ARTIFICIAL INTELLIGENCE
A NEW ERA IN FASHION

Megan van Doorn
Fashion and Management
Amsterdam Fashion Institute

Graduation assignment
Research report
Amsterdam, June 2017
Research report

Megan van Doorn
500685757

Supervisors: Jorrit Lang and Sander Schellens

Amsterdam, June 2017

Amsterdam Fashion Institute
Fashion & Management
DISCLAIMER

1. This report represents the final part of my graduation project, aimed at attaining the title BSc. in Fashion and Textile Technologies from the Amsterdam University of Applied Sciences and has been written by me.

2. This research report has never been submitted before by me or anyone else in the framework of a learning assignment aimed at the attainment of a certificate or degree, within the AMFI program or elsewhere.

3. All the data collected in this report have been collected by me and are original.

4. All quotes from other sources are recognizable in the report by quotation marks and the sources are accessible at the end of this report.

Date: 19.06.2017
Place: Amsterdam
Name: Megan van Doorn
E-mail address: [...@...]
Phone number: 500685757
Student number: 
University of Applied Sciences: Amsterdam Fashion Institute, AMFI
Bachelor: Fashion and Management (Fashion and Textile Technologies)
Supervisors: Jorrit Lang and Sander Schellens
Signature:
This research report is written as part of the graduation assignment for the Bachelor in Fashion and Management at the Amsterdam Fashion Institute. The results of this report are conducted into guidelines for the implementation of artificially intelligent e-commerce solutions for luxury brands.

The report is a mixture of industry professionals’ views, theoretical research, and my own personal experience and knowledge that I have been collecting during the flexible program of my studies. It represents my way of thinking and my view on the industry that is evolving at fast pace.

During the process of this assignment, I have been guided by supervisors, Jorrit Lang and Sander Schellens, from AMFI, whom I would like to thank for their insights and advice. In addition, I would like to thank the professionals and interviewees that contributed to the content of this report, with your input this report exceeded my expectations.

Megan van Doorn, Amsterdam, June 19th 2017
STRUCTURE

Foreword p.4

Preface p.6

1.0 Introduction p.7
   1.1 Rationale p.7
   1.2 Aim p.8
   1.3 Methodology p.10

2.0 Artificially intelligent solutions in the luxury fashion e-commerce industry p.11
   2.1 Introduction of the high-end fashion industry p.11
   2.2 Disruption in luxury p.12
   2.3 The basis of Artificial Intelligence p.14
   2.4 Current AI applications p.17
   2.5 Sub-conclusion p.20

3.0 The barriers for implementing AI in the luxury fashion e-commerce industry based on the previous usage. p.23
   3.1 Technology implementation p.23
   3.2 Branding from physical stores to an e-commerce environment p.24
   3.3 Data availability p.24
   3.4 Available knowledge within an organization p.25
   3.5 Business case p.25
   3.6 Sub-conclusion p.25

4.0 Artificial intelligent solutions that are applied in other industries, but could be beneficial in the luxury fashion industry. p.27
   4.1 Introduction p.27
       4.1.1 The financial sector
       4.1.2 The health sector
       4.1.3 The hospitality sector
   4.2 Sub-conclusion p.29

5.0 The AI implementation funnel of a far advanced e-commerce organization p.30
   5.1 The implementation funnel p.30

6.0 Conclusion p.32

7.0 Afterword p.34

8.0 List of definitions p.35

9.0 Bibliography p.37
Prior to writing my final product, I have been part of the transformation of ByDanie’s online platform, did a short course in Online Business at University of the Arts London, and Luxury Management at the Institut Français de la Mode, and founded a company, Zazu, in artificial intelligence. Experiencing up close the new wave of technology that is revolutionizing the fashion industry, I learned the value of this knowledge and applications.
INTRODUCTION

1.1 Rationale

1.1.1 Emerging tech-solutions
In the past years, technology has drastically evolved, where Artificial Intelligence has set a major role. Not only can AI-systems generate and label data, they are now capable of making more accurate predictions. Worlds’ tech leaders, including Microsoft, and Google, are investing millions of dollars in AI* startups (Mercer, 2016).

*AI, or Artificial Intelligence; Usually defined as a computer system that is able to learn and perform operations that normally requires human intelligence.

1.1.2. Investment in fashion-tech
This knowledge-investing trend is entering fashion. Global e-commerce leaders, Net-A-Porter, and Asos understand this new climate and realize that fashion can no longer segregate from technology.

The aforementioned organizations partnered with fashion-tech accelerators to provide mature startups, specified in retail technology, with knowledge and business development support (Wayra UK, 2016). Thus, enables e-commerce organizations to facilitate high-end technologies that can be implemented in their systems ensuring an optimized retail experience.

With a net revenue of 1.7 billion dollars in 2015, Net-A-Porter has been exponentially growing since launching in 2000 (Yoox Net-A-Porter Group, 2016). Understanding their market very well, they have managed to become leading in online designer retail. However, many organizations in the high-end fashion industry are still conservative when it comes to technology and do not understand the emerging eco-system.

This phenomenon of conservatism in high-end fashion has undergone major changes. Just a decade ago it seemed unheard of that a luxury brand would sell online or be present on social media. Now, it is an evident part of their business model and you are able to purchase your $4000 Chanel bag with a simple click on their site.
1.1.3 The value of online marketing in relation with the consumer

Social media platforms are increasingly developing tools that easily connect brands and influencers to a mass-audience of consumers. Platforms including Facebook and Instagram ensure that promotion for brands can simply be launched and analyzed.

Instagram, acquired by Facebook in 2012 for $1 billion, is with over 600,000,000 monthly visitors the third most popular social media platform behind YouTube and Facebook (Mac, 2016). The platform has become compelling in the fashion industry and global brands, including Nike (69,400,000 followers on Instagram), and Chanel (18,100,000 followers on Instagram), are taking the real-time photo medium by storm to connect with their customers (Instagram, 2017).

