 'Not effective at all'.

Each section of the questionnaire aims to obtain responses on the issues presented in **Subsection 5.1.1** (Objectives), while these responses are also studied in combination, in order

to draw conclusions regarding the potential relationship among them. The 5-point Likert scale is chosen in order to facilitate the data analysis after the end of the survey. The whole questionnaire can be found in **Appendix I** , in the exact form it was sent to the prospective participants.

5.1.3 Procedure

This Subsection describes the whole process that was followed from the design of the survey until the final collection of results.

The original questionnaire was designed, influenced by similar existing surveys regarding digital transformation. (Gerald C. Kane, 2015), (The digital change survey, 2017). Subsequently, several changes have been made in the format of the questions, while there have been a few new additions after communication with the supervisor of the Thesis. A pre-test of the questionnaire was considered necessary in order to ensure that it was fully understandable by the addressed sample and that it would serve its designed purpose. After the pretest, with a few individuals working within the fashion company, some final corrections were made, based on their remarks and the questionnaire took its final form (**Appendix I**). An on-line platform (Survey monkey) was chosen in order to facilitate the process of collecting answers, as well as the subsequent management of the collected data. The survey was first aired on August 26,2019 and remained open until September 23, 2019. The effort to approach the participants was mainly realized through LinkedIn, in the form of both posts (at the author's and the tutor's personal pages, as well as at those of a number of fashion related groups) and private messages (with a reference to the posts). Additionally, a number of e-mails was sent to fashion executives kindly asking them to participate in the survey with an attachment of the related link. Overall, more than three hundred people working in the fashion industry were approached, resulting in 73 respondents.

5.1.4 Hypotheses

The general concept of hypotheses which concern the digital transformation behavior of fashion companies and are formulated based on the evaluation of the literature review in the previous chapters has been given in **Section 4.3**. A number of such hypotheses are presented more clearly below.

H1: Social media and Big Data are the technologies that currently affect more the digital strategies of the fashion companies.

H2: Increased customer service and satisfaction is the most important goal of the companies' digital strategies.

H3: Older companies have a higher resistance to change compared to younger ones.

H4: Bigger companies have a greater issue with organizational structure as opposed to smaller ones.

H5: The stage of implementation of a company's digital strategy has an impact on the results observed so far by this digital strategy.

The validity of the above hypotheses will be checked with the help of statistical analysis in the following **Section 5.2**.

5.2 Results

Following the completion of the survey, the data gathered from the responses were extracted in an Excel file. Even though there was a participation of 73 respondents, a number of them did not complete the questionnaire. It was decided to use only the complete answers, as provided by the on-line platform, which amounts to 60. This basically includes the answers of the respondents who made it to the end of the survey (question 47). A few of them might have left a few of the previous questions unanswered, perhaps due to insufficient knowledge of the specific questions or because they simply overlooked them. Given that this was the case for a very small number of the overall questions (1 or 2), it was decided to include these answers in the analysis, treating them accordingly in case of correlations. Given the nature of the survey, the SPSS software was chosen for further analysis of the data.

5.2.1 Data analysis

In SPSS, each question corresponds to one variable and each variable can take multiple values. These values have the form of a name (for example 'Very effective'), but a coding using numerical values was chosen in order to facilitate the analysis. That is, each possible answer for every question is symbolized with a number. The assignment of numerical values to the potential answers follows the same principle throughout all questions. The first possible answer, as presented in the questionnaire, is assigned the value 1 and so on. The only exception is made in the questions were the 'Other' option was available in which case it is always assigned the value 0, regardless of its position in the set of possible answers. For the Likert-scale questions (that is, sections 2 to 7 of the questionnaire) the same principle is applied resulting in the following numerical values to the sets of answers: 1 as the highest value ('To a very great extent', 'Extremely important', 'Extremely effective') and 5 as the lowest one ('Not at all', 'Not important at all', 'Not effective at all'). Even though numerical values have been assigned to the data none of the variables is continuous. All of them are categorical, meaning that they can only take a number of possible values all of which are names (not numbers). Most of them are ordinal, meaning that they have a clear ordering (as is the case for the Likert-scale measured variables), while a few of them are nominal which means there is no ordering between their possible

values. The type of variables is important when choosing the statistical method for their analysis, as it will be shown further on.

The above constitute the preliminary analysis process, even though in the results presentation the answers are shown as presented originally and not with their numerical values. The analysis and presentation of the results is divided into two parts, the first is dedicated to a descriptive presentation of the answers in addition to a comparison between the different answers within each section from 2 to 6, while the second one tackles the correlations that can be observed between various questions. A testing of the hypotheses takes place in both parts, but with the use of different statistical tools. In general, the use of relatively simple statistical tests was decided, as they were deemed sufficient for the purposes of the present Thesis and the nature of the questionnaire.

5.2.2 Main findings

For the first section of the questionnaire, the results for each question are presented in a Table produced by SPSS and a corresponding graph taken directly from the survey platform (Survey Monkey), to give an initial picture of the respondents' and their companies' profiles, in addition to their general attitude to digital transformation. There are representatives of all 10 possible areas of work, while 7 respondents chose the 'Other' option. Their answers were: Retail management, E-commerce, Buyer and export coordinator, Supply chain (which also includes

Table 5.1: Results analysis of Q1 ('Which of the following best describes your area of work within your company?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	7	11,7	11,7	11,7
	HR	3	5,0	5,0	16,7
	Marketing	15	25,0	25,0	41,7
	Sales	9	15,0	15,0	56,7
	Operations	7	11,7	11,7	68,3
	Strategy	3	5,0	5,0	73,3
	Product Development	2	3,3	3,3	76,7
	Finance	4	6,7	6,7	83,3
	General Management	6	10,0	10,0	93,3
	IT	3	5,0	5,0	98,3
	Production	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

part of OM and product development, Business transformation, Digital and DTC retail). Thus, there is a rather representative sample in terms of sectors of work within the company.

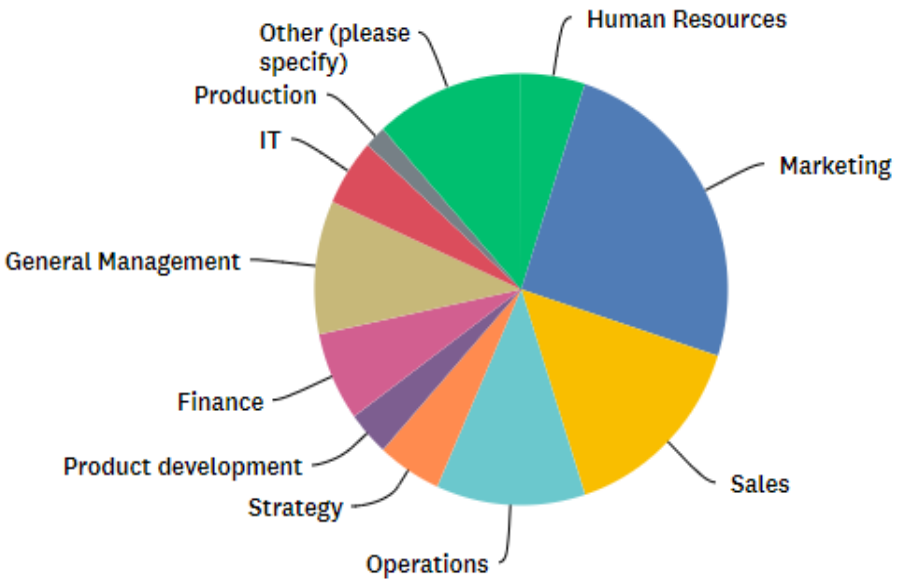

Figure 5.1: Graphic representation of the results in Table 5.1.

From the answers to question 2, summarized in **Table 5.2** and **Figure 5.2**, it is evident that the majority of the respondents occupy a top or middle management level in the company, therefore it can be assumed they have a better image of the company's digital strategy overall. The single 'Other' answer in this question was: Internship.

Table 5.2: Results analysis of Q2 ('Please select the management level that best describes your current position within the company').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	1	1,7	1,7	1,7
	Top level	25	41,7	41,7	43,3
	Middle level	30	50,0	50,0	93,3
	Operative level	4	6,7	6,7	100,0
	Total	60	100,0	100,0	

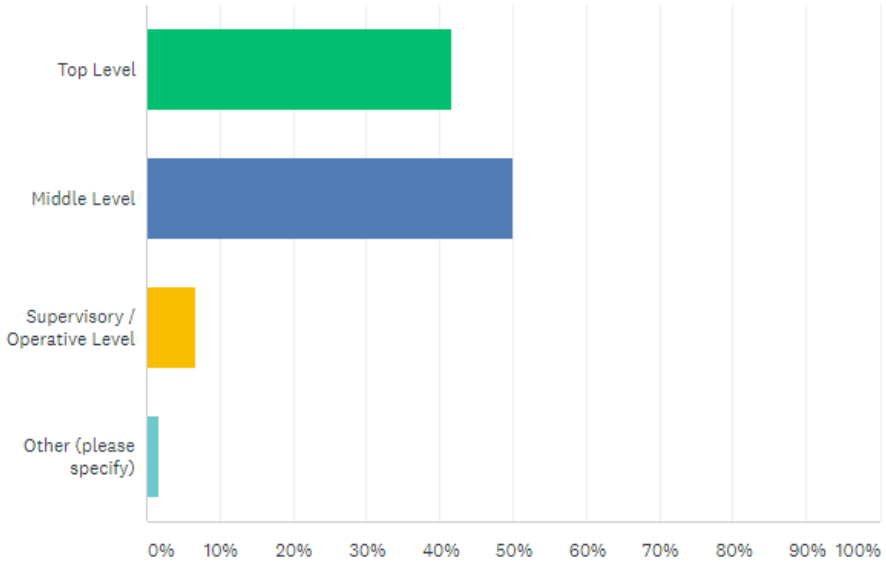

Figure 5.2: Graphic representation of the results of Table 5.2.

As seen in **Table 5.3** and **Figure 5.3,** which summarize the answers to question 3, half of the respondents work in the apparel/footwear subsector of the industry, a percentage that makes sense given that the majority of fashion companies mainly operate in this subsector. The beauty subsector comes next with 20 participants coming from it, while the percentages for Accessories and Luxury goods are significantly lower. Even though there is not an equality in the number of participants it is important to note that all of fashion industry's subsectors are being represented.

Table 5.3: Results analysis of Q3 ('In which segment of the fashion industry is your company primarily active? (By primarily active meaning the segment that presents the highest revenue percentage)').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Apparel/Footwear	30	50,0	50,0	50,0
	Accessories	5	8,3	8,3	58,3
	Beauty	20	33,3	33,3	91,7
	Luxury goods	5	8,3	8,3	100,0
	Total	60	100,0	100,0	

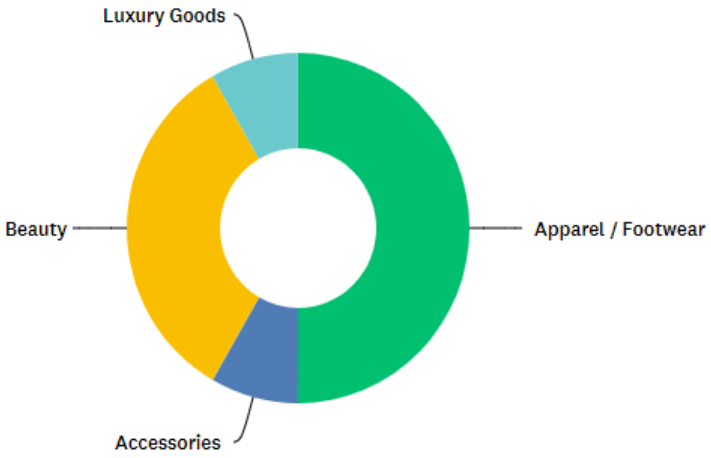

Figure 5.3: Graphic representation of the results of Table 5.3

Table 5.4: Results analysis of Q4 ('Please select the main item of your company's activity/specialization (typically the one that produces the largest percentage of the company's revenue)').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Manufacture/Producer	28	46,7	46,7	46,7
	Retail	32	53,3	53,3	100,0
	Total	60	100,0	100,0	

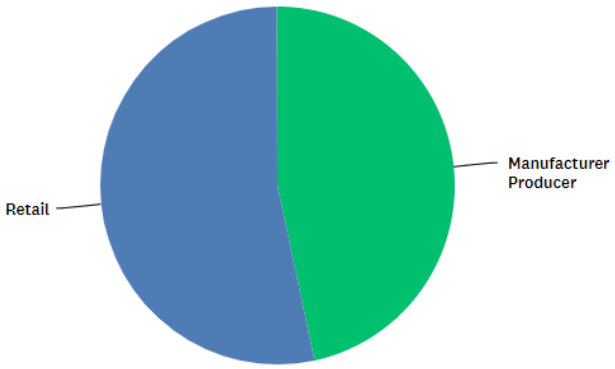

Figure 5.4: Graphic representation of the results of Table 5.4.

In question 4, two more possible answers were given and those were Industry specific, 'Added Value Services (non IT)' and 'Industry specific IT services'. None of the respondents chose the above options, therefore they are not presented in **Table 5.4** and **Figure 5.4 ,** which summarize the results to question 4 **.**

Table 5.5: Results analysis of Q5 ('To what extent, according to your opinion, are digital technologies transforming your industry?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agreat deal	37	61,7	61,7	61,7
	A lot	18	30,0	30,0	91,7
	A moderate amount	5	8,3	8,3	100,0
	Total	60	100,0	100,0	

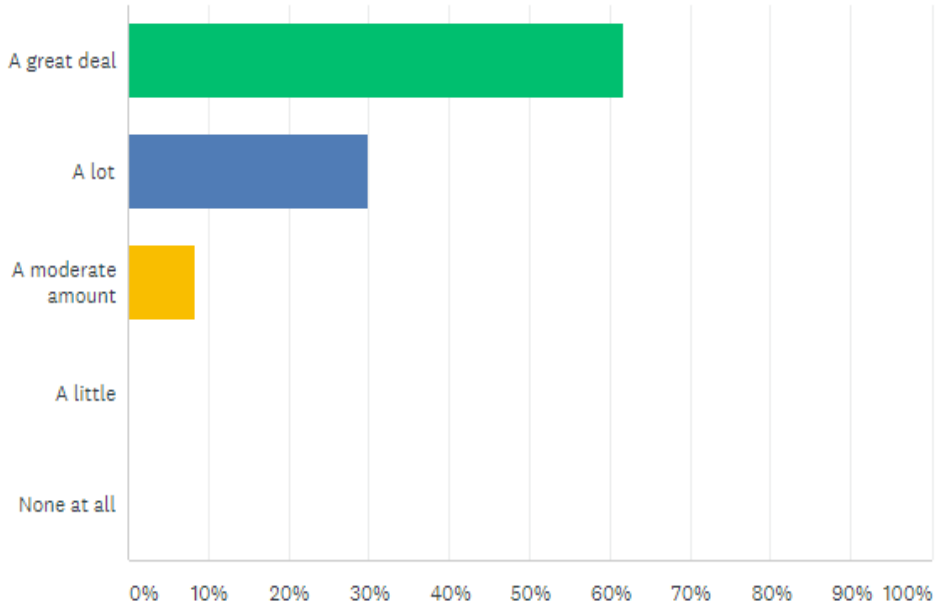

Figure 5.5: Graphic representation of the results of Table 5.5.

In **Table 5.5** and **Figure 5.5,** which present the answers to question 5, one can see that the vast majority (almost 92%) of the respondents believe that digital transformation is transforming the fashion industry to a significant extent (either a great deal or a lot). This indicates that fashion employees and executives are aware of the new reality that exists in the fashion world and it remains to be seen how the companies adapt to it.

Table 5.6: Results analysis of Q6 ('Which is your company's size (based on the number of employees)?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Small	4	6,7	6,7	6,7
	Medium	17	28,3	28,3	35,0
	Large	39	65,0	65,0	100,0
	Total	60	100,0	100,0	

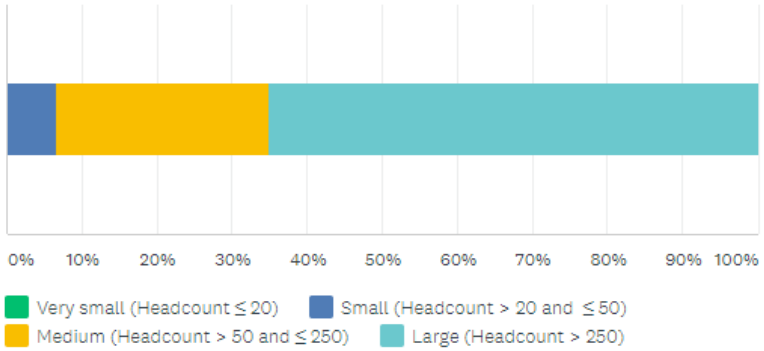

Figure 5.6: Graphic representation of the results of Table 5.6.