L2, a business intelligence firm that benchmarks the digital performance of brands, published an overview of their top brands’ social media presence. Stating that with an increase of 23% since 2013, 98% of the top fashion brands are active on Instagram (Opperman, 2017).

Since Instagram launched an extended version of the tool “Instagram Stories” back in November 2016, brands and bloggers are able to directly forward their entourage to any link. Thus, enabling their followers’ easy access to their products, news posts, and even their e-commerce shops.

This form of technology is emerging at multiple platforms, including Facebook where it is now possible as a retailer to directly link products in campaigns. This proving that companies as Instagram and Facebook are aware of the value of these tools and that there is a growing demand for tailor-made experiences within e-commerce businesses, and social media.

Due to the enormous range of opportunities and possibilities that are available for applying AI in e-commerce, it is difficult as a brand to get an overview of the possible technological applications. Present day, there is not an institution or expert that sets a standard for applying AI in fashion.

1.2 Aim

The goal of this paper is to construct guidelines for implementing AI in the luxury fashion e-commerce industry. These guidelines will aid the luxury fashion brands in implementing AI to closely connect with their targeted audience and guide them in this new visual language. The research question is as follows: “What are the guidelines for implementing AI in the
To give the answer to the main question, the undermentioned sub-questions will elaborate the research goal.

1.2.1 Sub-questions

1. Which AI-solutions are currently used within the luxury fashion e-commerce industry?
2. Which learning can be made from previous AI usage in the luxury fashion industry to understand the barriers to implementing AI?
3. Which Artificial Intelligent solutions are already there, but are not being utilized in the fashion industry?
4. What is the implementation funnel for applying AI solutions in a far advanced e-commerce organization?
This research finds its foundation from my personal experiences and is written to persuade luxury brands to embrace the new digital language that can boost their organization.

In order to get an understanding of the luxury fashion industry, I consulted my personal notes of conversations with industry professionals, working, amongst others, at Louis Vuitton, Balenciaga, and Vogue. To elaborate these perspectives, there is an explanatory literature research that underlines the principles of the luxury market. These principles constitute the foundation of the guidelines. Due to the early stage and actuality of the topic, the sources are an interaction between interviews, online research, and conversations with industry experts. This is translated into my personal vision that I conducted based on past experiences.

The first chapter enumerates the most common applications of AI-solutions in the luxury fashion industry. These are selected based on the result of my benchmark between luxury e-commerce platforms, with gathered data that mainly derives from online research.

To construct guidelines for the implementation of AI in organizations, I researched the barriers to entry that occur during this process. In order to gain insight into these barriers, I spoke to a data scientist at Bol.com and intrapreneurs from Ernst and Young, both responsible for AI implementation, and conducted online research into companies that have been precursors in adopting new technologies.

In chapter three, I display AI-solutions from different industries to form a vision of the possibilities that could be constructed in the luxury fashion industry. The applications are based on literature research and conversations with developers of solutions in these industries.

To understand the process behind AI implementation in organizations, I identified the steps that are being made at Netherlands’ biggest e-commerce platform, Bol.com. This allowed me to determine the basis of an implementation funnel that applies to any e-commerce organization.

The combination of research into the high-end fashion industry and the possibilities in AI-solutions allowed me to construct guidelines for the implementation of AI at luxury brands. Based on this I am able to consult luxury brands in their transition to data-driven structures.
RESEARCH QUESTION 1

Artificially intelligent solutions in the luxury fashion e-commerce industry.

2.1 Introduction to the high-end fashion industry

The high-end* fashion industry has many faces and does not let itself define by a period of time. Luxury has evolved over the years since its existence, yet stayed the same in its essence. High-end, described by the Oxford Dictionary as “Denoting the most expensive of a range of products” (Oxford Dictionaries, 2017), has built an image and focus around “luxurious” consumerism that takes shape in the experience and quality of goods.

*High-end, /ˈhī-ˈend/ adj. appealing to sophisticated and discerning customers. (American Heritage Dictionary, 2016)

The term luxury traces back as far as the Roman Empire and defines to possessing expensive or more superior goods than the person next door (Thomas, 2014). It is often lineated to status and demonstrating the welfare of oneself towards other.

Fashion and luxury are two concepts that are seen as inseparable because in contradiction to clothing, fashion does not have a well-defined function other than self-expression. Hence, it has evolved in high-end concepts and leaders that ensure that pay-willing consumers are treated with finesse.

Thus, the discussion around technology in luxury goods has been raising questions and opponents since the rise of e-commerce. The consideration, if online retailing is luxurious exclaimed question marks with industry leaders. Even in 2013, when the retail industry was well aware and using e-commerce channels exponentially, Bruno Pavlovksy, Chanel’s global director of fashion, expressed criticism and stated that “Fashion is about clothing, and clothing you need to see, to feel, to understand.” (Milnes, How 2 high-end brands balance luxury with e-commerce, 2015)

E-commerce, in contrary, represents easy access to clothing anywhere, anytime. Whereas luxury experiences often entail a prolonged visitation in one of the luxury houses’ boutiques. Aforementioned houses have always ensured a tailor-made experience for each individual
customer. With the concept of e-commerce, high-street brands, and retail chains are enabled to provide a similar experience for their mass-audience.

There are often regulations that are implemented in high-end experiences, and this is in contrast with selling online. The market is more challenging than “mainstream” retail, for that the need of this specific client outweighs a particular expectation.

Hence, although e-commerce has been driving fashion for a long time, it has not been as self-evident in the luxury segment for its unwillingness to innovate. However, established industry names, including Michael Kors, Burberry, and Hermès, are precursors on maintaining a luxury experience within e-commerce (Milnes, How 2 high-end brands balance luxury with e-commerce, 2015).

Michael Kors has vertically integrated their online activities with their physical stores, creating a digital environment around the brand. This resulting in their overall e-commerce sales accounting for 7 percent of North American Sales according to CEO John Idol (Milnes, How 2 high-end brands balance luxury with e-commerce, 2015). For Burberry, and Hermès the ditto strategic movement applies, and proves that luxury is experiencing a digital transition.

According to president and CEO of Bruce Mau Design, Hunter Tura, it is challenging to pull off luxury in a digital context. “The keys to luxury are personalization, authenticity, and the feel of materials.” (Milnes, How 2 high-end brands balance luxury with e-commerce, 2015) To mimic this in a digital setting it is therefore considerable that the houses create an experience in the extension of their existing aesthetics.

2.2 Disruption in luxury

The high-end fashion industry is facing a disruptive motion with innovations, in terms of technology, that changes the way of purchasing goods. Global industry leaders are increasingly delving the companies in the transition towards a new visual language that is taking place online.

The world of e-commerce, however, is already taking booming measures to change the way consumers experience and purchase. E-commerce giants, as Alibaba, are being shaped by progressive leaders as Jack Ma, whose vision is to establish global retailing. Alibaba providing a platform for small businesses ensures opportunities for SME-entrepreneurs to
offer their products to a truly global audience. This all driven by advanced technologies that merge buying, financing, and delivering (O'Connor, 2017).

The biggest e-commerce company is determined to reduce trade barriers and boost the fortunes of small businesses. Ma immediately reinforces his word with the promise to the President of the United States of America, Donald Trump, to realize one million new job opportunities in the US (O'Connor, 2017). These political and business developments are characteristics and forecasts for the future of e-commerce and open a whole new market.

Alibaba’s subsidiary Tmall, the high-end site for established retailers, is already moving in the e-commerce scene (O'Connor, 2017). The fact that they are gaining market share in the high-end segment significantly shows that the competition pool increases and the supply becomes more broaden for the consumer.

The emerging accessibility to luxury goods results in an increase of upcoming brands that identify as high-end. In addition, the established order is shaken by the rule breaking generation of online influencers that is less appreciative of clothing etiquette. The question remains how high-end brands are going to anticipate to that to stay relevant.

Although there is an opposition against digitalization in high-end fashion, there are also proponents who disrupted the industry of luxury. Natalie Massenet, the founder of Net-A-Porter, was one of the first visionaries that understood the need for accessibility in buying high-end garments on an e-commerce basis (England, 2015).

LVMH, the Moet Hennessy Louis Vuitton group, that facilitates names as Loewe, Louis Vuitton, Dior, and Kenzo in their portfolio, announced beginning 2017 the launch of an e-commerce platform that will market their brands, and competing names. The Financial Times reported on March 17 that LVMH will adopt this strategy to compete with online platforms, including Net-A-Porter, and Farfetch (Harriet Agnew, 2017).

The appointment of Ian Rogers, responsible for the creation of Apple’s online radio station, in 2015 as Chief Digital Officer at LVMH (Harriet Agnew, 2017) suggests that the worlds’ largest luxury goods company is well aware of the importance of digital transition.

In addition, Exane BNP Paribas analysts stated that customers who purchase both online and offline are more likely to spend 50 percent more than customers who only visit physical
stores (Harriet Agnew, 2017). This given shows that the online strategy strengthens the offline sales, and it will be inevitable to implement a tailor-made e-commerce strategy.

The importance of innovating within e-commerce is evidently visible in the rising figures of consummation online, worldwide. India, an emerging economy, has an online market of $7 billion and is forecasted to multiply 4 times by 2020 according to Facebook (Cher, 2017). New markets are quickly arising because of technological developments, and globalization becomes more likely because of the digital influence that is spreading in countries as China, and India.

To reach an adequate online presence, and to penetrate potential markets it is essential that companies who are aspiring sustainable e-commerce strategies are utilizing smart tools based on new technological developments in AI.

2.3 The basis of Artificial Intelligence
Artificial intelligence is the study and implementation of computer systems to perform perception and reasoning that normally requires human intelligence. The distinction between ‘normal’ tech and AI is that AI computer systems are able to perform tasks that are intelligence intensive and can only be performed with human intelligence, whereas ‘normal’ technology can only handle predefined scenarios and do not show any form of conscientiousness.

When talking about AI there is a distinction between several domains within perception and reasoning. Perception can be defined as any sensory impulse from the ‘real’ world. Recognition and understanding of visual impulses are contained within the field of computer vision. This specific domain focuses on turning pixel data into applicable knowledge such as a group of pixels representing the distinction between two objects. For example, as shown in figure 1 computer vision detects and recognizes, based on given data, the authenticity of items and can make the distinction with counterfeits.
Figure 1 illustrates the analysis of the computer vision system that translates pixel data into knowledge that can be used, for instance, to measure the authenticity of a product.

The domain that focuses on textual data is defined as natural language processing. Within this data, text is analyzed by a computer system and is given high-level understanding. This means that an AI computer system is able to read and understand the context of a specific text, for instance, a social media post. This can be applied to brands that are heavily influenced by social activity. The computer system can read a tweet and identify the sentiment behind the text.

No one is able to look into the future, but with machine learning, it is possible to make predictions that are of high accuracy. To do so, large bodies of historical data is required and analyzed for recurring patterns. These patterns can be used to predict a scenario that has not occurred before. Meaning, predicting for instance customer behavior can be and how that can be influenced to optimize revenue becomes more feasible. The computer system analyses the patterns and divide these into features and based on that computes a prediction.
As seen in figure 2 person A and B have distinctive characteristics. These characteristics are clustered and show differences between their buying behavior. Person C shows similar characteristics to person A and therefore can be categorized with the similar profile. Based on person A’s historical purchases, a selection of these items can be recommended to person C.
2.4 Current AI applications

Even though the fashion industry is not in the lead when it comes to technology, the most proceedings within fashion e-commerce are dominated by artificial intelligence. It is usually an unanswered question when consumers receive a targeted advertisement; the system behind it, all comes down to AI.