Regarding the company size (based on number of employees), **Table 5.6** and **Figure 5.6,** which summarize the answers given by the respondents to question 6, show that more than half of the participants work in large fashion companies while only four of them work in small ones and there was no participant of a very small fashion company. Given that the questionnaire was mainly answered by people found on LinkedIn, such an outcome is reasonable, given that smaller companies do not usually have very active LinkedIn pages.

Table 5.7: Results analysis of Q7 ('Which is your company's size (based on turnover)?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very small	1	1,7	1,7	1,7
	Small	3	5,0	5,0	6,7
	Medium	14	23,3	23,3	30,0
	Large	42	70,0	70,0	100,0
	Total	60	100,0	100,0	

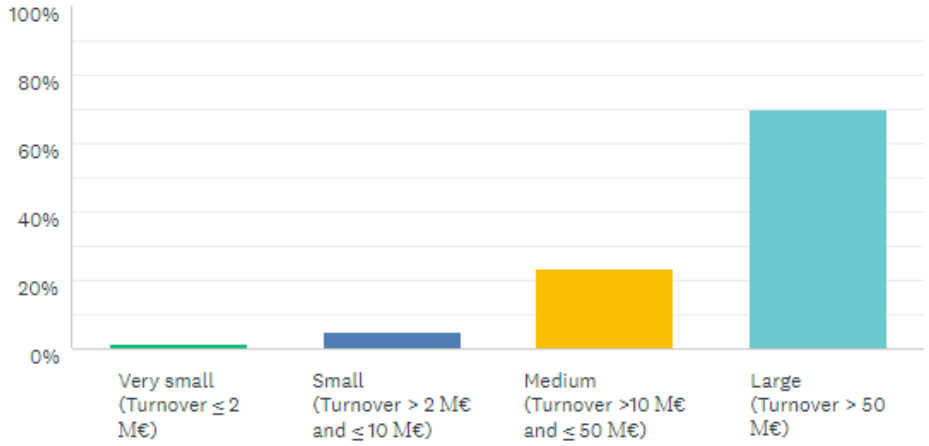

Figure 5.7: Graphic representation of the results of Table 5.7.

The same observations as in the previous question can be made in **Table 5.7** and **Figure 5.7**, which contain the results obtained from the answers to question 7, even though there are a few differences to be noticed between the categorization of a company's size by number of employees and by revenue.

Table 5.8: Results analysis of Q8 ('How many years has your company been in business?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 to 10 years	3	5,0	5,1	5,1
	10 to 25 years	11	18,3	18,6	23,7
	25 to 50 years	14	23,3	23,7	47,5
	More than 50 years	31	51,7	52,5	100,0
	Total	59	98,3	100,0	
Missing	System	1	1,7		
Total		60	100,0		

The answers to question 8, summarized in **Table 5.8** and **Figure 5.8,** show that most participants come from companies with more than a 50 year presence in the fashion industry, and this percentage decreases as the years of presence decrease. There are no respondents from a

company operating less than 3 years and only 3 from companies in business from 3 to 10 years. Again, this distribution makes sense as most fashion companies have an established presence for many years.

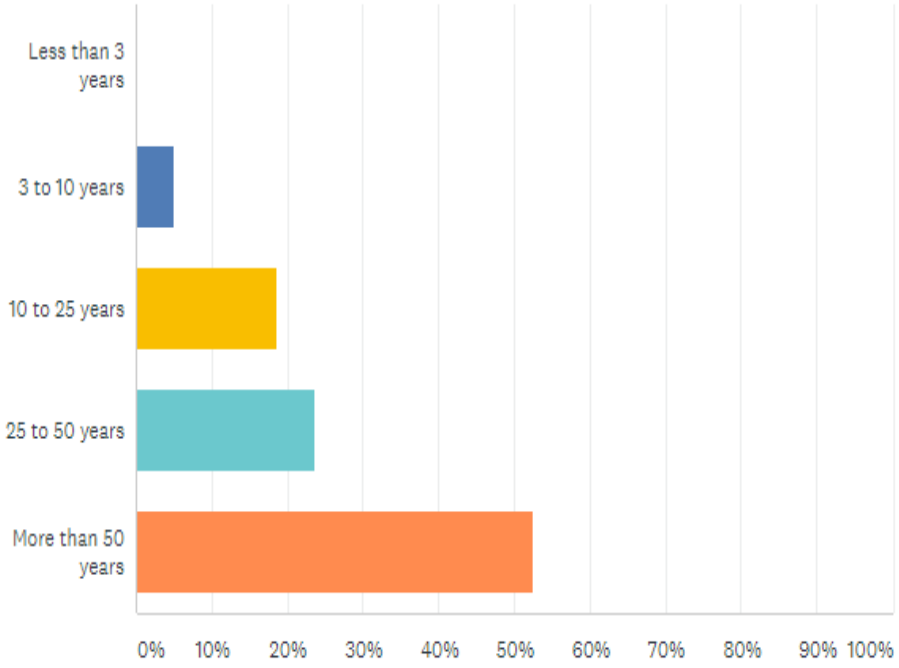

Figure 5.8: Graphic representation of the results of Table 5.8.

Table 5.9: Results analysis of Q9 ('At what stage of implementation is your company's digital strategy?')

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Still under development	13	21,7	21,7	21,7
	Implemented for 1-3 years	14	23,3	23,3	45,0
	Implemented for more than 3 years	30	50,0	50,0	95,0
	I am not familiar with my company's digital strategy	3	5,0	5,0	100,0
	Total	60	100,0	100,0	

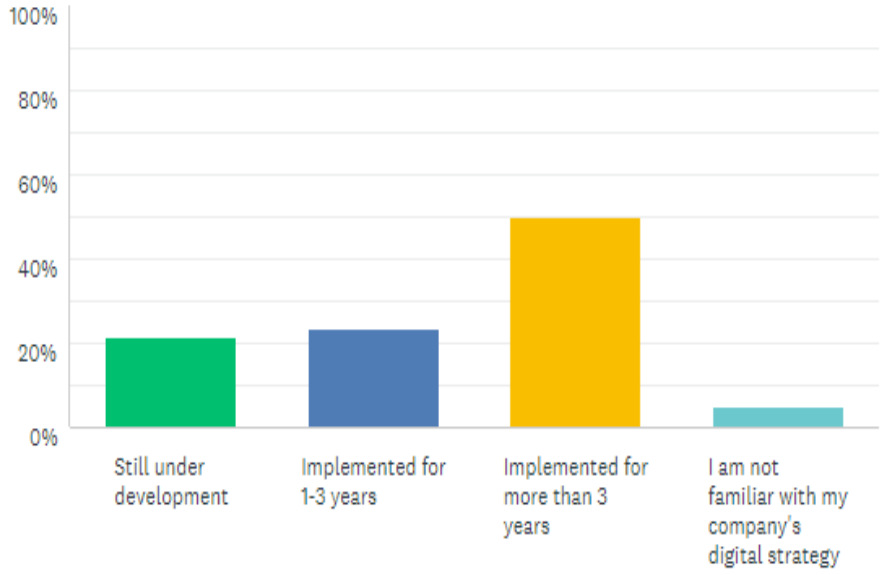

Figure 5.9: Graphic representation of the results of Table 5.9.

Question 9, the answers to which are summarized in **Table 5.9** and **Figure 5.9,** is the first that provides an insight into the level of adoption of digital transformation by the fashion companies. It is important to note that for half of the respondents' companies a digital strategy has been implemented for more than three years signifying a good level of response to the modern business world requirements. On the other side, a significant number of respondents (13) said that their company's digital strategy is still under development, while three of them declared that they are not familiar with their company's digital strategy. There are therefore important differences, regarding the level of adoption of digital transformation among the fashion companies, as observed in **Chapter 4**.

Table 5.10: Results analysis of Q10 ('How does your company implement digital initiatives?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Top down	25	41,7	41,7	41,7
	Bottom up	2	3,3	3,3	45,0
	Through a cross functional team	33	55,0	55,0	100,0
	Total	60	100,0	100,0	

Regarding the method of implementation of their companies' digital strategies, **Table 5.10** and **Figure 5.10,** which summarize the answers to question 10, show that most respondents said either it was implemented top down from a senior management team or through a cross functional team responsible for the digital strategy. Both options signify a tendency towards an overall and consistent digital strategy throughout company's departments, but at the same time excludes employees of a lower level from actively participating in digital initiatives.

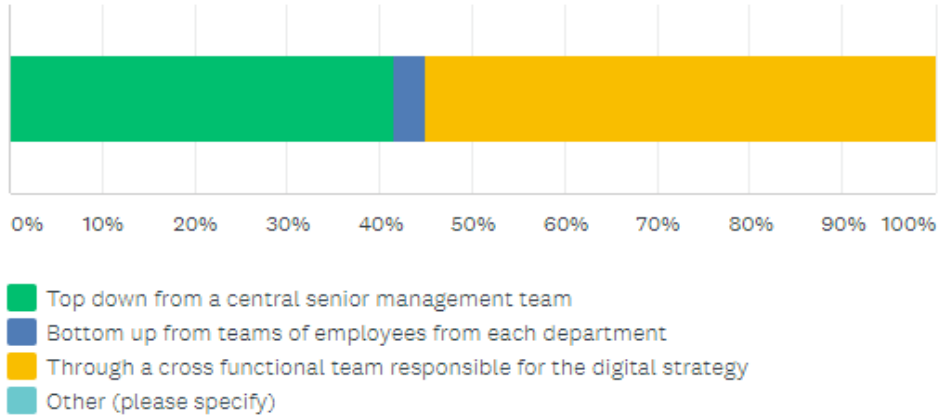

Figure 5.10: Graphic representation of the results of Table 5.10.

The answers to Question 11, which are summarized in **Table 5.11** and **Figure 5.11,** show that participants, when asked to rate their company's digital strategy compared to that of the

Table 5.11: Results analysis of Q11 ('How would you say your company's digital strategy compares to that of the competition?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Far above average	5	8,3	8,3	8,3
	Above average	25	41,7	41,7	50,0
	Average	19	31,7	31,7	81,7
	Below average	9	15,0	15,0	96,7
	Far below average	2	3,3	3,3	100,0
	Total	60	100,0	100,0	

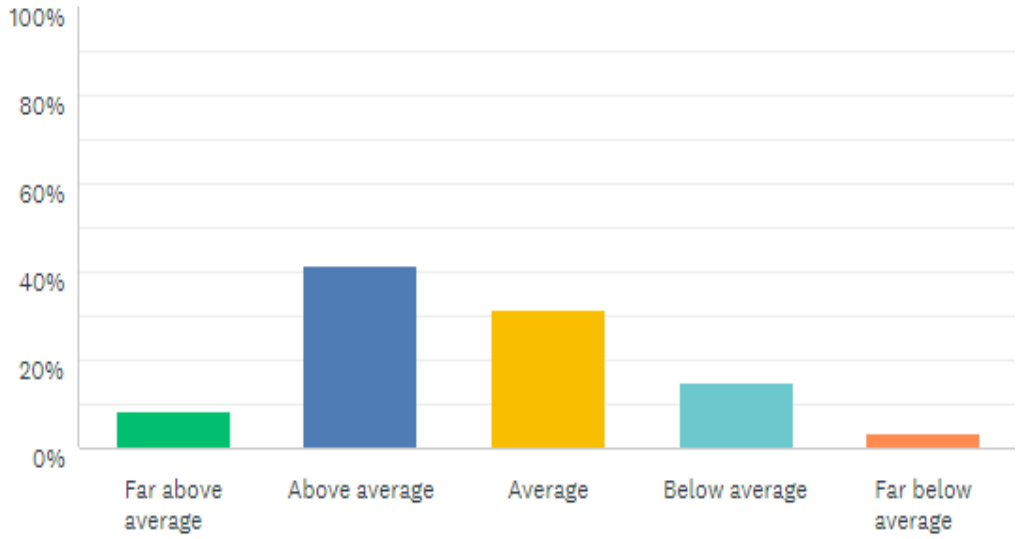

Figure 5.11: Graphic representation of the results of Table 5.11.

competition, tend to view their own company's digital strategy rather favorably, as half of the respondents placed it above or far above average compared to a 20% who placed it below or far below average. A significant number of participants (19) said that their company's digital strategy is right at the average compared to the competition, which evidently means that a number of these companies need to upgrade their strategies in order to stay competitive. It also serves as another identifying factor of the differences between the fashion companies in terms of how they tend to respond to the challenges of digital transformation.

Table 5.12: Results analysis of Q12 ('Have you personally been involved in a digital transformation project and from what position?').

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes, as a project sponsor	5	8,3	8,3	8,3
	Yes, as leader of a team	13	21,7	21,7	30,0
	Yes, as member of a team	18	30,0	30,0	60,0
	No, but i am familiar with at least 1 such project	24	40,0	40,0	100,0
	Total	60	100,0	100,0	

The last question of the first section (question 12), the answers to which are presented in **Table 5.12** and **Figure 5.1 2,**aims to discover the level of participation of the respondents in digital transformation projects. The answers show that 60% of the respondents have participated in such a project from some position, whereas the remaining 40% has not actively participated but knows of at least one such project. These results align with the observation made in question 10, that the implementation of digital initiatives are restricted to certain people to whom this role has been assigned rather than involving more employees in this process.

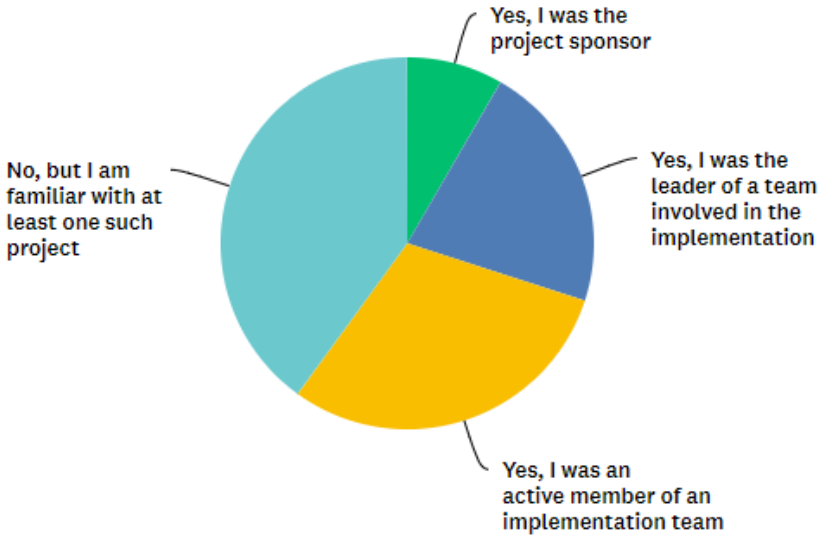

Figure 5.12: Graphic representation of the results of Table 5.12.

Sections 2, 3, 4, 5 and 6 of the questionnaire are examined next, each one separately, in order to make comparisons between the different technologies, barriers, goals, practices and results and to test hypotheses **H1** and **H2**. The pattern of presentation described below in detail for section 2 will be followed also for the remaining sections 3 to 6.

The root question of section 2 is: *'Which technologies do you expect to affect more your company's digital strategy in the coming years and to what extent?'* **Table 5.13** summarizes the responses concerning the eight different digital technologies on which the opinion of the participants was asked for, whereas **Figure 5.13** is a graphic representation of these data. **Table 5.14** presents a basic statistical treatment of the same data with the use of SPSS. The results are expressed via the following quantities, which from now on will be referred to as 'statistical indicators': **N** (the sample size), **Mean** (the average of the data set formed by the answers, each expressed by its assigned numerical value), **Median** (the middle value of the data set), **Mode** (the most common answer in the data set) and the **25, 50 and 75 Percentiles** for the same data set. It should be pointed out here, that the use of the Mean for ordinal data is considered controversial. However, its use is generally acceptable, as long as it is not used in any specific

statistical test and no comparative conclusions are drawn based exclusively on the value of the Mean. **Tables 5.13** and **5.14** as well as **Figure 5.13,** show that the Social media and Big Data stand out as the digital technologies which are expected to affect most the digital strategies of the companies in the years to come with 85% and 79% of respondents respectively answering

Table 5.13: Section 2 results: Digital technologies and their effect on fashion companies' digital strategies.

	To a very great extent		To a great extent		To a moderate extent		To a small extent		Not at all	
	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Social Media	26	44,1 %	24	40,7 %	4	6,8%	5	8,5%	0	0,0%
Cloud computing	17	28,3 %	20	33,3 %	17	28,3 %	3	5,0%	3	5,0%
Internet of Things (IoT) & Sensor Technologies	9	15,0 %	21	35,0 %	15	25,0 %	7	11,7 %	8	13,3 %
Big Data & Data Analytics	25	41,7 %	22	36,7 %	8	13,3 %	4	6,7%	1	1,7%
Virtual & Augmented Reality	13	21,7 %	12	20,0 %	18	30,0 %	9	15,0 %	8	13,3 %
Blockchain technology	7	11,7 %	15	25,0 %	17	28,3 %	12	20,0 %	9	15,0 %
Process Automation	13	21,7 %	15	25,0 %	15	25,0 %	9	15,0 %	8	13,3 %
Artificial Intelligence	11	18,3 %	22	36,7 %	13	21,7 %	3	5,0%	11	18,3 %

that their effect will be of a 'great' or 'very great' extent. This can be also verified by the respective Means and Modes having the lowest values for these two technologies (**Table 5.14**). Taking into account the code for assigning numerical values to potential answers (1 corresponding to the highest ranking answer, which is 'To a very great extent' etc.), it is obvious

that having a smaller mean value means a greater impact on the digital strategies. The usual statistical test cannot be employed in this case, due to the ordinal nature of the variable, so based on these measures it can be concluded that hypothesis **H1**, concerning digital strategies, is verified. On the other hand, digital technologies like Blockchain technology and Virtual and

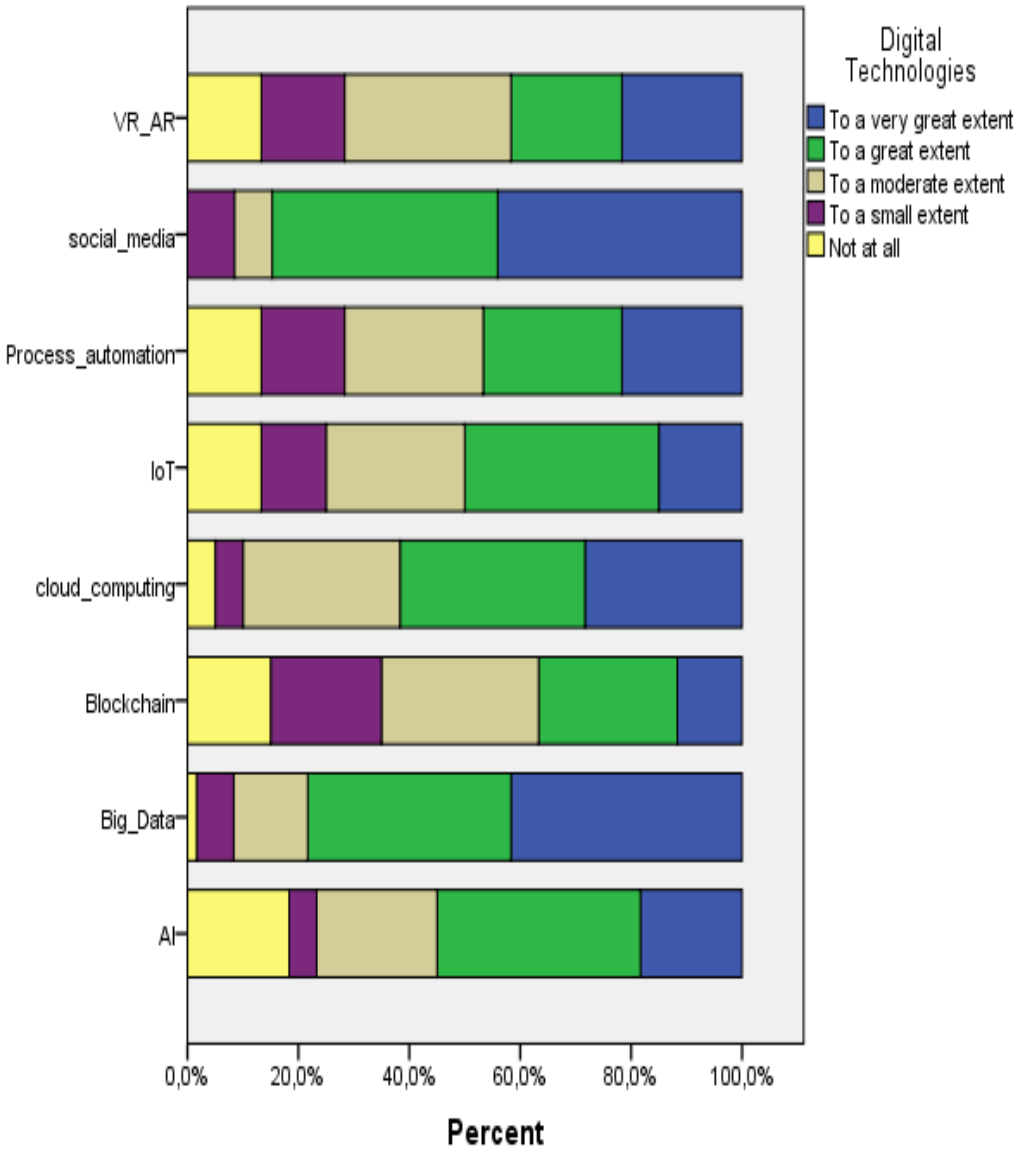

Figure 5.13 Graphic representation of the results of Table 5.13.

Augmented Reality seem not to be considered especially important for fashion companies, given than only 37% and 41% of the respondents, respectively, believe that they will affect their digital strategies to a great extent. Having explored in **Chapter 4** how these particular technologies, mainly AR, can be used within the fashion industry, the conclusion can be drawn that there are possibilities being left unexploited when it comes to these technologies.

Table 5.14: Statistical indicators for the different digital technologies.

		Social Media	Cloud computing	Internet of Things (IoT) & Sensor Technologies	Big Data & Data Analytics	Virtual & Augmented Reality	Blockchain technology	Process Automation	Artificial Intelligence
N	Valid	59	60	60	60	60	60	60	60
	Missing	1	0	0	0	0	0	0	0
Mean		1,80	2,25	2,73	1,90	2,78	3,02	2,73	2,68
Median		2,00	2,00	2,50	2,00	3,00	3,00	3,00	2,00
Mode		1	2	2	1	3	3	2[a]	2
Percentiles	25	1,00	1,00	2,00	1,00	2,00	2,00	2,00	2,00
	50	2,00	2,00	2,50	2,00	3,00	3,00	3,00	2,00
	75	2,00	3,00	3,75	2,00	4,00	4,00	4,00	3,00

a. Multiple modes exist. The smallest value is shown.

The root question of section 3 is: *'Which are the major barriers to implementing your digital strategy and how important are they according to your opinion?'* **Table 5.15** summarizes the responses concerning the six different types of barriers, **Figure 5.14** is a graphic representation of these data and **Table 5.16** presents a basic statistical treatment using SPSS. In the case of barriers to implementing digital strategies, no great differences can be observed among the potential barriers, as suggested by the statistical indicators in **Table 5.16**. If a couple of them had to be selected as important, it would be the organizational resistance to change, as well as the lack of an overall strategy, but in general all of them seem to pose difficulties to fashion companies, given that for all of the proposed barriers the percentage of respondents that labeled them as 'extremely' or 'highly important' was between 73,4% and 56%. According to the results, the less important barrier for digital strategies are budget constraints. So, overall, the picture from the results of this question matches that presented in **Chapter 4**.

Table 5.15: Section 3 results: Major barriers for the implementation of digital strategy and their importance.

	Extremely important		Highly important		Moderately important		Of small importance		Not important at all	
	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Security concerns and issues	16	26,7%	22	36,7%	19	31,7%	2	3,3%	1	1,7%
Lack of an overall and consistent strategy	16	26,7%	27	45,0%	12	20,0%	4	6,7%	1	1,7%
Lack of technical skills	16	26,7%	22	36,7%	11	18,3%	6	10,0%	5	8,3%
Organizational resistance to change	19	31,7%	25	41,7%	10	16,7%	4	6,7%	2	3,3%
Organizational structure	16	26,7%	25	41,7%	15	25,0%	2	3,3%	2	3,3%
Budget constraints	17	28,8%	16	27,1%	19	32,2%	5	8,5%	2	3,4%

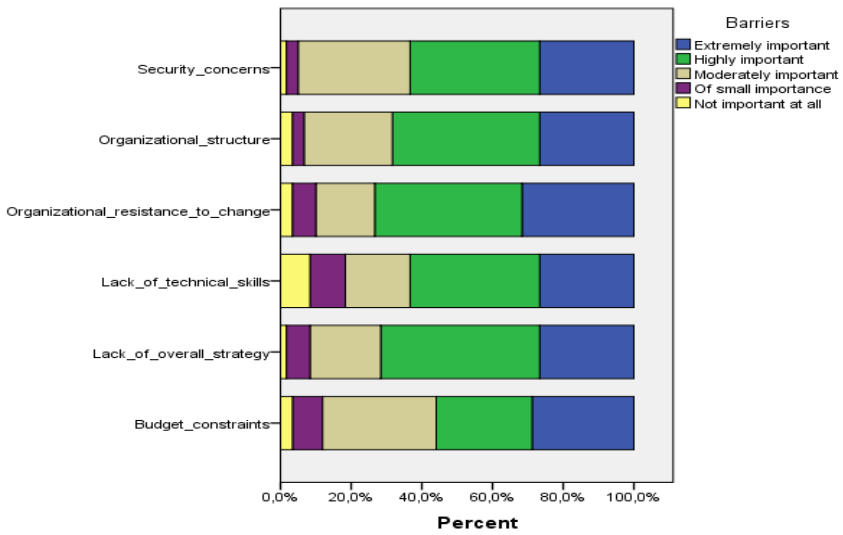

Figure 5.14: Graphic representation of the results of Table 5.15.

Table 5.16: Statistical indicators for the different barriers.

		Security concerns and issues	Lack of an overall and consistent strategy	Lack of technical skills	Organizational resistance to change	Organizational structure	Budget constraints
N	Valid	60	60	60	60	60	59
	Missing	0	0	0	0	0	1
Mean		2,17	2,12	2,37	2,08	2,15	2,31
Median		2,00	2,00	2,00	2,00	2,00	2,00
Mode		2	2	2	2	2	3
Percentiles	25	1,00	1,00	1,00	1,00	1,00	1,00
	50	2,00	2,00	2,00	2,00	2,00	2,00
	75	3,00	3,00	3,00	3,00	3,00	3,00

The root question of section 4 is: *'How important are the following outcomes for your company's digital strategy?'* **Table 5.17** summarizes the responses concerning the five different outcomes, **Figure 5.15** is a graphic representation of these data and **Table 5.18** presents a basic statistical treatment using SPSS .

This section is of special interest because it addresses another hypotheses put forward in **Subsection 5.1.4,** namely **H2.** When it comes to the potential outcomes or, in other words, the main objectives of their companies' digital strategies, increased customer service and satisfaction stands out as the most important one with 63% of the respondents ranking it as extremely important and only 8% of them as moderately important or of small importance. The statistical indicators of **Table 5.18** verify this picture, in agreement with that formed based in Chapter 4, thus confirming hypothesis **H2**. In this case a statistical test cannot be made to test the hypothesis, again due to the ordinal nature of the variable. The second most important goal for the digital strategies of fashion companies seems to be 'increased productivity' with an overall of 86% of respondents finding it either extremely or highly important. In contrast, the facilitation of research and innovation processes does not appear to be of a particular importance, compared to the rest of them, as a 38% of the respondents thought of it as of moderate or small importance. From the above, one can conclude that most fashion companies design their digital strategies around the satisfaction of the customer and to a lesser degree the facilitation of their current processes and are not so focused on experimenting and creating more innovating products.

Table 5.17: Section 4 results**:** Potential outcomes of digital strategies and their importance.

	Extremely important		Highly important		Moderately important		Of small importance		Not important at all	
	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Cost savings	18	30,0%	23	38,3%	14	23,3%	5	8,3%	0	0,0%
Increased productivity	26	43,3%	26	43,3%	6	10,0%	2	3,3%	0	0,0%
Increased customer service and satisfaction	38	63,3%	17	28,3%	4	6,7%	1	1,7%	0	0,0%
Facilitation of research and innovation processes	12	20,0%	25	41,7%	16	26,7%	7	11,7%	0	0,0%
Improved decision making for senior executives	16	26,7%	29	48,3%	11	18,3%	4	6,7%	0	0,0%

The root question of section 5 is: *'To what extent are the following practices important for your company's digital strategy?'*

Table 5.19 summarizes the responses concerning the eleven different practices, **Figure 5.16** is a graphic representation of these data and **Table 5.20** presents a basic statistical treatment using SPSS software. As shown in both the Tables and the graph, the practices which stand out for highest importance are: 'the interconnection of digital and physical selling points (omni-channeling)', 'providing customers with an experience rather than just a product' and 'preserving their brand name and essence'. More than 93% of the respondents found the above practices of extreme or high importance, with the protection of the brand name being the most important one. Data availability and sharing, along with maintaining a strong social media presence and establishing a collaborative digital culture within the company were also considered of significant importance for most respondents. On the other hand, investment in new technologies and product digitization were the least important practices, with 37% and 61% of respondents finding them of medium, small or no importance at all. The above results seem logical if one takes into account the results from the previous questions which mark overall a

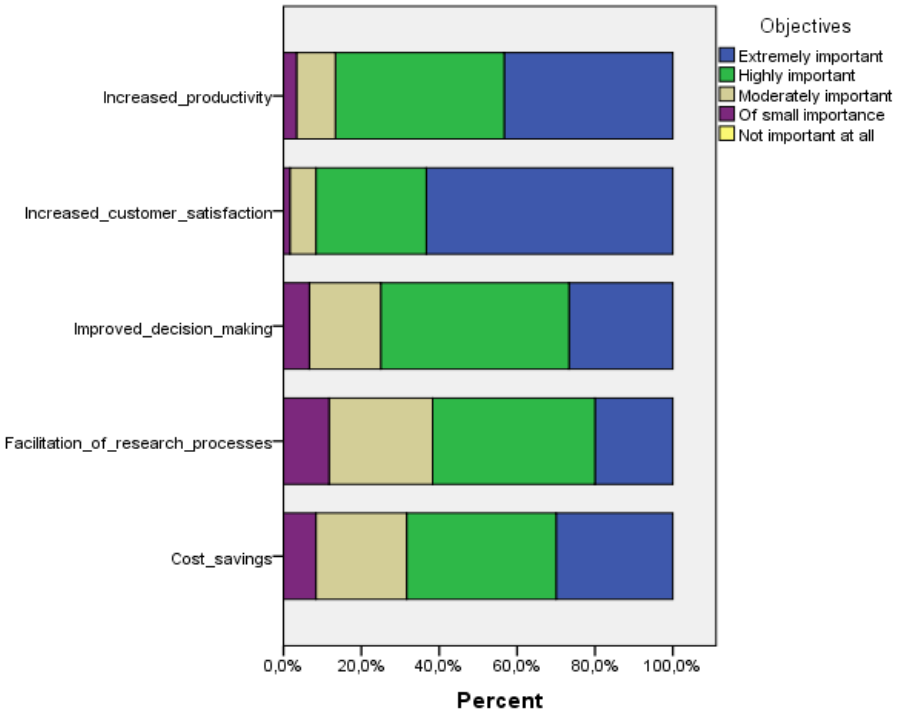

Figure 5.15: Graphic representation of the results of Table 5.17.

Table 5.18: Statistical indicators for the different potential outcomes of digital strategies.

		Cost savings	Increased productivity	Increased customer service and satisfaction	Facilitation of research and innovation processes	Improved decision making for senior executives
N	Valid	60	60	60	60	60
	Missing	0	0	0	0	0
Mean		2,10	1,73	1,47	2,30	2,05
Median		2,00	2,00	1,00	2,00	2,00
Mode		2	1[a]	1	2	2
Percentiles	25	1,00	1,00	1,00	2,00	1,00
	50	2,00	2,00	1,00	2,00	2,00
	75	3,00	2,00	2,00	3,00	2,75

a. Multiple modes exist. The smallest value is shown

Table 5.19: Section 5 results: Different digital practices and their importance.