2.4.1 Data analysis
The current AI technologies that are implemented in e-commerce devices are often based on analyzing and predicting trends. Based on big data, and deep learning algorithms, computers can predict, analyze, and perform tasks such as the identification of specific objects in images (Abnett, 2016).

The various applications that are currently utilized in the fashion industry can be divided into different segments. The foremost appliance is to analyze gathered data to give insight into best-selling products and demographic preferences. This system is capable of making more accurate predictions for buying departments.

Through Natural Language Processing, a system that is able to extract data, such as time and location, from a human written text, a computer is able to match words or segments with certain images making it easier for a consumer to find their desired products and therefore contributes to a positive customer journey.

Big data, however, is an understanding that is only valuable when found the right application. Without a purpose for segmentation, the data is unserviceable and irrelevant to apply in an organization.

2.4.2 Tailor made services
Artificial intelligence, in comparison to traditional technology, is far more advanced when it comes to tailor-made experiences, and enables retailers to service each customer on an individual level. Thus, this ensures that even online luxury consumers can be approached based on their personal preferences. This occurs amongst others in the form of Chatbots and machine learning. A Chatbot is AI because there is no predefined storyline or flow of conversation. The Chatbot is able to interact as an actual person and sometimes fool a human being into thinking that it is an actual person.
The use of Chatbots on high-end e-commerce platforms is a visible trend that enables online retailers to provide a more personal experience, whilst being online. Chatbots are able to service a customer in real-time with providing answers to questions regarding uncertainties about the products, search options or service difficulties. Net-A-Porter, as high-end e-commerce platform is profoundly using the technology, ensuring their customers a faster and qualitative service (Net-a-Porter, 2017).

*Chatbots, a virtual messaging assistant that can answer questions and conduct suggestions in real-time.

Cosabella, a luxury lingerie brand, has collaborated with Emarsys to find artificial intelligent applications for their data. Resulting in optimizing the supply chain and efficiency in buying. Besides applying AI for their internal buying systems, they offer their customers tailored e-mails; advertisements, the improvement of product recommendations, and an individual e-commerce layout based on the actions of a consumer (Milnes, The future of AI in fashion, 2017). With the help of machine learning, retailers are able to understand the customer instead of a market and are able to reach the individual.

2.4.3. Computer Designing
The possibilities with data analysis are endless and continuously disrupting the way we interpret fashion. With the advent of data analysis in real time, computers are able to anticipate and deliver designs instantly.

In 2016, Marchesa and IBM presented the IBM Watson dress on Karolina Kurkova during the prestigious Met Gala at the Metropolitan Museum of Art in New-York. IBM’s Watson analyzed social media on publics’ statements and calculated matching hues based on the emotional consensus. The dress, extended with led lights, displayed the feelings and emotions in real time during the event (Colon, 2016). This application illustrates the creative possibilities, in contrast with production efficiency, and prediction of consumer behavior.

2.4.4 Blockchain
A particular young technology that is taking the artificial intelligent industry by storm is the concept of Blockchain. This technology enables retailers to correlate all facets of the supply chain in one system. Thus, eases the process of tracking and identifying goods. The Blockchain designates an entity to each product, and therefore the management of goods is more clear and efficient. The Blockchain records can track down the ownership of products, and identity, making it easier to battle counterfeits. This, especially in high-end houses, can prevent that illegal counterfeit sellers are deceiving consumers (Chiswick, 2017).
2.4.5 Voice search
Artificial intelligence can be applied to many aspects of the customer journey. Enhancing offline with online to expand the possibilities of experiencing as a consumer. Through voice search, the act of speaking to a device to get a research question, it is possible to facilitate a search in the form of a recommended product. Ted Baker utilized the app Voice Search, released by Google, to place targeted shopping windows and giving consumers recommendations for in-store products (Chiswick, 2017).

2.4.6 Fight against counterfeits
Many, however not accessible to the mass, desire the high-end industry. This in response has emerged a new industry of counterfeiting. The Internet has made it possible to deceive a wider audience that is interested in the purchase of a ‘designer’ good with the price tag of Primark. Artificial intelligent systems can analyze targeted ads promoting counterfeits on social media, and eliminate them to avoid illegal violations of intellectual-property (Chiswick, 2017).

2.3.7 Project Muze
As Marchesa teamed up with intrapreneurs from IBM, Zalando, one of the biggest online e-commerce retailers, collaborated with Google to create the digital design studio: Stinkdigital. With selected data and a system that is trained, based on machine learning, to design preferences, they developed an engine that can design 3D garments. The data input of influencers in combination with trends on Zalando and figures of Google results in garments that are predicting the trends (Sawers, 2016).

*Intrapreneur, someone who acts as an entrepreneur within an organization, by setting up initiatives that enhance the business.

2.4.8 Internet of Things
With the emerging arrival of IoT, it will be possible to track inventory and respond to consumer needs at high pace. IoT, or Internet of things, is the process of physical goods that are in relation with smart devices. Intel launched The Intel Responsive Retail Platform that enables retailers to monitor their data in real time and to process their inventory more efficiently, leading to higher sales and smarter placement of goods. Therefore the gap between the digital and physical retail will decrease. (Biswal, 2017)
2.5 Sub-conclusion

High-end goods are considered luxurious because you buy an experience. The luxurious experience characterizes personalization, tailored services, and authenticity. It is the belief of a ‘magical moment’, during a physical visit to a luxury boutique that seduces consumers to purchase a costly item based on the storytelling around the brand and the service treatment. Resulting in a gap between e-commerce and luxury brands.

The sale of luxury goods on e-commerce platforms received criticism because there is a conviction that a physical in-store luxury experience is impossible to re-enact in a digital environment. Although many luxury brands are reluctant in implementing new technologies, there are companies that are moving towards an online dimension that enhances the brand identity.

Despite the somewhat unwillingness from brands to innovate, there is a growing line in the transition to new digital surroundings. Therefore, the demand for knowledge on recreating an experience on e-commerce platforms with smart algorithms increases.