	Extremely important		Highly important		Moderately important		Of small importance		Not important at all	
	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Data availability and sharing across functions	15	25,0%	39	65,0%	5	8,3%	1	1,7%	0	0,0%
Providing customers with an experience rather than just a product	38	64,4%	18	30,5%	3	5,1%	0	0,0%	0	0,0%
Connecting digital and physical selling points (omni-channeling)	34	57,6%	23	39,0%	2	3,4%	0	0,0%	0	0,0%
Providing a high margin of personalization in your products	17	28,3%	27	45,0%	14	23,3%	2	3,3%	0	0,0%
Maintaining a strong social media presence	29	48,3%	25	41,7%	5	8,3%	1	1,7%	0	0,0%
Keeping your brand name and essence intact	45	75,0%	14	23,3%	0	0,0%	1	1,7%	0	0,0%
Introducing digital features into products (product digitization)	9	15,3%	13	22,0%	27	45,8%	6	10,2%	4	6,8%
Investing in new technologies	14	23,3%	24	40,0%	17	28,3%	4	6,7%	1	1,7%
Recruiting more digital savvy employees and consultants	10	16,7%	36	60,0%	13	21,7%	1	1,7%	0	0,0%
Implementing wider organizational changes to facilitate future digital strategies	10	16,7%	34	56,7%	14	23,3%	2	3,3%	0	0,0%
Establishing a collaborative digital culture within the company	16	26,7%	33	55,0%	10	16,7%	1	1,7%	0	0,0%

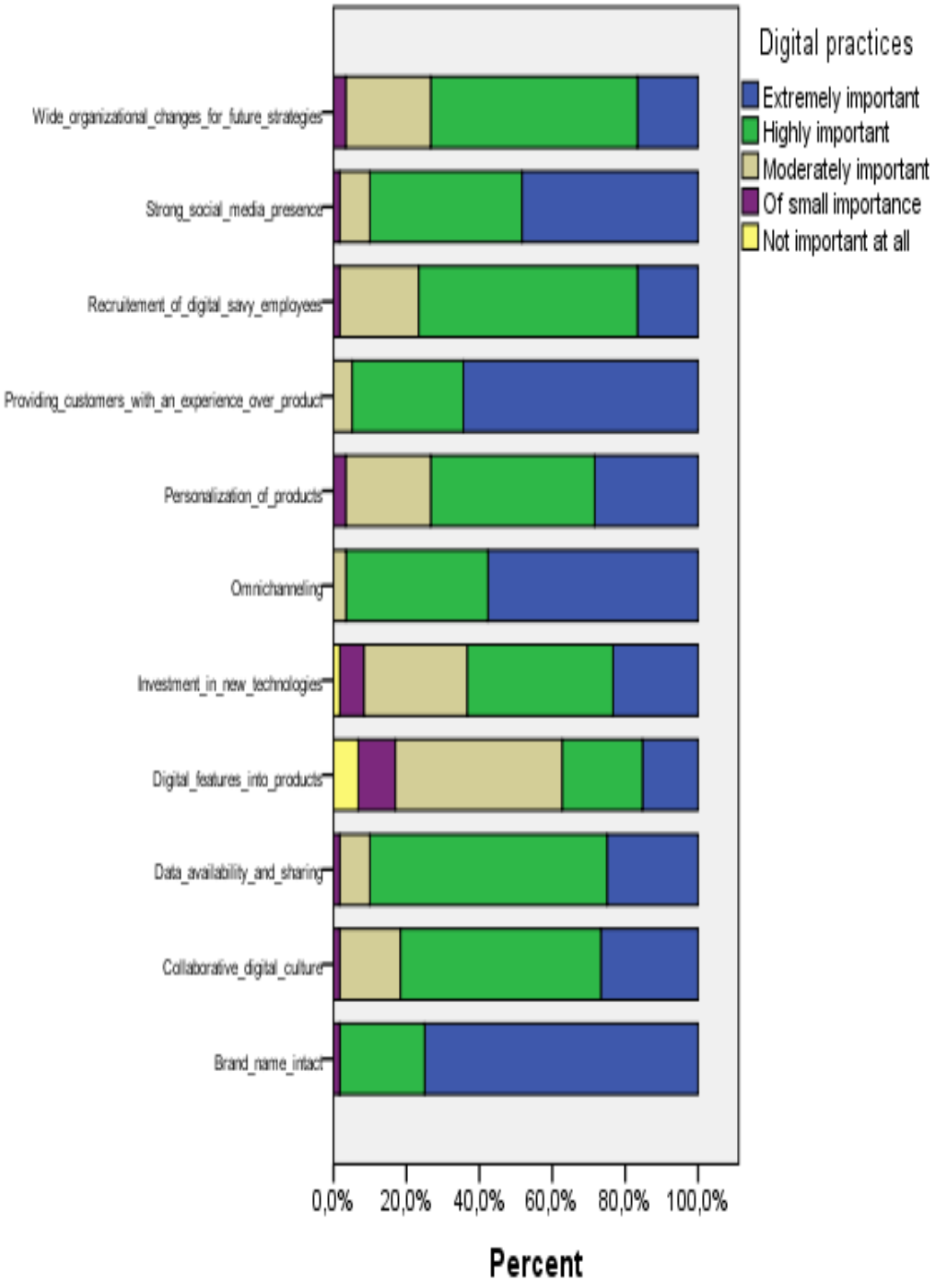

Figure 5.16: Graphic representation of the results of Table 5.19.

Table 5.20: Statistical indicators for different digital practices.

		Data availability and sharing across functions	Providing customers with an experience rather than just a product	Connecting digital and physical selling points (omni-channeling)	Providing a high margin of personalization in your products	Maintaining a strong social media presence	Keeping your brand name and essence intact	Introducing digital features into products (product digitization)	Investing in new technologies	Recruiting more digital savvy employees and consultants	Implementing wider organizational changes to facilitate future digital strategies	Establishing a collaborative digital culture within the company
N	Valid	60	59	59	60	60	60	59	60	60	60	60
	Missing	0	1	1	0	0	0	1	0	0	0	0
Mean		1,87	1,41	1,46	2,02	1,63	1,28	2,71	2,23	2,08	2,13	1,93
Median		2,00	1,00	1,00	2,00	2,00	1,00	3,00	2,00	2,00	2,00	2,00
Mode		2	1	1	2	1	1	3	2	2	2	2
Percentiles	25	1,25	1,00	1,00	1,00	1,00	1,00	2,00	2,00	2,00	2,00	1,00
	50	2,00	1,00	1,00	2,00	2,00	1,00	3,00	2,00	2,00	2,00	2,00
	75	2,00	2,00	2,00	3,00	2,00	1,75	3,00	3,00	2,00	3,00	2,00

focus on the customer and the services provided to improve their experience, as opposed to the innovation and experimentation with the products on the part of the fashion companies. In general, it can be concluded that more importance is given on the digitization and upgrade of the processes following the production (marketing, sales etc.) rather than the manufacturing and supply processes. Furthermore, the need for an overall collaborative digital culture within the company is indicated.

The root question of section 6 is: *'How much has your company been benefited by digital transformation in the following areas*?' **Table 5.21** summarizes the responses concerning the four different areas, **Figure 5.17** is a graphic representation of these data and **Table 5.22** presents a basic statistical treatment using SPSS. Firstly, it is important to note that the increased number of missing answers in this question (2 to 4) can be explained because the skip option was encouraged for those who were not familiar with their company's digital strategy or were not in a position to know the observed outcomes of it so far.

Table 5.21: Section 6 results: The benefits of digital transformation in different areas.

	A great deal		A lot		A moderate amount		A little		None at all	
	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %	Count	Row Valid N %
Customer satisfaction	15	25,9%	20	34,5%	16	27,6%	6	10,3%	1	1,7%
Productivity	11	19,6%	17	30,4%	18	32,1%	9	16,1%	1	1,8%
Information availability to decision makers	13	22,4%	30	51,7%	14	24,1%	1	1,7%	0	0,0%
Research and innovation processes	8	14,3%	20	35,7%	17	30,4%	10	17,9%	1	1,8%

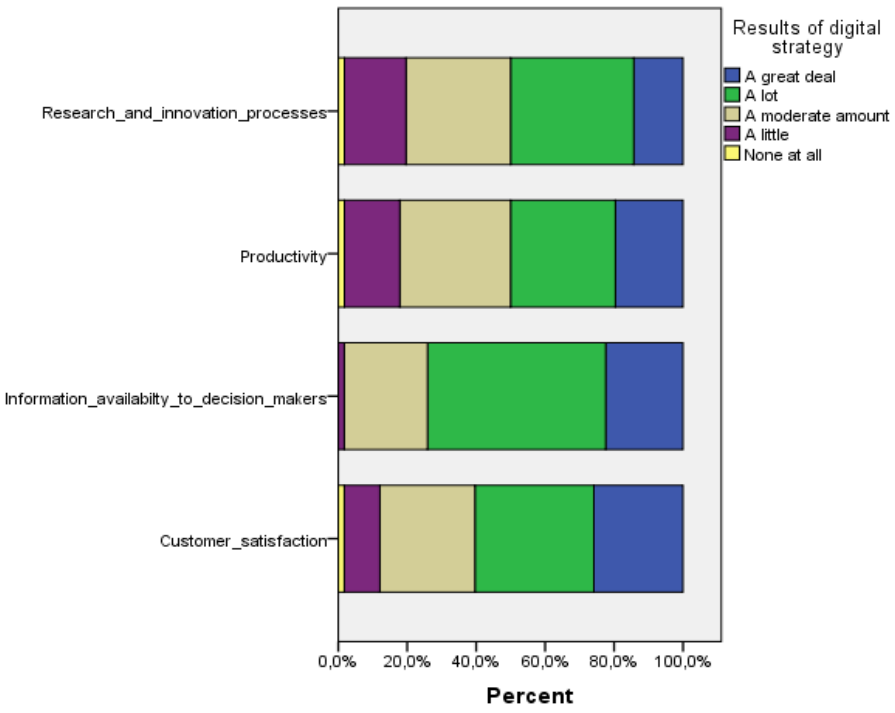

Figure 5.17: Graphic representation of the results of Table 5.21.

Table 5.22: Statistical indicators for different areas of digital transformation.

		Customer satisfaction	Productivity	Information availability to decision makers	Research and innovation processes
N	Valid	58	56	58	56
	Missing	2	4	2	4
Mean		2,28	2,50	2,05	2,57
Median		2,00	2,50	2,00	2,50
Mode		2	3	2	2
Percentiles	25	1,00	2,00	2,00	2,00
	50	2,00	2,50	2,00	2,50
	75	3,00	3,00	3,00	3,00

As shown in both **Tables 5.21** and **5.22** and in **Figure 5.17**, almost all of the respondents said that their company has been benefited in some degree from digital transformation. In the cases of 'productivity', 'research and innovation processes', and 'customer satisfaction', half of the respondents said that their companies have been benefited a lot or a great deal. Finally, in the area of 'information availability to decision makers' the results are even more encouraging, as 74% of the respondents said the benefits observed are in the higher two scales. Given that for almost half of the respondents the digital strategies have been implemented for less than 3 years (see analysis of **Question 9** in section 1), it appears that the significance and potential value of digital transformation for fashion companies is great and fashion companies should take more advantage of it.

The single question (Q47) in the 7th and last section of the questionnaire is: *'Overall how effective do you find your company's digital strategy so far?'* **Table 5.23** summarizes the responses, **Figure 5.18** is a graphic representation of the data and **Table 5.24** presents a basic statistical treatment using the SPSS software. As shown in both the Tables and the graph, almost half of the respondents consider the digital strategy of their company somewhat effective, while 40% of them consider it very effective and 8% of them as not effective. These results reveal that even though there have been positive effects so far from the current digital strategies, there is still plenty of room for improvement and more can be done in order to achieve successful and efficient digital strategies.

Table 5.23: Results analysis for Q47 (*'Overall how effective do you find your company's digital strategy so far?').*

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Extremely effective	2	3,3	3,3	3,3
	Very effective	24	40,0	40,0	43,3
	Somewhat effective	29	48,3	48,3	91,7
	Not so effective	4	6,7	6,7	98,3
	Not effective at all	1	1,7	1,7	100,0
	Total	60	100,0	100,0	

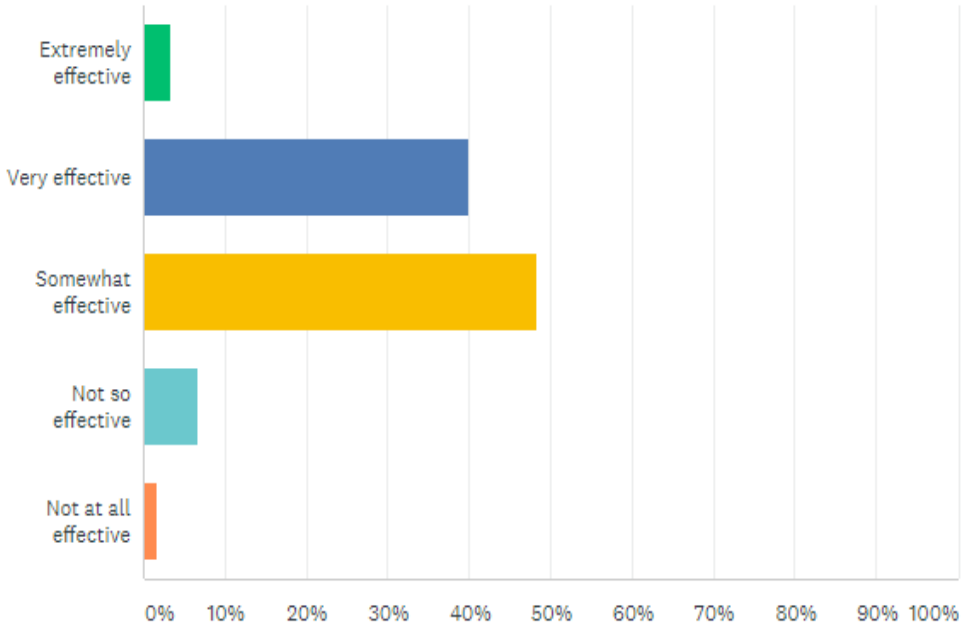

Figure 5.18: Graphic representation of the results of Table 5.23.

5.2.3 Correlations

The current Section of the Results chapter is dedicated to the correlations observed between the various questions and answers, both those that were expected before the survey and some that were not. In order to explore the correlations, cross-tabulation tables were used, as

provided by SPSS and the chi-square independence test was originally selected in order to test the hypotheses. It is the most popular test to discover if there is a relationship between two categorical variables but in order to generate accurate results there are two assumptions that must be met. Those are that no cell should have expected value (count) less than 1, and no more than 20% of the cells should have expected values (counts) less than 5. Given the size of our sample, both assumptions were not met in any of the cases that were studied below. For that reason, the Fischer's exact test was selected and used instead, which is generally preferred for smaller sample sizes. The general principle of this test is the same with chi-square, with the difference that the two mentioned assumptions do not need to be met. A p-value is generated from the Fischer's exact test, which, if it is equal or smaller than 0.05, leads to the rejection of the hypothesis that the two studied variables are independent, therefore it indicates a statistical relation between the variables. It does not however explore the nature of this relation. In the cases were the variables are ordinal and the nature of the relation between them is of interest, the linear by linear association is used, as well as Spearman's rho and Kendall's tau_b coefficients. For the linear by linear association test, the p-value must be equal or smaller to 0.05 in order to indicate a linear relationship between the two variables. Spearman's rho and Kendall's tau_b coefficients are used to measure the strength of the relationship between two ordinal variables. They take values between minus one and one. A positive correlation signifies that the ranks of both variables are increasing. On the other hand, a negative correlation signifies that as the rank of one variable is increased, the rank of the other variable is decreased. The closer the coefficients are to 1, the stronger the relationship.

To begin with, the hypotheses **H3 to H5** that were previously presented will be tested.

H3: Older companies have a higher resistance to change compared to younger ones.

That signifies a relationship between a company's 'organizational resistance to change' as a barrier to its digital strategy and its 'age'. It is therefore sought to discover if there is a relationship between variables (questions) 8 and 24. The results are shown in **Tables 5.24 and 5.25** and in **Figure 5.19.** As one can see, the p-value of Fischer's exact test is 0.767> 0.05 so there is no statistical relationship between the two variables. Therefore, the original hypothesis **H3** is not verified.

H4: Bigger companies have a greater issue with organizational structure as opposed to smaller ones

That signifies a relationship between a company's 'organizational structure' as a barrier to its digital strategy and its 'size', therefore it is sought to discover if there is a relationship between variables (questions) 6 and 25. The results are shown in **Tables 5.26 and 5.27** and in **Figure 5.20.** As can be seen, the p-value of Fischer's exact test is 0.817> 0.05, so there is no statistical relationship between the two variables. Therefore, our original hypothesis **H4** is not verified.

Table 5.24: How many years has your company been in business? * Organizational resistance to change. Crosstabulation.

			Organizational resistance to change					Total
			Extremely important	Highly important	Moderately important	Of small importance	Not important at all	
How many years has your company been in business?	3 to 10 years	Count	1	1	1	0	0	3
		Expected Count	,9	1,3	,5	,2	,1	3,0
		%within Organizational resistance to change	5,6%	4,0%	10,0%	0,0%	0,0%	5,1%
	10 to 25 years	Count	1	6	3	1	0	11
		Expected Count	3,4	4,7	1,9	,7	,4	11,0
		%within Organizational resistance to change	5,6%	24,0%	30,0%	25,0%	0,0%	18,6%
	25 to 50 years	Count	6	6	2	0	0	14
		Expected Count	4,3	5,9	2,4	,9	,5	14,0
		%within Organizational resistance to change	33,3%	24,0%	20,0%	0,0%	0,0%	23,7%
	More than 50 years	Count	10	12	4	3	2	31
		Expected Count	9,5	13,1	5,3	2,1	1,1	31,0
		%within Organizational resistance to change	55,6%	48,0%	40,0%	75,0%	100,0%	52,5%
Total		Count	18	25	10	4	2	59
		Expected Count	18,0	25,0	10,0	4,0	2,0	59,0
		%within Organizational resistance to change	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Table 5.25: Chi-Square Tests for Table 5.24.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7,889[a]	12	,794	,807		
Likelihood Ratio	10,103	12	,607	,734		
Fisher's Exact Test	8,784			,767		
Linear-by-Linear Association	,006[b]	1	,937	,947	,504	,054
N of Valid Cases	59					

a. 16 cells (80,0%) have expected count less than 5. The minimum expected count is ,10.

b. The standardized statistic is ,079.

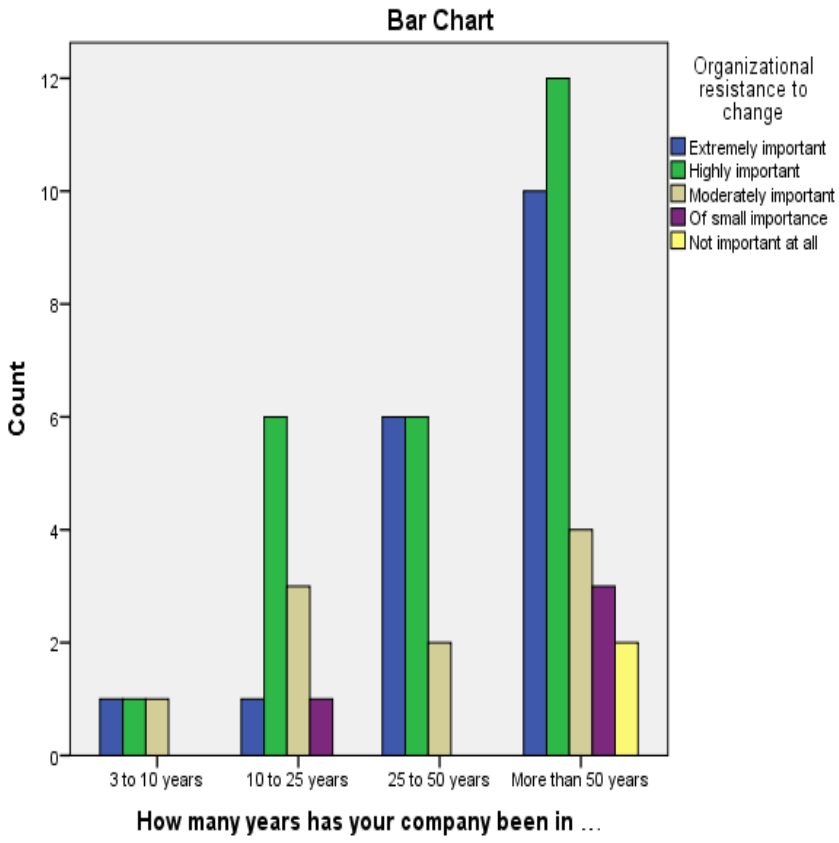

Figure 5.19: Graphic representation of the results of Table 5.24.

Table 5.26: Which is your company's size (based on the number of employees)? * Organizational structure. Crosstabulation.

			Organizational structure					Total
			Extremely important	Highly important	Moderately important	Of small importance	Not important at all	
Which is your company's size (based on the number of employees)?	Small	Count	1	2	1	0	0	4
		Expected Count	1,1	1,7	1,0	,1	,1	4,0
		% within Organizational structure	6,2%	8,0%	6,7%	0,0%	0,0%	6,7%
	Medium	Count	7	7	3	0	0	17
		Expected Count	4,5	7,1	4,3	,6	,6	17,0
		% within Organizational structure	43,8%	28,0%	20,0%	0,0%	0,0%	28,3%
	Large	Count	8	16	11	2	2	39
		Expected Count	10,4	16,3	9,8	1,3	1,3	39,0
		% within Organizational structure	50,0%	64,0%	73,3%	100,0%	100,0%	65,0%
Total		Count	16	25	15	2	2	60
		Expected Count	16,0	25,0	15,0	2,0	2,0	60,0
		% within Organizational structure	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Table 5.27: Chi-Square Tests for Table 5.26**.**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	4,653[a]	8	,794	,759		
Likelihood Ratio	5,833	8	,666	,754		
Fisher's Exact Test	5,019			,817		
Linear-by-Linear Association	2,820[b]	1	,093	,104	,054	,022
N of Valid Cases	60					

a. 11 cells (73,3%) have expected count less than 5. The minimum expected count is ,13.

b. The standardized statistic is 1,679.

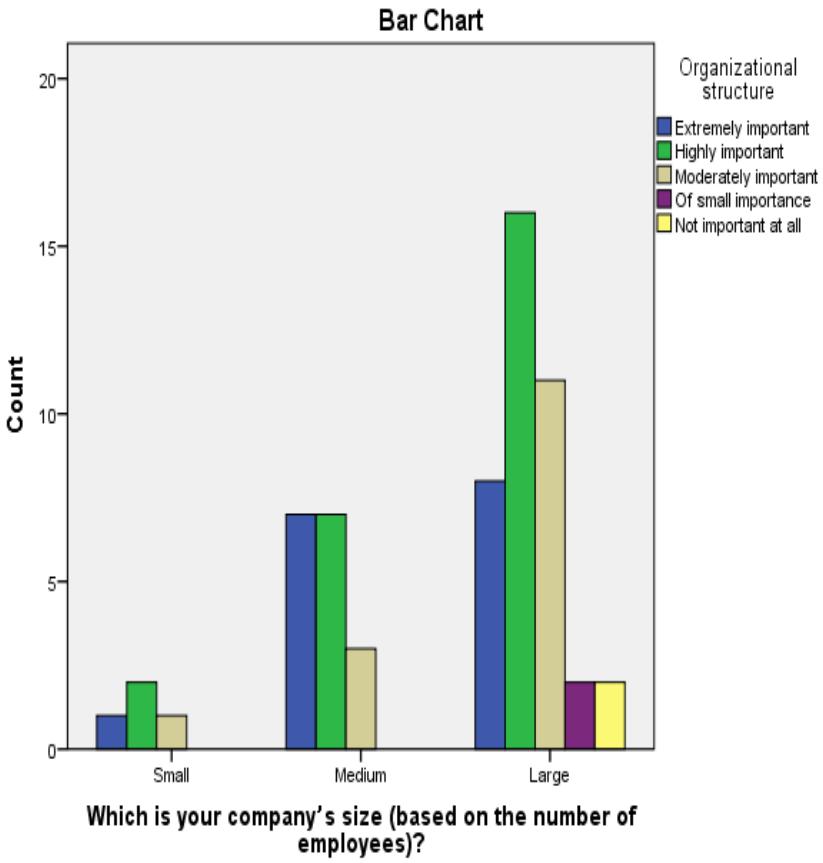

Figure 5.20: Graphic representation of the results of Table 5.26.

Table 5.28: At what stage of implementation is your company's digital strategy? * Overall how effective do you find your company's digital strategy so far? Crosstabulation.

			Overall how effective do you find your company's digital strategy so far?					Total
			Extremely effective	Very effective	Somewhat effective	Not so effective	Not effective at all	
At what stage of implementation is your company's digital strategy?	Still under development	Count	1	4	5	2	1	13
		Expected Count	,4	5,2	6,3	,9	,2	13,0
		% within Overall how effective do you find your company's digital strategy so far?	50,0%	16,7%	17,2%	50,0%	100,0%	21,7%
	Implemented for 1-3 years	Count	1	4	8	1	0	14
		Expected Count	,5	5,6	6,8	,9	,2	14,0
		% within Overall how effective do you find your company's digital strategy so far?	50,0%	16,7%	27,6%	25,0%	0,0%	23,3%
	Implemented for more than 3 years	Count	0	14	16	0	0	30
		Expected Count	1,0	12,0	14,5	2,0	,5	30,0
		% within Overall how effective do you find your company's digital strategy so far?	0,0%	58,3%	55,2%	0,0%	0,0%	50,0%
	I am not familiar with my company's digital strategy	Count	0	2	0	1	0	3
		Expected Count	,1	1,2	1,5	,2	,1	3,0
		% within Overall how effective do you find your company's digital strategy so far?	0,0%	8,3%	0,0%	25,0%	0,0%	5,0%
Total		Count	2	24	29	4	1	60
		Expected Count	2,0	24,0	29,0	4,0	1,0	60,0
		% within Overall how effective do you find your company's digital strategy so far?	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

H5: The stage of implementation of a company's digital strategy has an impact on the results observed so far by its digital strategy.

Therefore, it is sought if there is a relationship between variables (questions) 9 and 47. The results are shown in **Tables 5.28** and **5.29** and in **Figure 5.21.** In this case, the p-value of

Table 5.29: Chi-Square Tests for Table 5.28.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	16,446[a]	12	,172	,176		
Likelihood Ratio	18,071	12	,114	,076		
Fisher's Exact Test	18,087			,047		
Linear-by-Linear Association	1,240[b]	1	,266	,276	,158	,043
N of Valid Cases	60					

a. 14 cells (70,0%) have expected count less than 5. The minimum expected count is ,05.

b. The standardized statistic is -1,113.

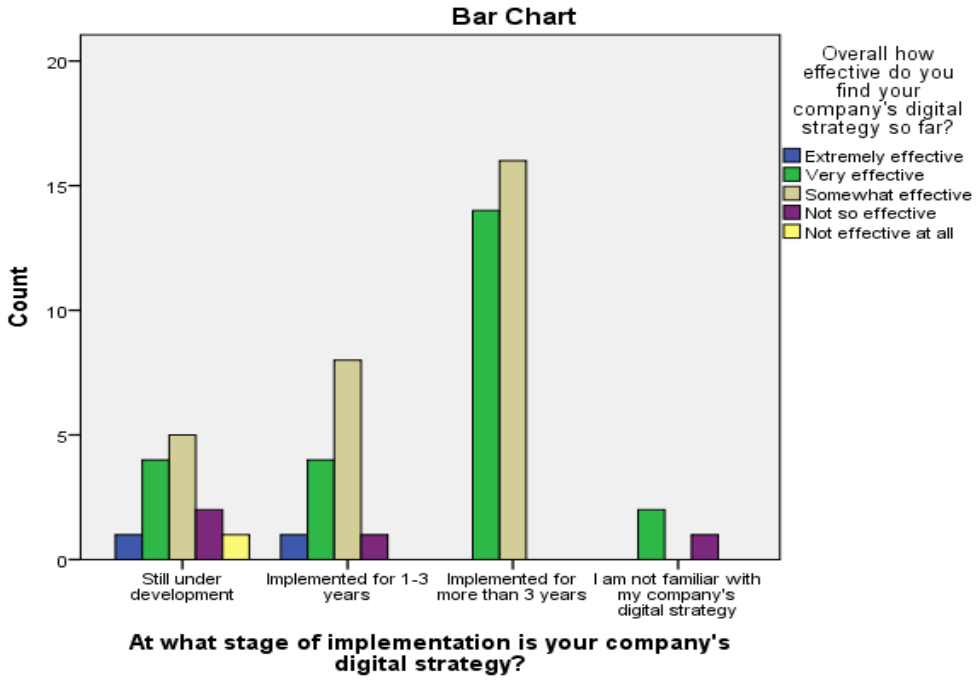

Figure 5.21: Graphic representation of the results of Table 5.28.

Fischer's exact test is 0.047<0.05 which indicates that the two variables are not independent. Therefore, hypothesis **H5** is verified. In order to see if there is also a linear association between the two variables, one can look at the Linear by linear association p-value on **Table 5.29** which is 0.276>0.05 so there is no statistical proof for a linear relationship between them. This assumption is further verified by looking at the Kendall's tau_b and Spearman's rho coefficients in **Table 5.30** which are closer to zero, further confirming that result and signifying a weak relationship.

Table 5.30 Correlations between Q9 and Q47.

			At what stage of implementation is your company's digital strategy?	Overall how effective do you find your company's digital strategy so far?
Kendall's tau_b	At what stage of implementation is your company's digital strategy?	Correlation Coefficient	1,000	-,124
		Sig. (2-tailed)	.	,288
		N	60	60
	Overall how effective do you find your company's digital strategy so far?	Correlation Coefficient	-,124	1,000
		Sig. (2-tailed)	,288	.
		N	60	60
Spearman's rho	At what stage of implementation is your company's digital strategy?	Correlation Coefficient	1,000	-,133
		Sig. (2-tailed)	.	,311
		N	60	60
	Overall how effective do you find your company's digital strategy so far?	Correlation Coefficient	-,133	1,000
		Sig. (2-tailed)	,311	.
		N	60	60

In the following, a few new correlations that were discovered after analysis will be presented:

Q29 with Q33: 'Increased customer service and satisfaction' as a desired outcome *vs.* 'providing customers with an experience rather than just a product' as an important practice.

The results are shown in **Tables 5.31** ,**5.32** and **5.33**, and in **Figure 5.22.** As shown in **Table 5.32,** the p-value of Fischer's exact test is 0.005<0.05 which indicates that the two variables are not independent. In order to see if there is also a linear association between the two variables, one

Table 5.31: Increased customer service and satisfaction * Providing customers with an experience rather than just a product. Crosstabulation.

			Providing customers with an experience rather than just a product			Total
			Extremely important	Highly important	Moderately important	
Increased customer service and satisfaction	Extremely important	Count	29	7	1	37
		Expected Count	23,8	11,3	1,9	37,0
		% within Providing customers with an experience rather than just a product	76,3%	38,9%	33,3%	62,7%
	Highly important	Count	8	8	1	17
		Expected Count	10,9	5,2	,9	17,0
		% within Providing customers with an experience rather than just a product	21,1%	44,4%	33,3%	28,8%
	Moderately important	Count	1	3	0	4
		Expected Count	2,6	1,2	,2	4,0
		% within Providing customers with an experience rather than just a product	2,6%	16,7%	0,0%	6,8%
	Of small importance	Count	0	0	1	1
		Expected Count	,6	,3	,1	1,0
		% within Providing customers with an experience rather than just a product	0,0%	0,0%	33,3%	1,7%
Total		Count	38	18	3	59
		Expected Count	38,0	18,0	3,0	59,0
		% within Providing customers with an experience rather than just a product	100,0%	100,0%	100,0%	100,0%

Table 5.32: Chi-Square Tests for Table 5.31.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	27,935[a]	6	,000	,002		
Likelihood Ratio	15,100	6	,019	,011		
Fisher's Exact Test	15,581			,005		
Linear-by-Linear Association	11,237[b]	1	,001	,001	,001	,001
N of Valid Cases	59					

a. 8 cells (66,7%) have expected count less than 5. The minimum expected count is ,05.

b. The standardized statistic is 3,352.

can look at the Linear by linear association p-value on **Table 5.32** which is 0.001<0.05 so there is a linear relationship between them. To further investigate how strong that relationship is, one can look at the Kendall's tau b and Spearman's rho coefficients in **Table 5.33** ,which are 0.388 and 0.405 respectively, signifying a moderately strong positive relationship between the two variables. That is, the more important the respondents consider the increased customer service and satisfaction as an outcome, the more important they tend to find providing customers with an experience rather than a product, as a practice.