The advent of e-commerce forces high-end brands to learn to communicate in a new visual language as the online retail industry is moving at high paces. E-commerce giants strive towards a world of global retailing and ensure this movement by using advanced technologies that bind the systems within an organization, causing a technologic architecture that is structured to have an optimal outcome.

By opening global retail platforms, small luxury ventures are able to generate traction on a mass-scale. Resulting in a more extensive competitors pool for the established luxury brands. The e-commerce alternatives for high-end goods with physical store margins, are more flexible and thus, cheaper for the reason that they do not have to encounter store costs. This concludes that consumers facing more choices, and brands have to pull more efforts to maintain their competitive advantage.

Consumers, with the rise of e-commerce, are becoming more demanding and are setting higher expectations for brands. E-commerce offers the possibility to get easier access to luxury goods. An important advantage that e-commerce has in relation to offline retail is the speed with the purchase of items. This should be seen as an extra service for luxury customers who dislike the elongated process of an in-store purchase instead of a threat to the experience.
Conglomerates that are leading the luxury industry are anticipating on this demand of speed, by launching platforms to stay relevant in reaction to the fast moving developments. And with the attraction of tech experts in the fashion industry, it becomes evident that brands are aspiring to boost their online presence. In addition to the technological developments, there are emergent economies, including China and India that can lead to great business potential. These economies have accelerated rapidly and are being directed by technology. Herein it is essential to find adequate solutions that can appeal to these new markets.

The current AI-solutions on high-end e-commerce platforms are primarily based on the improvement of the customer experience, and the management of the supply chain. The solutions are mainly based on machine learning that can make predictions that result in a more accurate, faster, and individualistic organization.
IBM Watson X Marchesa dress at the MET-gala in New York
RESEARCH QUESTION 2

The barriers for implementing AI in the luxury fashion e-commerce industry based on the previous usage.

3.1 Technology implementation

When implementing AI in fashion there is a substantial amount of aspects that are crucial for a successful application. Naturally, there is the technological feasibility that has to be taken into account when aspiring AI implementation. However, there is an often forgotten concept that might be even more crucial for the high-end e-commerce industry. The behavior of the consumer has been a factor that pushed back technological developments. A technological concept might be fantastic when it comes to innovation, if the consumer does not anticipate, it will be meaningless to one’s business.

Fashion is not only seen as functional but is a representation of emotion. Therefore, when implementing AI it is essential to change the behaviors of consumers or anticipate on intuitive concepts that the consumers will immediately understand.

Diane von Furstenberg, high-end designer and known for her iconic wrap-dress, is a precursor in wearable technology. In 2013, Diane debuted her version of the Google Glass on the runway and got a negative response. Her philosophy to create a technological fashion item to be the standard was reciprocated with criticism. The wearable glass was according to Ray Edwards, Executive of HP New Ventures, not ‘appealing’ enough for daily use (Sedghi, 2014). Even though this is a one man’s opinion, the mass did not respond to the application, and the trend did not set foot on the ground. This can be partially explained by the cost of the wearable, somewhere around $1600 for a starter model. A wealthier consumer, rather than the mass audience can only afford this, meaning that it will not become mainstream, due to the fact that the mass needs to accept the wearable to become the ‘standard’.

The technology is present, however, this indicates that the barriers to implementing AI are partially explained in the unwillingness of consumers to adapt from the conservative idea that occurs when analyzing fashion.
3.2 Branding from physical stores to an e-commerce environment

A luxury brand has its status partly due to the storytelling behind the products or the name. The difficulty in having a strong brand identity is the translation to online. The commonly made mistake is that physical stores are seen as equals to a digital environment. The problem however in such is the story that stays the same but requires a different form of presenting (Barua, 2015).

The challenge that arises is to duplicate the feeling of exclusivity and luxury of a traditional tailored brick-and-mortar experience into an online e-commerce business. Coach, a luxury brand in leather goods and ready-to-wear, has turned their e-commerce platform into a luxurious digital environment that re-enacts the feeling that consumers desire when purchasing in a physical store. Coach inserts tailor-made real-time applications in their e-commerce platform such as informative films of the production process and a chat that enables customers to interact with personnel that is able to guide them throughout their purchase (Barua, 2015).

The barrier herein lies in the internal organizational culture and the mindset of luxury brands. A high-end brand must embrace innovation and build a different business model out of their e-commerce platform to ensure customers with a similar feel of luxury. Especially when consumers pay the price for the experience that comes along with a high-end brand it is important to focus and enhance online to offline. The pitfall is the emotion within luxury brands that is conservative; hence they are reluctant to implement new technologies to their business because of the image that is connected to a luxury experience.

3.3 Data availability

The concept of data faces two difficulties: 1. There is an overload of data without the tools or applications to get an output of the incoming data, and 2. There is a lack on data to get input for the desired outcome. Data can be extremely valuable to a high-end retailer since the outcome can predict, and track consumer needs and can conclude in a tailor-made experience. However the complexity of data analytics and applications can be underestimated (Barua, 2015).

Analyzing data to boost sales and predict trends is a common process in the fashion industry, however, this had to be done manually. Lack of data has played a huge part in the setback of data analytics when it comes to fashion e-commerce. With the emergent sources as Facebook,
and Instagram, it is possible to make predictions based on AI algorithms and there is data available that can get a more specific outcome to translate in buying, sales, and supply chain management strategies. The more data that is put in the machine learning system, the more accurate the system becomes.

Although the possibilities are endless when it comes to trend prediction with the input of data, Francesca Muston, head of retail at WGSN, argues that there will always need to be human intuition involved. Trends are based on consumer emotions, and although every data set is used, it is never possible to predict a trend with 100 percent accuracy (Murray, 2016).