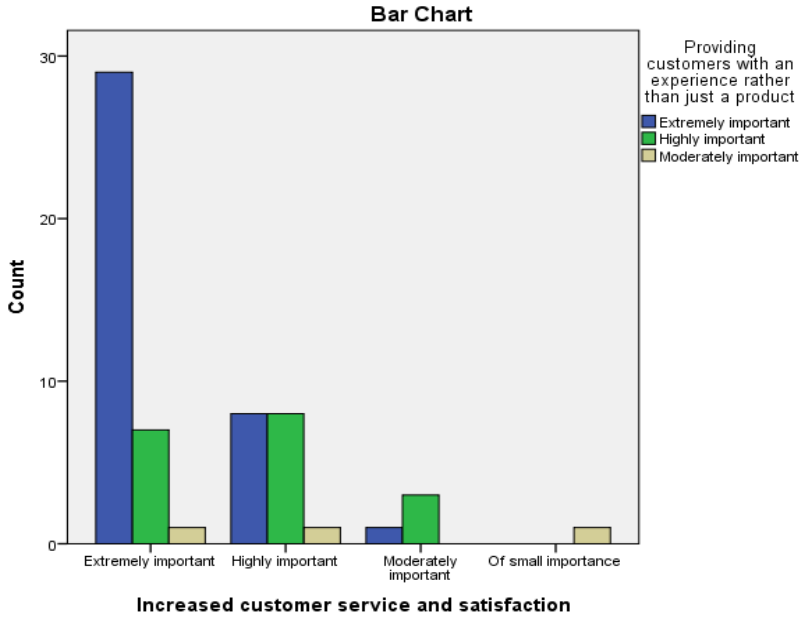

Figure 5.22: Graphic representation of the results of Table 5.31.

Table 5.33: Correlations between Q29 with Q33.

			Increased customer service and satisfaction	Providing customers with an experience rather than just a product
Kendall's tau_b	Increased customer service and satisfaction	Correlation Coefficient	1,000	,388**
		Sig. (2-tailed)	.	,002
		N	60	59
	Providing customers with an experience rather than just a product	Correlation Coefficient	,388**	1,000
		Sig. (2-tailed)	,002	.
		N	59	59
Spearman's rho	Increased customer service and satisfaction	Correlation Coefficient	1,000	,405**
		Sig. (2-tailed)	.	,001
		N	60	59
	Providing customers with an experience rather than just a product	Correlation Coefficient	,405**	1,000
		Sig. (2-tailed)	,001	.
		N	59	59

**. Correlation is significant at the 0.01 level (2-tailed).

Q30 with Q38: 'Facilitation of research and innovation processes' as an important outcome *vs.* 'introducing digital features into products' as an important practice.

The results are shown in **Tables 5.34** and **5.35**, and in **Figure 5.23.** As shown in **Table 5.35,** the p-value of Fischer's exact test is 0.000<0.05 which indicates that the two variables are not independent. In order to see if there is also a linear association between the two variables, we can look at the Linear by linear association p-value on **Table 5.35** which is 0.000<0.05 so there is a linear relationship between them, and apparently a quite strong one.

Table 5.34: Facilitation of research and innovation processes * Introducing digital features into products. Crosstabulation.

			Introducing digital features into products					Total
			Extremely important	Highly important	Moderately important	Of small importance	Not important at all	
Facilitation of research and innovation processes	Extremely important	Count	5	4	1	1	0	11
		Expected Count	1,7	2,4	5,0	1,1	,7	11,0
		% within Introducing digital features into products	55,6%	30,8%	3,7%	16,7%	0,0%	18,6%
	Highly important	Count	3	8	12	0	2	25
		Expected Count	3,8	5,5	11,4	2,5	1,7	25,0
		% within Introducing digital features into products	33,3%	61,5%	44,4%	0,0%	50,0%	42,4%
	Moderately important	Count	1	1	11	3	0	16
		Expected Count	2,4	3,5	7,3	1,6	1,1	16,0
		% within Introducing digital features into products	11,1%	7,7%	40,7%	50,0%	0,0%	27,1%
	Of small importance	Count	0	0	3	2	2	7
		Expected Count	1,1	1,5	3,2	,7	,5	7,0
		% within Introducing digital features into products	0,0%	0,0%	11,1%	33,3%	50,0%	11,9%
Total		Count	9	13	27	6	4	59
		Expected Count	9,0	13,0	27,0	6,0	4,0	59,0
		% within Introducing digital features into products	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Q30 with Q39: 'Facilitation of research and innovation processes' as an important outcome *vs.* 'investing in new technologies' as an important practice.

The results are shown in **Tables 5.36** and **5.37,** and in **Figure 5.24.** As shown in **Table 5.37,** the p-value of Fischer's exact test is 0.000 < 0.05, which indicates that these two variables are not

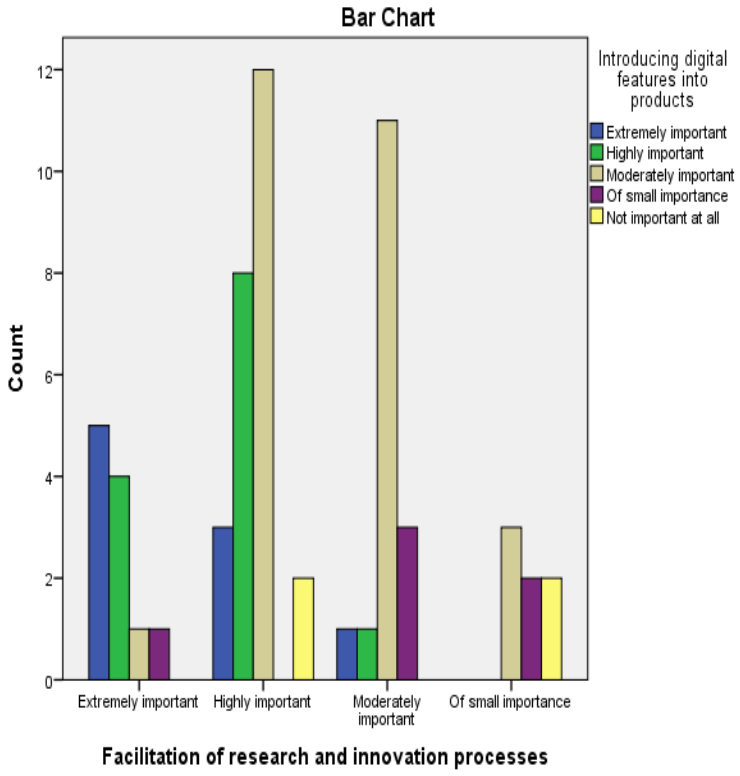

Figure 5.23: *Graphic representation of the results of Table 5.34.*

independent. In order to see if there is also a linear association between the two variables, we can look at the Linear by linear association p-value on **Table 5.35** which is 0.000<0.05 so there is a linear relationship between them, and apparently a quite strong one.

Table 5.35: *Chi-Square Tests for Table 5.34.*

	Value	*df*	*Asymp. Sig. (2-sided)*	*Exact Sig. (2-sided)*	*Exact Sig. (1-sided)*	*Point Probability*
Pearson Chi-Square	*32,125[a]*	*12*	*,001*	*,001*		
Likelihood Ratio	*35,621*	*12*	*,000*	*,001*		
Fisher's Exact Test	*27,722*			*,000*		
Linear-by-Linear Association	*16,670[b]*	*1*	*,000*	*,000*	*,000*	*,000*
N of Valid Cases	*59*					

a. 16 cells (80,0%) have expected count less than 5. The minimum expected count is ,47.

b. The standardized statistic is 4,083.

Table 5.36: Facilitation of research and innovation processes * Investing in new technologies. Crosstabulation.

			Investing in new technologies					Total
			Extremely important	Highly important	Moderately important	Of small importance	Not important at all	
Facilitation of research and innovation processes	Extremely important	Count	7	4	1	0	0	12
		Expected Count	2,8	4,8	3,4	,8	,2	12,0
		% within Investing in new technologies	50,0%	16,7%	5,9%	0,0%	0,0%	20,0%
	Highly important	Count	7	14	3	0	1	25
		Expected Count	5,8	10,0	7,1	1,7	,4	25,0
		% within Investing in new technologies	50,0%	58,3%	17,6%	0,0%	100,0%	41,7%
	Moderately important	Count	0	4	10	2	0	16
		Expected Count	3,7	6,4	4,5	1,1	,3	16,0
		% within Investing in new technologies	0,0%	16,7%	58,8%	50,0%	0,0%	26,7%
	Of small importance	Count	0	2	3	2	0	7
		Expected Count	1,6	2,8	2,0	,5	,1	7,0
		% within Investing in new technologies	0,0%	8,3%	17,6%	50,0%	0,0%	11,7%
Total		Count	14	24	17	4	1	60
		Expected Count	14,0	24,0	17,0	4,0	1,0	60,0
		% within Investing in new technologies	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Q30 with Q42: 'Facilitation of research and innovation processes' as an important outcome *vs.* 'establishing a collaborative digital culture within the company' as an important practice.

The results are shown in **Tables 5.38** and **5.39,** and in **Figure 5.25.** As shown in **Table 5.39,** the p-value of Fischer's exact test is 0.000<0.05, which indicates that the two variables are not independent. In order to see if there is also a linear association between the two variables, one

Table 5.37: Chi-Square Tests for Table 5.36

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	35,645[a]	12	,000	,000		
Likelihood Ratio	39,027	12	,000	,000		
Fisher's Exact Test	32,232			,000		
Linear-by-Linear Association	19,636[b]	1	,000	,000	,000	,000
N of Valid Cases	60					

a. 16 cells (80,0%) have expected count less than 5. The minimum expected count is ,12.

b. The standardized statistic is 4,431.

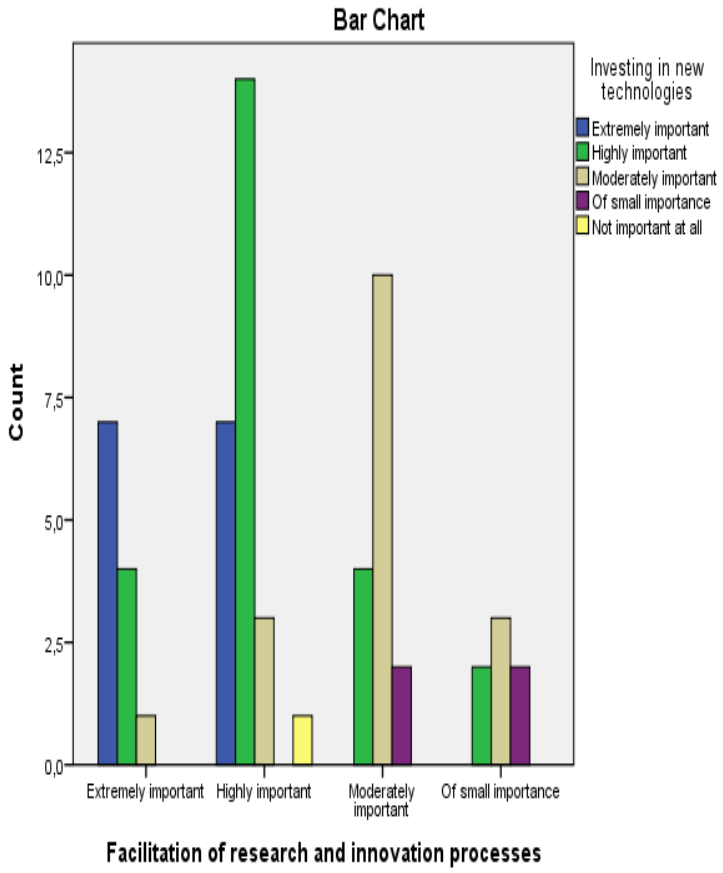

Figure 5.24: Graphic representation of the results of Table 5.36.

can look at the Linear by linear association p-value on **Table 5.39** which is 0.000<0.05 so there is a linear relationship between them.

Table 5.38: Facilitation of research and innovation processes * Establishing a collaborative digital culture within the company. Crosstabulation.

			Establishing a collaborative digital culture within the company				Total
			Extremely important	Highly important	Moderately important	Of small importance	
Facilitation of research and innovation processes	Extremely important	Count	9	3	0	0	12
		Expected Count	3,2	6,6	2,0	,2	12,0
		% within Establishing a collaborative digital culture within the company	56,2%	9,1%	0,0%	0,0%	20,0%
	Highly important	Count	4	19	2	0	25
		Expected Count	6,7	13,8	4,2	,4	25,0
		% within Establishing a collaborative digital culture within the company	25,0%	57,6%	20,0%	0,0%	41,7%
	Moderately important	Count	3	6	6	1	16
		Expected Count	4,3	8,8	2,7	,3	16,0
		% within Establishing a collaborative digital culture within the company	18,8%	18,2%	60,0%	100,0%	26,7%
	Of small importance	Count	0	5	2	0	7
		Expected Count	1,9	3,9	1,2	,1	7,0
		% within Establishing a collaborative digital culture within the company	0,0%	15,2%	20,0%	0,0%	11,7%
Total		Count	16	33	10	1	60
		Expected Count	16,0	33,0	10,0	1,0	60,0
		% within Establishing a collaborative digital culture within the company	100,0%	100,0%	100,0%	100,0%	100,0%

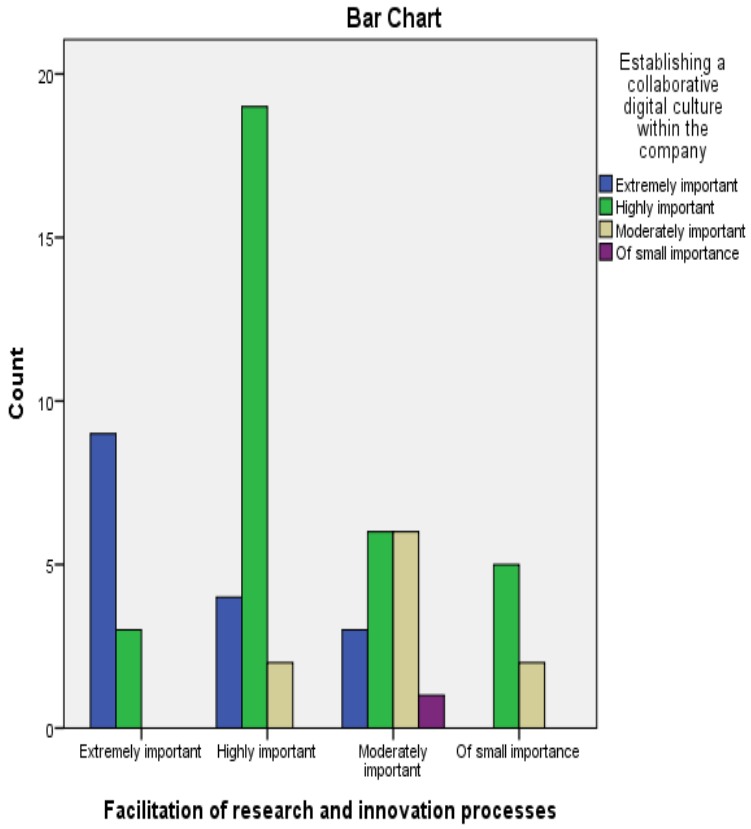

Figure 5.25: Graphic representation of the results of Table 5.38.

Table 5.39: Chi-Square Tests for Table 5.38.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	29,663[a]	9	,001	,000		
Likelihood Ratio	29,584	9	,001	,000		
Fisher's Exact Test	25,583			,000		
Linear-by-Linear Association	14,456[b]	1	,000	,000	,000	,000
N of Valid Cases	60					

a. 12 cells (75,0%) have expected count less than 5. The minimum expected count is ,12.

b. The standardized statistic is 3,802.

Table 5.40: Correlations between Q30, Q38, Q39 and Q42.

			Facilitation of research and innovation processes	Introducing digital features into products	Investing in new technologies	Establishing a collaborative digital culture within the company
Kendall's tau_b	Facilitation of research and innovation processes	Correlation Coefficient	1,000	,495**	,555**	,467**
		Sig. (2-tailed)	.	,000	,000	,000
		N	60	59	60	60
	Introducing digital features into products	Correlation Coefficient	,495**	1,000	,606**	,257*
		Sig. (2-tailed)	,000	.	,000	,024
		N	59	59	59	59
	Investing in new technologies	Correlation Coefficient	,555**	,606**	1,000	,233*
		Sig. (2-tailed)	,000	,000	.	,042
		N	60	59	60	60
	Establishing a collaborative digital culture within the company	Correlation Coefficient	,467**	,257*	,233*	1,000
		Sig. (2-tailed)	,000	,024	,042	.
		N	60	59	60	60
Spearman's rho	Facilitation of research and innovation processes	Correlation Coefficient	1,000	,554**	,629**	,519**
		Sig. (2-tailed)	.	,000	,000	,000
		N	60	59	60	60
	Introducing digital features into products	Correlation Coefficient	,554**	1,000	,681**	,304*
		Sig. (2-tailed)	,000	.	,000	,019
		N	59	59	59	59
	Investing in new technologies	Correlation Coefficient	,629**	,681**	1,000	,269*
		Sig. (2-tailed)	,000	,000	.	,038
		N	60	59	60	60
	Establishing a collaborative digital culture within the company	Correlation Coefficient	,519**	,304*	,269*	1,000
		Sig. (2-tailed)	,000	,019	,038	.
		N	60	59	60	60

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Having established that the importance of all three of the digital practices mentioned above has a linear relationship with the 'importance of facilitation of research and innovation processes as an outcome of a company's digital strategies', the Kendall's tau_b and Spearman's rho coefficients are used, as shown in **Table 5.40,** in order to determine the strength of each of these relationships. Among the three, a stronger linear relationship seems to exist between the practice of 'investing in new technologies' and the 'facilitation of research and innovation processes' as an important outcome, with a 0.555 value of Kendall's tau b coefficient and a 0.629 value of Spearman's rho coefficient (red entries in **Table 5.40)** .

Table 5.41: Improved decision making for senior executives * Implementing wider organizational changes to facilitate future digital strategies. Crosstabulation

			Implementing wider organizational changes to facilitate future digital strategies				Total
			Extremely important	Highly important	Moderately important	Of small importance	
Improved decision making for senior executives	Extremely important	Count	5	9	2	0	16
		Expected Count	2,7	9,1	3,7	,5	16,0
		% within Implementing wider organizational changes to facilitate future digital strategies	50,0%	26,5%	14,3%	0,0%	26,7%
	Highly important	Count	5	18	6	0	29
		Expected Count	4,8	16,4	6,8	1,0	29,0
		% within Implementing wider organizational changes to facilitate future digital strategies	50,0%	52,9%	42,9%	0,0%	48,3%
	Moderately important	Count	0	7	4	0	11
		Expected Count	1,8	6,2	2,6	,4	11,0
		% within Implementing wider organizational changes to facilitate future digital strategies	0,0%	20,6%	28,6%	0,0%	18,3%
	Of small importance	Count	0	0	2	2	4
		Expected Count	,7	2,3	,9	,1	4,0
		% within Implementing wider organizational changes to facilitate future digital strategies	0,0%	0,0%	14,3%	100,0%	6,7%
Total		Count	10	34	14	2	60
		Expected Count	10,0	34,0	14,0	2,0	60,0
		% within Implementing wider organizational changes to facilitate future digital strategies	100,0%	100,0%	100,0%	100,0%	100,0%

The second strongest relationship is between the practice of 'Introducing digital features into products' and the same outcome with a 0.495 value of Kendall's tau_b coefficient and a 0.554 value of Spearman's rho coefficient (blue entries in **Table 5.40**). The same applies for the third combination, but in this case the strength of the linear relationship is even lower. So, overall respondents who have ranked higher the importance of 'facilitation of research and innovation processes' as an outcome of a company's digital strategies, also tend to rank high the importance of 'investing in new technologies', 'introducing digital features into products' and 'establishing a collaborative digital culture within the company'. In other words, these last three digital practices are instrumental in achieving the goal of facilitation of research and innovation processes.

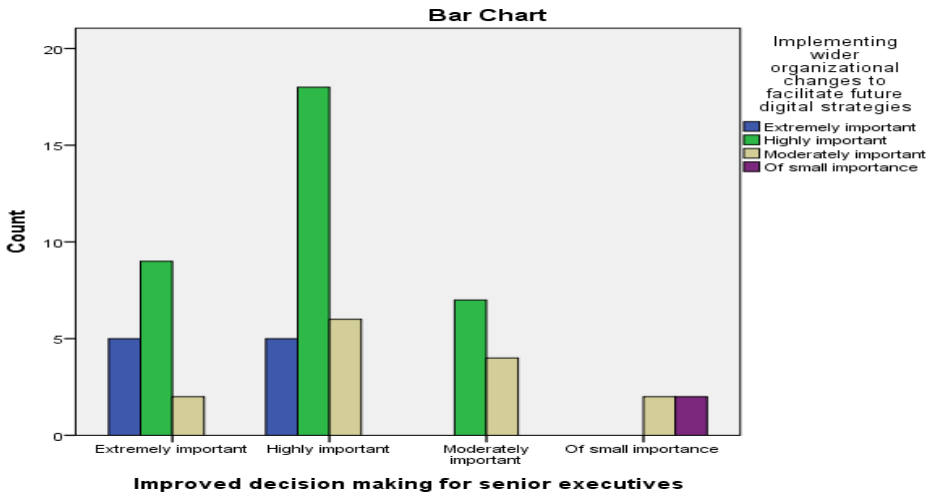

Figure 5.26: Graphic representation of the results of Table 5.41.

Table 5.42: Chi-Square Tests for Table 5.41.

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	37,969[a]	9	,000	,000		
Likelihood Ratio	24,885	9	,003	,003		
Fisher's Exact Test	18,786			,006		
Linear-by-Linear Association	15,399[b]	1	,000	,000	,000	,000
N of Valid Cases	60					

a. 12 cells (75,0%) have expected count less than 5. The minimum expected count is ,13.

b. The standardized statistic is 3,924.

Table 5.43: Correlations between Q31 and Q41.

			Improved decision making for senior executives	Implementing wider organizational changes to facilitate future digital strategies
Kendall's tau_b	Improved decision making for senior executives	Correlation Coefficient	1,000	,395**
		Sig. (2-tailed)	.	,001
		N	60	60
	Implementing wider organizational changes to facilitate future digital strategies	Correlation Coefficient	,395**	1,000
		Sig. (2-tailed)	,001	.
		N	60	60
Spearman's rho	Improved decision making for senior executives	Correlation Coefficient	1,000	,434**
		Sig. (2-tailed)	.	,001
		N	60	60
	Implementing wider organizational changes to facilitate future digital strategies	Correlation Coefficient	,434**	1,000
		Sig. (2-tailed)	,001	.
		N	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

Q31 with Q41: Improved decision making for senior executives as an important outcome *vs.* implementing wider organizational changes to facilitate future digital strategies as an important practice.

The results are shown in **Tables 5.41** ,**5.42** and **5.43**, and in **Figure 5.26.** As shown in **Table 5.42,** the p-value of Fischer's exact test is 0.006<0.05 which indicates that the two variables are not independent. One can also look at the Linear by linear association p-value on **Table 5.42** which is 0.000<0.05, so there is a linear relationship between them. The Kendall's tau_b and Spearman's rho coefficients in **Table 5.43**, which are 0.395 and 0.434 respectively (red entries), signify a moderately strong positive relationship between the two variables. That is, the more important the respondents consider the 'Improved decision making for senior executives' as an outcome, the more important they tend to find 'Implementing wider organizational changes to facilitate future digital strategies', as a practice.

6 Conclusions

In the last chapter of the present Thesis, a conclusive overview of the state of digital transformation adoption by the fashion industry is presented, based on the results of the on-line survey analyzed and discussed in **Chapter 5**. At first, the initially posed key questions in **Chapter 1** are addressed, as presenting answers to these questions constitutes the objective of the Thesis. This discussion leads to more general conclusions that are subsequently presented. The level of accordance between the tentatively drawn conclusions from the search in the relevant sources in **Chapter 4**, which led to the proposed hypotheses in **Subsection 5.1.4,** and the actual information taken from the survey is examined, whereby an evaluation of the chosen research approach is made. Finally, some suggestions for further study will be made, with an aim to overcome the constraints of the present Thesis outlined in **Chapter 1**.

6.1 Addressing the Objectives

The questions the present Thesis aspired to answer include: the current level of adoption of digital transformation by fashion companies, the challenges this process presents, the potential benefits arising for the companies, as well as the practices and technologies that play an instrumental role throughout this process. In the following, the answers given to the above questions by the survey results, as derived in **Chapter 5**, are summarized.

To begin with, it seems that even though fashion companies have begun to adopt digital transformation as an important part of their strategies, this adoption remains at an early stage. In the case of most fashion companies, their digital strategies are either in a development stage or count a few years of implementation. Therefore, it cannot be said that the fashion industry is one of the most advanced industries in terms of digital transformation, especially if it is compared with other industries like automobile or telecommunications. Of course, great differences can be observed between the level of adoption between fashion companies and the way they adapt to digital reality, but overall it can be said that the industry is at the beginning of being digitally transformed.

The main challenges for companies throughout this process are both of a practical and a cultural nature, with the lack of an overall strategy and an organizational resistance to change being the most important ones. Other challenges include security concerns and issues, as well as the organizational structure of the companies trying to implement digital strategies. Finally, the lack of technical skills by the current employees and budget constraints can make the process of digital transformation even harder for the companies. On the other hand, if the above barriers can be overcome, digital transformation presents a number of benefits for fashion companies, as demonstrated by the survey results. The observed benefits can be found in all areas of a company's operations, including productivity, research and innovation processes and customer

satisfaction, but above all it is related to the information availability to decision makers, which digital transformation has significantly facilitated. It becomes clear that digital transformation is not a general concept that only sounds good in theory, but can also actually produce results and be beneficial for the companies and in this case those that operate in the fashion industry.

The final comment is about the last of the above posed questions, concerning the most important digital technologies and practices for fashion companies, that is the technologies and practices that were chosen by fashion executives themselves as being of more importance in their companies' digital strategies. Social media and Big data analytics seem to be the most important technologies for fashion companies with Cloud computing, Artificial Intelligence and Internet of Things being considered of a significant importance as well. Blockchain technology, Virtual and Augmented Reality and Process automation do not appear to be as important even though that does not mean there are no applications for them within the fashion industry. As most important and instrumental practices throughout the process of digital transformation the omni-chanelling and providing customers with an experience rather than just a product stand out. Other fundamental digital practices include data availability and sharing, along with maintaining a strong social media presence and establishing a collaborative digital culture within the company. The facilitation of future strategies seems to be also a preoccupation for fashion companies, as implementing wide organizational changes for that purpose is another practice considered of significant importance. On the other hand, investment in new technologies and product digitization do not seem to be included in the fashion companies' list of priorities, even though they do exist as part of certain fashion companies' digital strategies. Finally, preserving the brand name was rated as of the utmost importance by almost all of the respondents.

6.2 Overall comments

Considering the answers produced by the survey results to the initial questions of this Thesis, a new question that arises is: What conclusions can be drawn from them? The first one is that fashion companies seem to be aware of the importance of digital transformation and are taking steps into incorporating it to their operations. Nevertheless, these steps are happening at a rather slow pace and it appears that this incorporation happens at a greater extent in certain functions of a company as opposed to others. Having set the satisfaction of the customer as the ultimate goal, fashion companies seem to plan their digital strategies exclusively around this goal. Therefore, digital transformation can be mainly observed in sectors revolving around the companies' relationship with the customers, like sales and marketing and digital technologies are used in order to enhance the overall shopping experience of the fashion customers. On the other hand, the digitization of manufacturing and supply processes, which do not include an immediate relation with the customer, does not seem to be a priority for most fashion companies. Even less attention seems to be given to research and innovation processes and the integration of digital transformation within them. It, therefore, becomes obvious that most

fashion companies have not succeeded in fully and equally integrating digital transformation in their strategy, but selectively apply it on specific operations and sectors. This conclusion can be verified by the practices, technologies and desired outcomes that the survey respondents ranked as more important. Furthermore, mentality reasons appear to be an important barrier in the successful implementation of digital strategies. A certain cultural resistance to change can be observed, which, combined with a lack of organization and consistence in the digital strategy, can cause bigger difficulties for the fashion companies than any practical constraints. The lack of an overall approach though does not limit itself among sectors and operations, but among people as well. So far, the forming of digital strategies is responsibility of certain people within the companies, usually of a higher management level and there is not enough involvement and acceptance from the total of a company's human capital. All of the above indicate that most fashion companies have not yet made digital transformation an indispensable part of their philosophy and strategy. This constitutes the main conclusion of this Thesis and is graphically summarized in **Figure 6.1.** There is still plenty of room for improvement and evolution and many opportunities that can be taken advantage of from the fashion companies, in terms of digital transformation.

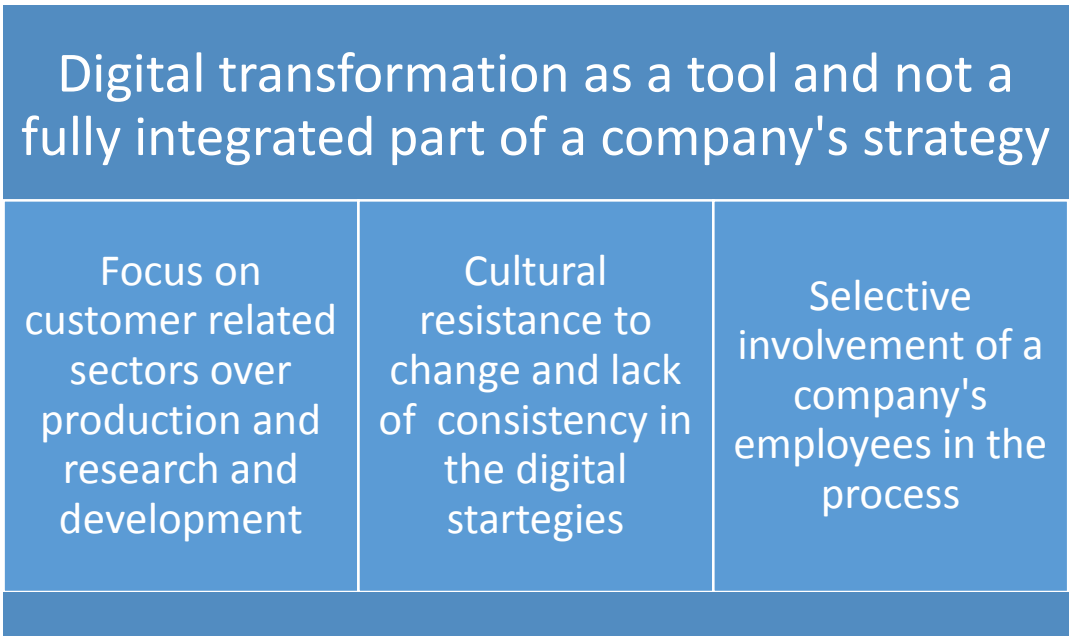

Figure 6.1: Summary of the main Thesis conclusions.

Another set of conclusions that can be drawn from the on-line survey originates from the observed correlations (**Subsection 5.2.3**) . Firstly, certain goals of a company's digital strategy are related with specific digital practices. For example, the goal of increased customer service and satisfaction is strongly related with the practice of providing customers with an experience rather than just a product, while the goal of facilitation of research and innovation processes is related with practices such as investing in new technologies and product digitization. Therefore,

it can be said that different digital practices are being implemented in order to achieve different objectives of a fashion company's digital strategy. Furthermore, the different level of digital transformation adoption by fashion companies cannot be strongly linked to their size, subsector or years of existence. It is more a question of a company's philosophy and the attitude of its leaders against digital transformation. Overall, it seems that most fashion companies share the same objectives, value the same technologies and face the same problems in implementing their digital strategies, regardless of the subsector of the fashion industry within which they operate.

6.3 Method evaluation

Having outlined the main conclusions of the on-line survey regarding the state of digital transformation in the fashion industry, the next step is to examine whether these conclusions align with the tentative ones, presented in **Chapter 4** based on the literature search on the subject. Overall, there seems to be a close correspondence, with the customer-centric approach of digital strategies and the limited experimentation and innovation practices being prominent in both cases. Furthermore, the importance of brand protection and the main barriers in the implementation of digital strategies constituted common ground between the two sets of conclusions. However, the presumed increased hesitation of luxury goods companies towards digital transformation, was not verified by the survey. The same applies for the importance of personalized products, which according to the literature search is quite big, an observation that did not totally align with the survey results.

Regarding the specific hypotheses that were formulated and subsequently tested by the survey the results were mixed. On one hand, the first two hypotheses **H1** and **H2** regarding the most important digital technologies (Social media and Big Data) and the most desired outcome for digital strategies (Customer satisfaction) were verified and so was the hypothesis **H5** regarding a correlation between the stage of implementation of a company's digital strategy and the effectiveness of that strategy. However, the relationship between the latter two variables was not further proved to be of a linear nature. On the other hand, hypotheses **H3** and **H4** were not verified, that is there was no evidence that older companies have a higher resistance to change compared to younger ones or that bigger companies have a greater issue with organizational structure as opposed to smaller ones. The above result however can be explained by the fact that there were great inequalities between the sizes and the years of existence of the companies in which the survey respondents work, thus making the respective questions inappropriate for correlation tests. More than half of the respondents came from large companies with more than a fifty-year presence in the industry.