3.4 Available knowledge within an organization

A much-forgotten danger when implementing technologies as AI in organizations is the lack of knowledge on smart solutions. The data scientist at Bol.com, The Netherlands’ biggest e-commerce platform, argues that there are many solutions, but are not being reported due to the expectation that it is not possible to find a technological implication (Bol.com, 2017).

3.5 Business case

Many organizations are struggling to appoint ownership of innovation and the execution of new technologies. Innovation is an ambiguous concept and can be translated into different perspectives and is therefore difficult to specify into a department. An appointed innovation manager that is testing AI applications is crucial for the success of an e-commerce platform; since it is built on technology.

Thus, concluding that the crucial barriers to implementing AI in the high-end e-commerce fashion industry are mainly based on the behaviors of the participants and the willingness of consumers to adapt to provided AI applications.

3.6 Sub-conclusion

Occurring barriers for implementing AI in a high-end organization can be divided into internal- and external factors. The challenge is to navigate the barriers in an aligned strategy that focuses on the organization as well as the consumers.

Emotions and behavior are crucial facets for the success of AI implementation. The desired solution is often realistic and feasible to build. However, the barrier for rolling out
applications is the need for educating and stimulating the employees and consumers to effectively use the solutions. In addition, tech-solutions are in most cases still costly, and therefore are not appealing the mass market. This results in a select group of consumers that uses applications and it is because of that, that the solution will not become an understanding in daily life.

Another internal barrier for implementation is the aversion that prevails against digital innovation in the high-end industry. Many luxury brands are fixated on the traditional concept of an experience and are therefore passive in the adaptation of innovative solutions. This aversion is not entirely for no reason; many brands have failed to recreate the feeling of the physical experience in a digital environment. It is often that the translation between offline and online is made properly, and the requirements can take great effort and investment. Organizationally speaking in many companies there is a lack of appointment for the ownership of innovation. Setting up such a department can become costly, and work intensive. Therefore, this could be seen as a barrier to organizations that do not prioritize innovation.

In addition, there is a select group that has knowledge on AI applications and opportunities. Meaning that unresolved issues are more likely to end up on a pile of work, whilst smart algorithms could have tackled these.
4.1 Introduction

There are countless AI applications that are resolving difficulties with smart AI algorithms across many industries. In respective to the fashion industry, AI is not an emergent technology. The banking sector has been applying AI to different facets all the way back to the 1950’s and is now applying it in regards to their customer relationships and for pattern recognition (Marous, 2017).

4.1.1 The financial sector
AI benefits the speeding process of their customer personalization and enables banks to communicate in real-time with clients. Customers that are willing to share their confidential information are now able to receive custom advice, offers, and tailored services. Virtual advisors, which are based on AI algorithms that analyze the data of customers, can service consumers with tailor-made recommendations of their wealth (Marous, 2017).

The front-end applications are mainly focused on the customer experience; however, the back-end applications ensure a more efficient working environment and retain this back to the front-end. The least obvious applications are woven into the organization and contribute to back office processing. Manual driven tasks are being automated by AI algorithms to increase the workforce productivity and to let employees focus on their core tasks (Marous, 2017).

4.1.2 The health sector
Artificial intelligence, within medical sciences, is disrupting the health sector tremendously when it comes to diagnoses and treatments, however, there is another form of AI that is improving healthcare. Customer experience does not only apply to luxury industries and is emerging in patient services (Jacobs, 2016).

A company called Sqoony developed interactive videos that eliminate the communication problem within organizations. Based on videos, documents, and photographs they are able to
increase the effectiveness of an organization and to improve the digital storytelling (Sqoony, 2017).

In an industry as the health sector this application results in a better service front for their patients, and clear appliance for employees. Fashion houses could apply this technology to inform and instruct their employees about new technological applications to create awareness and a more efficient environment.

4.1.3 The hospitality sector
A targeted advertisement of discounted flight tickets that pops up ‘randomly’ on a consumers’ social media page is not as random as it may seem. Behind this add runs a well thought-out system of custom travel software. The most common feature that is being supported by machine learning are the recommendation engines. With previous searches, a booking agency can make tailored recommendations based on your search request and preferences (Altexsoft, 2016).

Another application that is less visible to the consumer is the system that predicts fares and enables dynamic pricing for hospitality organizations. With data of previous fares and prices the AltexSoft data science team has developed a tool that is able to predict, based on trending facets as time and season, future prices, and fares with the help of machine learning (Altexsoft, 2016). This tool is for example, able to help consumers in predicting whenever the most beneficial time is to book a flight.

Travel assistants are no longer human entities but are replaced by smart AI systems that guide consumers with their travel itineraries. As aforementioned, the emerging Chatbots, that are able to perform requested task from consumers, are being installed as service employees across multiple industries. Instant messaging apps, including Facebook Messenger and Whatsapp, enable hotels and other hospitality organizations to get a closer connection to their customers with a lower level of costs. The Chatbots are giving custom advice and answers to the consumers’ questions without the costs and management of service employees. It offers big brands the possibility to communicate closely with a wide targeted audience, and a much more efficient customer service, resulting in a positive customer experience (Altexsoft, 2016).

A feature that is rolling out in the hospitality sector is optimized disruption management. Enabling travelers to be guided in inefficiencies that occur during travelling, such as delays or overbookings. Inconveniences during trips can be measured and predicted beforehand, thus making it easier to anticipated and change courses to spare time and money. The fashion
industry could use these systems to predict inconveniences for deliveries to customers, and for calculating unexpected errors, including risk management, and product damages.

The formula of having efficiency elaborates that time is key. To service consumers in real-time and with the speed that is required in present day, it is of essence that customer support is available within seconds. According to Qantas, the average time needed for manual services has an average of 15-20 minutes (Altexsoft, 2016), whereas an AI system can deliver answers in less than 30 seconds. Customer support tools could improve e-commerce tremendously with the mass questions that are gathered every single day.