Based on the above observations a critical overview of the chosen research approach can be made. In total, the choice of an on-line survey can be deemed efficient, as it generated results that were logical and significantly aligned with the literature. The objectives set in **Chapter 1** were fulfilled and a series of conclusions were drawn regarding the original research question.

The sample of the questionnaire was quite diverse and satisfactory in terms of size, taking into account the limited target group. It is obvious that a greater sample size and more representative of different subsectors and different company sizes could generate more reliable results, but' overall' the image of the fashion industry that it provided appears to be close to the actual one. Finally, the statistical analysis that was selected and applied, even though relatively simple, was found satisfactory and adequate for the purposes of this Thesis. It is evident that a more detailed and thorough statistical analysis could be applied, but it was not considered necessary.

6.4 Suggestions for further research

Referring to the constraints posed on the outset on the scope of this Thesis in **Section 1.2,** the approach to the subject of digital transformation is from a more holistic point of view and explores the key elements within it, without going into specific details regarding the exact ways the various digital technologies can be implemented in a company's operations. Further research can be focused on specific sectors of a fashion company and the ways digital evolution have transformed them. For example, one could explore the implications and possibilities for digital technologies exclusively in the manufacturing of fashion goods or in a fashion company's supply chain. Another possibility for research in this area can be e-commerce in the fashion industry and the ways digital evolution can transform and upgrade it. There can also be further research examining the effect of digital transformation in a specific subsector of the fashion industry like Beauty or Luxury Goods. It is evident that the possibilities are endless and as digital transformation increases its impact on the fashion industry, the opportunities for research will also increase. Digital transformation in fashion is just getting started and its evolution will be interesting to watch.

References

Accessories-United States. (2019, May). Retrieved from statista: https://www.statista.com/outlook/13000000/109/accessories/united-states

Apparel. (2019, may). Retrieved from Cambridge Dictionary: https://dictionary.cambridge.org/dictionary/english/apparel

apparel-worldwide. (2019, May). Retrieved from statista: https://www.statista.com/outlook/90000000/100/apparel/worldwide

Bardi, J. (2019, March 26). *What is virtual reality.* Retrieved from marxentlabs.com: https://www.marxentlabs.com/what-is-virtual-reality/

Behr, O. (2018). *Fashion_40_-_Digital_Innovation_in_the_Fashion_Industry.* Retrieved from www.researchgate.net: https://www.researchgate.net/publication/326263764_Fashion_40_-_Digital_Innovation_in_the_Fashion_Industry

big data analytics. (2019, september). Retrieved from ibm.com: https://www.ibm.com/analytics/hadoop/big-data-analytics

Charlton, G. (2017, June). *Five Examples of Personalization from Fashion Retailers*. Retrieved from blog.salecycle.com: https://blog.salecycle.com/post/five-examples-of-personalization-from-fashion-retailers/

cloud-computing. (2019, september). Retrieved from salesforce.com: https://www.salesforce.com/products/platform/best-practices/cloud-computing/

cosmetic industry. (2019, may). Retrieved from wikipedia: https://en.wikipedia.org/wiki/Cosmetic_industry

Cosmetics&Personal Care-United States. (2019, May). Retrieved from statista: https://www.statista.com/outlook/70000000/109/cosmetics-personal-care/united-states

Fashion accessory. (2019, may). Retrieved from wikipedia: https://en.wikipedia.org/wiki/Fashion_accessory

Fast fashion. (2019, May). Retrieved from Wikipedia: https://en.wikipedia.org/wiki/Fast_fashion

Fast Fashion Definition. (2019, April 22). Retrieved from Investopedia: https://www.investopedia.com/terms/f/fast-fashion.asp

Footwear-worldwide. (2019, May). Retrieved from statista: https://www.statista.com/outlook/11000000/100/footwear/worldwide

Get better night's sleep with Under Armour Athlete Recovery Sleepwear. (n.d.). Retrieved from hellovancity.com: http://www.hellovancity.com/lifestyle/get-better-sleep-with-under-armour-athlete-recovery-sleepwear/

Here's Your First Look at the H&M x Moschino Collection. (n.d.). Retrieved from preview: https://www.preview.ph/fashion/first-look-hm-moschino-collection-a00191-20181011

Here's Your First Look at the H&M x Moschino Collection. (n.d.). Retrieved from preview: https://www.preview.ph/fashion/first-look-hm-moschino-collection-a00191-20181011

Hudson, M. (2019, May 8). *What is Social Media*. Retrieved from thebalancesmb.com: https://www.thebalancesmb.com/what-is-social-media-2890301

John S. Major, V. S. (2018, december 20). *Fashion Industry*. Retrieved from Encyclopaedia Britannica: https://www.britannica.com/art/fashion-industry

Lay, R. (2019, July). *Digital transformation - the ultimate challenge for the fashion industry*. Retrieved from deloitte.com: https://www2.deloitte.com/ch/en/pages/consumer-industrial-products/articles/ultimate-challenge-fashion-industry-digital-age.html

Luxury Fashion-worldwide. (2019, may). Retrieved from statista: https://www.statista.com/outlook/21030000/100/luxury-fashion/worldwide

Maloney, C. C. (2019, february). *The Economic Impact of the Fashion Industry.* Retrieved from https://www.jec.senate.gov/public/_cache/files/39201d61-aec8-4458-80e8-2fe26ee8a31e/economic-impact-of-the-fashion-industry.pdf

McKinsey&Company. (2019). *The State of Fashion 2019.* Retrieved from McKinsey&Company: https://www.mckinsey.com/~/media/mckinsey/industries/retail/our%20insights/the%20state%20of%20fashion%202019%20a%20year%20of%20awakening/the-state-of-fashion-2019-final.ashx

MONMONOGRAM. (n.d.). Retrieved from Louisvuitton.com: https://us.louisvuitton.com/eng-us/stories/personalization-mon-monogram#

Morais, M. (2018, september). *digital-transformation-in-fashion-retail.* Retrieved from www.the-future-of-commerce.com: https://www.the-future-of-commerce.com/2018/09/21/digital-transformation-in-fashion-retail/

Okonkwo, U. (2007). What's in a name?The history of luxury fashion branding. In U. Okonkwo, *Luxury Fashion Branding.* New York: palgrave macmillan.

Paola Bertola, J. T. (2018). Fashion 4.0. Innovating fashion industry through digital transformation. *Research Journal of Textiles and Apparel, Vol22*, 352-369.

Raut, S. (2017, september). *digital-transformation-in-fashion.* Retrieved from simplified-analytics.blogspot.com: https://simplified-analytics.blogspot.com/2017/09/digital-transformation-in-fashion.html

RENT THE RUNWAY LAUNCHES NEW ACCESSORIES PLATFORM. (n.d.). Retrieved from fashionweekdaily.com: https://fashionweekdaily.com/rent-runway-launches-new-accessories-platform/

roberto-cavalli-home-interiors-naturalistic-chromatic-collection. (n.d.). Retrieved from covetedition.com: http://covetedition.com/inspirations/roberto-cavalli-home-interiors-naturalistic-chromatic-collection/

Rogers, D. L. (2016). *The Digital Transformation Playbook.* New York: Columbia University Press Publishers.

Rosic, A. (2016). *What is blockchain technology.* Retrieved from blockgeeks.com: https://blockgeeks.com/guides/what-is-blockchain-technology/

Rouse, M. (2016). *internetofthingsagenda.* Retrieved from techtarget.com: https://internetofthingsagenda.techtarget.com/definition/Internet-of-Things-IoT

Rouse, M. (2017). *searchenterpriseai*. Retrieved from techtarget.com: https://searchenterpriseai.techtarget.com/definition/AI-Artificial-Intelligence

Rouse, M. (2019, september). *searchbusinessanalytics*. Retrieved from techtarget.com: https://searchbusinessanalytics.techtarget.com/definition/big-data-analytics

Sleigh, S. (2018, september 13). *The UK fashion industry is worth £32 billion to the UK economy, says British Fashion Council CEO*. Retrieved from Evening Standard: https://www.standard.co.uk/fashion/uk-fashion-industry-32-billion-uk-economy-british-fashion-council-caroline-rush-a3934781.html

Stephenson, B. (2019, July 1). *The 8 Best Smart Clothes of 2019*. Retrieved from lifewire.com: https://www.lifewire.com/best-smart-clothes-4176104

What is digital transformation? (2019, May). Retrieved from ENTERPRISERS PROJECT: https://enterprisersproject.com/what-is-digital-transformation#q1

What is digital transformation? (2019, May). Retrieved from salesforce: https://www.salesforce.com/products/platform/what-is-digital-transformation/

Appendix I : Questionnaire

Digital transformation in the fashion industry – A Survey

Thank you for agreeing to participate in this study. Please let us know a few things about you and your company.

Question Title

1. **Which of the following best describes your area of work within your company?**

- ☐ Human Resources
- ☐ Marketing
- ☐ Sales
- ☐ Operations
- ☐ Strategy
- ☐ Product development
- ☐ Finance
- ☐ General Management
- ☐ IT
- ☐ Production
- ☐ Other (please specify)

Question Title

2. **Please select the management level that best describes your current position within the company.**

- ☐ Top Level
- ☐ Middle Level
- ☐ Supervisory / Operative Level
- ☐ Other (please specify)

Question Title

3. **In which segment of the fashion industry is your company primarily active?**

(By primarily active meaning the segment that presents the highest revenue percentage)

- ☐ Apparel / Footwear
- ☐ Accessories

- Beauty
- Luxury Goods

Question Title

4. **Please select the main item of your company's activity/specialization** (typically the one that produces the largest percentage of the company's revenue)

- Manufacturer / Producer
- Retail
- Industry specific Added Value Services (non IT)
- Industry specific IT services

Question Title

5. **To what extent, according to your opinion, are digital technologies transforming your industry?**

- A great deal
- A lot
- A moderate amount
- A little
- None at all

Question Title

6. **Which is your company's size (based on the number of employees)?**

- Very small (Headcount ≤ 20)
- Small (Headcount > 20 and ≤ 50)
- Medium (Headcount > 50 and ≤ 250)
- Large (Headcount > 250)

Question Title

7. **Which is your company's size (based on turnover)?**

- Very small (Turnover ≤ 2 M€)
- Small (Turnover > 2 M€ and ≤ 10 M€)
- Medium (Turnover >10 M€ and ≤ 50 M€)
- Large (Turnover > 50 M€)

Question Title

8. **How many years has your company been in business?**

- Less than 3 years
- 3 to 10 years
- 10 to 25 years
- 25 to 50 years
- More than 50 years

Question Title

9. **At what stage of implementation is your company's digital strategy?**

- Still under development
- Implemented for 1-3 years
- Implemented for more than 3 years
- I am not familiar with my company's digital strategy

Question Title

10. **How does your company implement digital initiatives?**

- Top down from a central senior management team
- Bottom up from teams of employees from each department
- Through a cross functional team responsible for the digital strategy
- Other (please specify)

Question Title

11. **How would you say your company's digital strategy compares to that of the competition?**

- Far above average
- Above average
- Average
- Below average
- Far below average

Question Title

12. **Have you personally been involved in a digital transformation project and from what position?**

- Yes, I was the project sponsor
- Yes, I was the leader of a team involved in the implementation
- Yes, I was an active member of an implementation team

- No, but I am familiar with at least one such project

Which technologies do you expect to affect more your company's digital strategy in the coming years and to what extent?

Question Title

13. **Social Media** (e.g. adopting a unified social technology for bringing together previously isolated teams or utilizing social network presence for improving insights into the customer journey and enhancing customer experience etc.).

- To a very great extent
- To a great extent
- To a moderate extent
- To a small extent
- Not at all

Question Title

14. **Cloud Computing** (e.g. moving a database to the cloud for improving security or reducing costs and capital tied to investments by adopting a metered usage of computing resources of a cloud infrastructure).

- To a very great extent
- To a great extent
- To a moderate extent
- To a small extent
- Not at all

Question Title

15. **Internet of Things (IoT) & Sensor Technologies** (e.g. creating new products or product lines based on smart fabrics with the use of embedded sensors or introducing combined sensor and mobile technology applications for providing added value services and enhance knowledge of customer preferences and behavior).

- To a very great extent
- To a great extent
- To a moderate extent
- To a small extent
- Not at all

Question Title

16. **Big Data & Data Analytics** (e.g. using data analytics for early identifying fashion trends, such as colors, fabrics or styles, and impose changes in the collection design or improve targeted and personalized marketing initiatives).

- ☐ To a very great extent
- ☐ To a great extent
- ☐ To a moderate extent
- ☐ To a small extent
- ☐ Not at all

Question Title

17. **Virtual & Augmented Reality** (e.g. using AR enhanced mobile applications for in store display and instant in app purchasing or supporting on line shopping through AR enhanced 'try before you buy' applications).

- ☐ To a very great extent
- ☐ To a great extent
- ☐ To a moderate extent
- ☐ To a small extent
- ☐ Not at all

Question Title

18. **Blockchain Technology** (e.g. using Blockchain technology for tracking and prove the authenticity of luxury and fashion items throughout their lifecycle).

- ☐ To a very great extent
- ☐ To a great extent
- ☐ To a moderate extent
- ☐ To a small extent
- ☐ Not at all

Question Title

19. **Process Automation** (e.g. digitizing the sampling process by combining 3D simulations of clothing with direct data transfer in virtual reality (VR) and augmented reality (AR) applications or introducing robotics in the production process).

- ☐ To a very great extent

- To a great extent
- To a moderate extent
- To a small extent
- Not at all

Question Title

20. **Artificial Intelligence** (e.g. using AI in clothes matching applications or applying machine learning techniques for core processes such as inventory management and forecasting).

- To a very great extent
- To a great extent
- To a moderate extent
- To a small extent
- Not at all

Which are the major barriers to implementing your digital strategy and how important are they according to your opinion?

Question Title

21. **Security concerns and issues**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

22. **Lack of an overall and consistent strategy**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

23. **Lack of technical skills**

- Extremely important

- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

24. **Organizational resistance to change**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

25. **Organizational structure**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

26. **Budget constraints**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

How important are the following outcomes for your company's digital strategy?

Question Title

27. **Cost savings**

- Extremely important
- Highly important
- Moderately important
- Of small importance

- Not important at all

Question Title

28. **Increased productivity**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

29. **Increased customer service and satisfaction**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

30. **Facilitation of research and innovation processes**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

31. **Improved decision making for senior executives**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

To what extent are the following practices important for your company's digital strategy?

Question Title

32. **Data availability and sharing across functions**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

33. **Providing customers with an experience rather than just a product**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

34. **Connecting digital and physical selling points (omni-channeling)**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

35. **Providing a high margin of personalization in your products**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

36. **Maintaining a strong social media presence**

- Extremely important
- Highly important

- Moderately important
- Of small importance
- Not important at all

Question Title

37. **Keeping your brand name and essence intact**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

38. **Introducing digital features into products (product digitization)**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

39. **Investing in new technologies**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

40. **Recruiting more digital savvy employees and consultants**

- Extremely important
- Highly important
- Moderately important
- Of small importance
- Not important at all

Question Title

41. **Implementing wider organizational changes to facilitate future digital strategies**

- ☐ Extremely important
- ☐ Highly important
- ☐ Moderately important
- ☐ Of small importance
- ☐ Not important at all

Question Title

42. **Establishing a collaborative digital culture within the company**

- ☐ Extremely important
- ☐ Highly important
- ☐ Moderately important
- ☐ Of small importance
- ☐ Not important at all

How much has your company been benefited by digital transformation in the following areas? *(In case your company hasn't implemented a digital strategy yet, please ignore the following questions)*

Question Title

43. **Customer satisfaction**

- ☐ A great deal
- ☐ A lot
- ☐ A moderate amount
- ☐ A little
- ☐ None at all

Question Title

44. **Productivity**

- ☐ A great deal
- ☐ A lot
- ☐ A moderate amount
- ☐ A little
- ☐ None at all

Question Title

45. **Information availability to decision makers**

- A great deal
- A lot
- A moderate amount
- A little
- None at all

Question Title

46. **Research and innovation processes**

- A great deal
- A lot
- A moderate amount
- A little
- None at all

47. **Overall how effective do you find your company's digital strategy so far?**

- Extremely effective
- Very effective
- Somewhat effective
- Not so effective
- Not at all effective