4.2 Sub-conclusion

AI has been widely spread through almost all industries. Some of those industries have found valuable solutions that can be applicable to any industry to solve various difficulties. The banking sector has shown their ability to successfully implement AI throughout their organizations and has built strong applications for the personalisation of consumers. This focus on personalisation can be translated to the online luxury industry, where there is demand for a personal and individualistic approach. Besides having tailor-made customer services, they have a strong back-end system that automates manual tasks and can therefore, generate optimal productivity.

A less obvious sector, in relation to the fashion industry, is health care. However, health care has been applying AI-solutions to connect organizations and shorten the line of communication. This means that it becomes possible to manage all facets, in a high-end fashion organization, more closely to optimal outcomes regarding; buying, sales, marketing, and the supply chain.

The hospitality sector has applied solutions that are based on the experience of customers, and are designed to provide a seamless customer journey. The aforementioned hospitality applications are, especially for mimicking a luxury experience, is particularly suitable for the boots of an e-commerce platform. Applying these solutions will benefit the feeling of an online luxury environment.
Implementing artificial intelligence is a challenge in any organization and in the case of the luxury e-commerce industry it comes with the additional emotional aspect that needs to be taken into consideration. An implementation funnel is very personal to an organization and needs to be redesigned for every single case. However, there are basic steps that are crucial for any organization to be taken into account when aspiring AI applications.

These steps are constructed on the basis of the implementation funnel of e-commerce platform Bol.com and illustrate the iteration of actions that are taken within the organization.

1. Change of mindset
The first step in any organization is the change of mindset towards innovation. Ai-solutions will not succeed when there is no belief in potential and there is the misjudgement of the value of smart algorithms. Prioritizing the implementation of efficiency tools, based on artificial intelligence, can stimulate the progression of the internal culture.

2. Appoint owner of innovation
Within the organization, there is an appointed manager or department that has the ownership of innovation whose sole job is to align the business’ strategy with the technological applications. This department functions as the contact point for the organization, when facing difficulties with AI-solutions.

3. Compose data science department
Implementing AI is often led from the inside of the company to create a close connection with the organization, instead of external data science companies. This to ensure that the alignment between the strategy and implementation is executed flexible and at a fast pace.

4. Identify the demand for AI-solutions
The implementation process of a solution stems from the need or pain that occurs within an organization. These demands are being identified by various departments and are being presented to the owner of innovation, who consults on the feasibility of the desired solution.
Hence, it is important for the directory of a company to stimulate initiatives and intrapreneurship regarding AI-solutions to create an innovative environment.

5. The availability of resources
An organization supplies the innovation department with the right means to deliver optimal performances and to be able to build the solution. This applies for physical resources, including computers, servers, and software tools, as well as recourses that contribute to innovation project. Bol.com, an advanced implementer of AI, supports young professionals by providing them time to commit to a self-selected initiative.

6. Proof of Concept
The PoC, or Proof of Concept, is the outcome of an issue that needs to be resolved. The PoC represents the first phase, wherein the minimal viable product is being tested before a solution is released for general use within the organisation. The data scientists at Bol.com are experimenting with algorithms and software during the PoC, gather results and redesign the software and codes if necessary.

7. Product implementation
Once the PoC has proven to be workable, and is adjusted to the technological architecture of the organisation, it is being transmitted into the process of implementation. The role of data scientist, from this point on, entails the supervision and education of the solution regarding the adaption of the employees within the organisation. The team that is responsible for the implementation of the solution monitors the usage of the product, and supports where is necessary to achieve an optimal outcome.

8. Product maintenance and analysis
In the last stage, where the solution is fully implemented in the organisation, it is up to the end-users, at Bol.com the employees, to utilise the AI-solution for its purpose. The remaining tasks, for the data science department, consists out of monetizing the applications of the solution, eliminate any errors that occur, and analysing the gathered data for new input. (Bol.com, 2017)
CONCLUSION

There is something about a luxury purchase in physical stores that cannot be explained by facts. For one, it is the event and positive memory of finally buying their first Chanel bag, for the other it is the feeling of warmth and attention that ones receiving from highly trained sales assistants. Apart from the underlying reason for each individual consumer of purchasing luxury goods, there is an unstated presence of experience that remains the same in its essence.

The fundament of established high-end brands, lies in their identity and storytelling that has gained the status that it has today. The brands rely on the identity to create value and authenticity for their consumers, and it is therefore important to create an online surrounding where the customer experiences the same feeling as when they visit one of the exclusive boutiques.

The high-end e-commerce industry is in transition towards the creation of a new visual language, and is in search of the recreation of a luxury experience in a digital environment. Luxury brands have been reluctant in adopting smart solutions, because they want to provide their customers with qualitative content that do not detract the brand values. To mimic the feeling of a physical luxury experience, use should be made of artificially intelligent solutions that can manage this demand.

Artificial intelligence has made incremental developments in building applications, in the retail industry, which are designed to reform the way of purchasing goods. There is an increasing demand of consumers for the accessibility of luxury goods through e-commerce, and it is crucial for luxury brands to anticipate on this demand through applications that can boost the online presence of a brand to stay relevant in the current market.

For the implementation of AI within high-end e-commerce organisations there are a number of facets that need to be taken in consideration. The biggest hurdle that needs to be taken is the alteration of mind-set. The success of a solution correlates with the willingness and internal stimulation of an organisation to strive for a new online dimension of the brand.

The translation to digital should not consist out of the duplication of storytelling from the physical stores, but must be rewritten for the alignment of the online customer journey. In addition, organisations have to get an understanding of the emotions and behaviours that
come along with the purchase of luxury goods. Based on machine learning algorithms, it is possible for these organisations to identify the individual, and apply personal approaches. By gathering data of the behaviour of individuals, instead of groups or ‘tribes’, through the e-commerce platform, an AI solution can provide more accurate predictions on the purchasing pattern of an individual customer.

These predictions enhance many departments involved in the sale of a good. The data on individual preferences and behaviours can be analysed by data scientists, whom can find new applications for targeting customers. The AI-solutions can segment data, providing the marketing department with valuable information on their customers to adopt in the marketing strategy. In terms of sales, AI can recognize the preferences and behaviours and translate this into predictions for future purchases or favourable products. Thus, organisations can offer tailored recommendations, which lead to a higher conversion rates.

Artificially intelligent solutions on high-end e-commerce platforms should therefore be seen as the bridge between the online and offline luxury experience, and the barriers should be identified through an implementation funnel to construct a successful implementation.
AFTERWORD

The past few months have been revolving around this research report. The results that are presented in this report are elaborated in an article that guides luxury brands through the implementation of artificially intelligent solutions. This report represents the lessons I learned during my time at the Amsterdam Fashion Institute. It reflects the themes and methods that I have been applying throughout my study.

The process of writing this thesis has given me in-depth information on the industry where I would like to continue my career in and I am very proud of the results that I have presented in this report.

The initial plan for my research has shifted during these months due to the knowledge that I gained and the actuality of the topic. I am very keen that I was able to shape this project in such that the results are relevant to the industry and hopefully can contribute to a successful implementation.

During my time at AMFI I discovered my interest for technology and how this can enhance fashion. My other interest lies in the field of luxury, and these two facets have turned out to be complimentary towards each other. These two aspects came together in my article: Artificial intelligence in the luxury industry, which I have written as part of the graduation project.

In this afterword I would like to thank all that have been part of my journey at AMFI and that have guided me with the process of self-reflection. It is for you that I am able to continue my path with competent knowledge.

Megan van Doorn, Amsterdam, June 2017
LIST OF DEFINITIONS

**Artificial intelligence**: Artificial intelligence is the study and implementation of computer systems to perform perception and reasoning that normally requires human intelligence. The distinction between ‘normal’ tech and AI is that AI computer systems are able to perform tasks that are intelligence intensive and can only be performed with human intelligence, whereas ‘normal’ technology can only handle predefined scenarios and do not show any form of conscientiousness.

**Data**: data is information that computer systems use to compute a desired outcome. Data is usually in a format of numbers and facts

**Big data**: is the same as ‘normal’ data, but due to the volume and complexity is segmented differently. Usually big data is hard to label.

**Datasets**: are collections of data. These sets are used to supply machine learning algorithms with sufficient data to get the right application.

**E-commerce**: retailing online.

**Fashion-tech**: any technology that is used to enhance fashion related activities, for instance marketing applications.

**Accelerator**: an accelerator provides companies’ with the necessities to expand their business. This can be in the form of data, recourses or funding.

**Start-up**: a newly started venture.

**Business development**: The process of expanding your business trough new business opportunities which are in line with the strategy.

**Eco-system**: the eco-system represents the demographics and opportunities where a venture is penetrating. For instance, in Silicon Valley there is a good eco-system for startups, because there are resources such as network, investment and employees.

**Business intelligence**: Is the measurement of all activities within an organization. With business intelligence you can enhance your business by effectively measuring what the results are and applying a suitable strategy.

**High-end**: appealing to sophisticated and discerning customers. (American Heritage Dictionary, 2016)

**SME**: small and medium-sized enterprises.

**Portfolio**: is the collection of companies that are brought in under one organization. For instance the LVMH group, has Loewe and Louis Vuitton in its portfolio.

**Computer vision**: Perception can be defined as any sensory impulse from the ‘real’ world. Recognition and understanding of visual impulses are contained within the field of computer
This specific domain focuses on turning *pixel data* into applicable knowledge such as a group of pixels representing the distinction between two objects.

**Pixel data:** A pixel is a dot on your screen. Consisting of 'brightness values' in a group of three values worth from 0 to 255, for example, 128, 56, 193. In other words, RGB values. Pixel data is the RBG value at a specific pixel.

**Natural Language Processing:** The domain that focuses on textual data is defined as *natural language processing*. Within this data, text is analyzed by a computer system and is given high-level understanding. This means that an AI computer system is able to read and understand the context of a specific text, for instance, a social media post.

**Machine learning:** It is possible to make predictions that are of high accuracy. To do so, large bodies of historical data is required and analyzed for recurring patterns. These patterns can be used to predict a scenario that has not occurred before.

**Historical data:** data that is already collected in the past by computer systems.

**Chatbot:** A Chatbot is computer system that can conversate with human intelligence. There is no predefined storyline or flow of conversation. The Chatbot is able to interact as an actual person and sometimes fool a human being into thinking that it is an actual person.

**Blockchain:** This technology enables retailers to correlate all facets of the supply chain in one system. (Chiswick, 2017)

**Internet of Things:** IoT, or Internet of things, is the process of physical goods that are in relation with smart devices. IoT, or Internet of things, is the process of physical goods that are in relation with smart devices.

**Google Glass:** is an optical head-mounted display designed in the shape of a pair of eyeglasses. It was developed by X (previously Google X) with the mission of producing a ubiquitous computer. (Google)

**Wearable, wearable technology:** An electronic device that is integrated in an item that you are able to wear. For instance the Apple watch.

**Brick-and-mortar:** physical stores.

**Algorithm:** a set of rules and numbers that together is able to perform a task.
Bibliography


journalist-and-film-publicist-bob-l-rooney-and-british-model-barbara-jones-who-was-also-a-movie-stand-in-for-sophia-loren

Harriet Agnew, J. E. (2017, March 8). LVMH goes digital with all its brands under one luxury goods site. Retrieved April 4, 2017, from The Financial Times: https://www.ft.com/content/464b3de2-03cb-11e7-ace0-1ce02ef0def9


Murray, S. (2016, October 05). Data analytics is on trend with fashion houses. Retrieved May 22, 2017, from Financial Times: https://www.ft.com/content/621d20c0-7033-11e6-a0c9-1365ce54b926


Research report

Amsterdam Fashion Institute

Megan van Doorn
500685757

Amsterdam, June 2017

Graduation project:
Artificial intelligence in the luxury industry